Calculating gradient worksheet earth science



Full PDF PackageDownload Full PDF PackageThis PaperA short summary of this paper1 Full PDF related to this paperDownloadPDF Pack DUAL LANGUAGE PROGRAMME Form 5 04/11/2020 11:38 AMMATHEMATICSSDRIADNATEKOLASHMMENUELNUGKAIKSSMHRUKAISYALKAEMMNAEKIDDNNETERIANP RUKUN NEGARA Bahawasanya Negara Kita Malaysia mendukung cita-cita hendak; Mencapai perpaduan yang lebih erat dalam kalangan seluruh masyarakatnya; Memelihara satu cara hidup demokrasi; Mencipta satu cara hidup demokrasi; Mencipta satu cara hidup demokrasi; Mencipta satu masyarakatnya; Memelihara satu cara hidup demokrasi; Mencipta satu cara hidup demokrasi; Mencipta satu masyarakatnya; Memelihara satu cara hidup demokrasi; Mencipta satu cara hidup demokrasi; Mencipta satu cara hidup demokrasi; Mencipta satu masyarakatnya; Memelihara satu cara hidup demokrasi; Mencipta satu masyarakatnya; Memelihara satu cara hidup demokrasi; Mencipta satu masyarakatnya; Mencipta satu masyarakatnya; Memelihara satu cara hidup demokrasi; Mencipta satu masyarakatnya; Mencipta satu kebudayaannya yang kaya dan pelbagai corak;Membina satu masyarakat progresif yang akan menggunakan sains dan teknologi moden;MAKA KAMI, rakyat Malaysia, berikrar akan menumpukanseluruh tenaga dan usaha kami untuk mencapai cita-cita tersebut berdasarkan prinsip-prinsip yang berikut:KEPERCAYAAN KEPADA TUHAN KESETIAAN KEPADA RAJA DAN NEGARA KELUHURAN PERLEMBAGAAN KEDAULATAN UNDANG-UNDANG KESOPANAN DAN KESUSILAAN (Sumber: Jabatan Penerangan, Kementerian Komunikasi dan Multimedia Malaysia) KURIKULUM STANDARD SEKOLAH MENENGAHdual language programmeMATHEMATICSFORM 5authorsNg Seng How Neo Geok Kee Goh Jia HaurtranslatorsLee Chye Mei Chng Chern WeiEDItorsToh Shee Ying Nurshamimi binti JaafarDEsIGnErLim Ah HongIllustratorZaidi bin SabranPenerbitan Pelangi Sdn. Bhd.2020 ACKNOWLEDGEMENT The publishing of this textbook involves cooperation from various parties. Our wholehearted appreciation and gratitude go out to all the parties involved:• Committee members of Penyemakan Naskhah Sedia Kamera, Educational Resources and Technology Division, Ministry of Education Malaysia.• Committee members of Penyemakan Naskhah Sedia Kamera for Dual Language Programme, Educational Resources and Technology Division, Ministry of Education Malaysia.• Officers of the Educational Resources and Technology Division, Ministry of Education Malaysia.• Officers of the Educational Resources and Technology Division, Ministry of Education Malaysia.• Officers of the Educational Resources and Technology Division, Ministry of Education Malaysia.• Officers of the Educational Resources and Technology Division, Ministry of Education Malaysia.• Officers of the Educational Resources and Technology Division, Ministry of Educational Resources and Technology Division, Mi Resources and Technology Division, the Curriculum Development Division, and the English Language Teaching Centre, Ministry of Education Malaysia. • Chairperson and members of the Quality Control Panel. • Editorial Team and Production Team, especially the illustrator and designer. • International GeoGebra Institute • Freepik.com • Everyone who has been directly or indirectly involved in the publication of this book. 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Contents IntroductionSymbols and Formulaev vii12 17 26 CHAPTER 11.1 1.2 1.32.1 Matrices2.2 Basic Operation on Matrices2.2 Basic Operation Direct Variation Direct Variation Inverse Variation Combined Variation Chapter 2 Matrices2.2 Basic Operation on Matrices2.2 Basic Operation Of April 2 Chapter 3 Consumer Mathematics: Insurance 723.1 Risk and Insurance 723.1 Risk and Insurance 723.1 Risk and Insurance 74 CHAPTER 4 Consumer Mathematics: Taxation 944.1 Taxation 96 iii KPM CHAPTER 5Congruency, Enlargement and Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Combined Transformations 1726.1 The Value of Sine, Cosine and Tangent 174 for Angle θ , 0° < θ < 360°6.2 The Graphs of Sine, Cosine and Tangent 174 for Angle θ , 0° < θ < 360°6.2 The Graphs of Sine, Cosine and Tangent 133 5.3 Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Combined Transformations 1225.1 Congruency 124 5.2 Enlargement 133 5.3 Congruency 124 5.2 Enlargement 134 5.3 Congruency 124 5.3 Congrue Tangent 184 FunctionsMeasures of Dispersion for Grouped Data161 CHAPTER 6 7.1 Dispersion7.2 Measures of Dispersion7.2 Meas on Dokumen Standard Kurikulum dan Pentaksiran (DSKP). This book meets the aims of Kurikulum Standard Sekolah Menengah (KSSM) in applying mathematical knowledge and skills so that the pupils are able to deal with challenges of the 21st century. The structure of this book emphasises on HOTS, STEM, EMK and the use of digital technology focusing on Inquiry-based Learning approaches to stimulate pupils' mind and intellect to compete globally. This book has 8 chapters to be explored and each chapter consists of Stimulus Page, Content and Ending which highlight special features. STIMULUS PAGE What will you learn?Consists of the Content Standards of the chapter?Exposes pupils to the real-life and career related applications. Do you know?Displays the development of mathematics as well as the contribution of great mathematicians as an added knowledge to pupils. Word BankList of keywords to learn together with its translation in Bahasa Malaysia. CHAPTER 5 Congruency, Enlargement • Combined Transformation • TessellationWhy study this chapter? Astronomers use the telescope to observe the surface of a planet. The surface of the distant planet appears to be magnified through the telescope. However, the resulting image is inverted with its original object. Reflection is applied to get the actual picture. Do you know? Johannes Kepler (1571-1630) was a German mathematician and astronomer who had documented the study of tessellations in 1619. He used the concept of tessellation to explore and explain the structure of snowflakes. For more information:bit.do/DoYouKnowChap5 WORD BANK122KPMscale factor congruency similarity reflection enlargement rotation tessellation transformation transformatio ProjectTerengganu Drawbridge which is located in Kuala Terengganu is a new landmark for Terengganu in 2019. It is the longest drawbridge in the world with a length of 638 metres, connecting Kuala Terengganu and Kuala Nerus at the river mouth of Sungai Terengganu. The unique feature of the bridge is that it can be lifted in the centre to facilitate the passage of large ships beneath it. Observe the structure of the bridge. Which parts have congruent shapes? 123KPM MIND MOBILISATION Explains the learning concepts through the active involvement of pupils and encourages mathematical communication through discussion. Self Practice Enables pupils to apply the knowledge they have learnt to the problem in reality and present their outcomes during the lesson. Tests the understanding of the pupils on the concepts they have learnt. Indicates HOTS questions to test pupils' higher order thinking skills. v KPM CHAPTER 5 Info BulletinConsists of mathematical information as extra knowledge that related to the chapter. Helps pupils remember the formulae or concepts they have learnt. Explains the history related to the title as extra knowledge. Encourages fun mathematics learning. ENDINGS unmary ArenaConsists of relations between concepts in mind maps. Poses questions that stimulate pupils to check the answers. Provides effective and helpful tips or guides. Alternative MethodShows solutions using other methods. Shows the application of concepts learnt in real life and careers. Encourages discussion between teachers with pupils and pupils with pupils. Guides pupils in the use of technology in learning. - Technology Shows the knowledge related to the title and the development of Malaysia. Extensive Practice ReflectionHelps pupils gauge the level of mastery of the topics in the chapter. A summative assessment which consists of Understanding. vi KPM MEMORY BOXApplication & CareerInteractive PlatformChecking AnswerMathematicsis fun!Symbols and Formulae is equal to is not equ Premium rates in sine cos cosinetan tangent° degree minute (angle) sumx mean2 variance standard deviation PA Scale factor, $k = PA\Sigma fx 2 \leq f$ Face value of policy Premium = RMx 1 per RMx 2 = 1 Percentage of 2×1 Insurable value2 Area of object Mean, $-x = \Sigma fx
1 d-b A-1 = ad-bc3-c$ a4Guide to Access Digital Materials in This Book- -x2 Standard deviation, =- -x 25f Variance, 2 = 5 fx2 5f Download the free QR code scanning application to your smartphone. Scan the QR code or visit to access the digital materials such as:• Worksheets• GeoGebra files • VideosThen download the free QR code or visit to access the digital materials for offline use. Note: Pupils can download the free QR code scanning application to your smartphone. relevant file via KPM CHA1PTERWhat will you learn?• Direct Variation• Inverse Variation• the depth of the sea and the water pressure and others. Do you know? The symbol a was introduced by William Emerson (1701-1782), an English mathematician, in 1768 in his book, The Doctrine of Fluxions. Variation joint variation pemalar pemboleh ubah ubahan bergabung ubahan tercantum In scientific research, electricians conduct experiments to investigate the relation between two or more variables. For example, in an experiment on electric current, if the value of the current flowing through the circuit increases too and vice versa. In contrast, if the value of the resistance decreases, then the value of the current increases and vice versa. Do you know how the current (I), voltage (V) and resistance (R) relate to each other? I KPM 5 cups of rice for 10 servings. 10 cups of rice for 20 servings. MIND MOBILISATION 1Individual Aim: To explain the meaning of direct variation. Steps: 1. By browsing through the Bank Negara Malaysian Ringgit (RM) to Singapore Dollar (\$), Thailand Baht (B|) and Japanese Yen (¥). 2. By using the rate of currency exchange, calculate the following values of Malaysian Ringgit to Singapore Dollar, Thailand Baht and Japanese Yen. Malaysian Ringgit (RM) 10 20 30 40 50 Singapore Dollar (\$) Thailand Baht (B) Japanese Yen (¥) 1.1 Direct Variation? A chef needs to decide the amount of ingredients used increase, then the number of servings. If the ingredients used increase, then the number of servings of direct variation? increases. On the contrary, if the ingredients used decrease, then the number of servings decreases too. In our daily life, we often face situations that involve the relation of quantity changes. For example, the distance travelled and the taxi fare, the amount of interest earned over a period of time at a certain interest rate. 2KPMExplain the meaning of direct variation.CHAPTER 1 CHAPTER 1 CHAPTER 1 Variation Discussion:1. State the change(a) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four, (c) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgitdivides by four doubled,(d) to Singapore Dollar, Thailand Baht and Japanese Yen when Malaysian Ringgit decreases by 50%.2. What is the relation between the values of Singapore Dollar, Thailand Baht and Japanese Yen? The results of Mind Mobilisation 1 show that the change in the value of Malaysian Ringgit, RM corresponds to the change in the values of Singapore Dollar, \$, Thailand Baht, B| and Japanese Yen, ¥. The values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decreases when the values of \$, B| and ¥ decre the number of hours he works. State the change on(a) the total wage is halved.(b) The total wage is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(b) The total wage is halved.(c) The number of working hours is doubled.(c) The number of working hours is doubled.(c) The number of worki halved.Self Practice 1.1a1. The value of resistance if the temperature decreases by half,1 Direct variation explains the relation between two variables, such that when variabley increases, then variable x also increases at the same rate and vice versa. This relation can be written as y varies directly as x.Example (c) the temperature if the value of the resistance decreases by 4 .3KPM CHAPTER 1 Time (minutes) 5 10 15 20 25 Number of bottles 10 20 30 40 50 MIND MOBILISATION 2GroupDetermine the relation between two variables for a direct variation. Aim: To determine the relation between two variables for a direct variation. Steps: 1. Divide the class into six groups. 2. Each group chooses a type of rate from the list below. (a) Rate of taxi fare by distance(b) Rate of parking by hours(c) Rate of parking by hours(c) Rate of taxi fare by distance(b) Rate of taxi fare by distance(b) Rate of parking by hours(c) Rate of taxi fare by distance (b) Rate of taxi fare by distance(c) Rate of taxi fare by distance(b) Rate of taxi fare by distance(c) Rate of taxi fare by distance(b) Rate of tax of simple interest in savings per year3. By browsing the internet, get information on the chosen rate and complete the table as shown below. For example, the rate of taxi fare is RM1.20 per km.4. Draw the graph of y against x using a suitable scale based on the table.5. Answer the questions in Discussion.6. Present the results to the class. Distance travelled, x (km) 2 4 6 8 10 Fare, y (RM) y x 2.3. Puan Wardina buys(a) 500 g of green beans. The table below shows the relation between the time needed and the number of bottles of jam produced in a
factory. State the change in the number of bottles of jam produced when (a) the time is halved. What is the relation between two variables for a direct variation? 4KPMCHAPTER 1 yCHAPTER 1 yCHAPT x?The results of Mind Mobilisation 2 show that for a direct variable y varies directly as theyThe graph of y against x is a straightline that passes through the origin, (c) the variable x representing the horizontal axis. x In direct variation, quantity y is said to be varied directly as xvariable x.if and only if yx is a constant, known as the concept of proportion:Bulletin unchanged quantity value. Relation between the value of k and the gradient of a straight line passes through the origin: y y y y gradient, y m=y1 y11234 x x1 x2 x3 x4x1 =kOxxDoes every gradient value represent the value of proportionality, k? Discuss. The relation of direct variation written as 'x and y are directly as x' can also be written as 'x and y are directly as x' is true only if the straight line passes through the origin. When y varies directly as x, then the relation is written as y ~ x. From this relation, y varies directly as x can be written as y ~ x. From this relation, y varies directly as x can be written as y ~ x. KPMCHAPTER 1 MIND MOBILISATION 3Group Aim: To determine the relation between the variables y and x2 for a direct variation. Steps: 1. Given a circle with radius, x (cm)Area of circle, y (cm2)Square of radius, x2 (cm2)Cube of radius, x3 (cm3)y x2y x33.5 7.010.5 14.0 17.5 3. Draw the graph of y against x2 and the graph of y against x3 by using approximate values. Discussion:1. Compare the values of x2 and x3. What is the relation between variable y and variable x2? The results of Mind Mobilisation 3 show that for a direct variation, yy(a) the value of x2 is a constant. Hence, k = x2 (b) the graph of y against x2 is a straight line that passes through the origin, (c) variable x2. In general, For a direct variation, y varies directly as xn can be written asIn Mind Mobilisation 3, what is the relation between theyy Ox2 y ∝ xn (variation relation) y = kxn (equation form)where 1 1values of π and xy ? 2 3 andThe graph of y against xn is a straight line form) where k is the gradient of the straight line form) where the graph of y against xn is a straight line form) where k is the gradient of the straight line form) where the graph of y against xn is a straight line form) where k is the gradient of the straight line form) where the graph of y against xn is a straight line form) where the graph of y against xn i the toy car, y, changes with time, t, as shown in the table below.Determine whether y varies directly as t or t2. Hence, write the relation in the form of variation. Solution:CHAPTER 1 Variation Example Time, t (s)24681012 Distance, y (cm) 142842567084 When y = 3x2, y does not vary directly as x. Discuss. t 2 4 6 8 10 12 y 14 28 42 56 70 84 y t14 = 7228 = 7442 = 7656 = 7870 = 71084 = 712 y t2 14 = 3.50 22 28 = 1.75 42 42 = 1.17 62 56 = 0.88 82 70 = 0.70 102 84 = 0.58 122 y varies directly as t because the value of yt is a constant. Hence, y \propto t. y does not vary directly as t because the value of yt is a constant. A determine whether y varies directly as x.3 Example x 0.4 0.8 1.2 y 1.5 2.0 2.5 x 2 3 4 5 y 8 18 32 50 Solution:(b)(b)By drawing the graph of y against x2, determine whether y varies directly as x2.y50 40 30 20 100 5 10 15 20 25 x27he straight line passes through the origin. xHence, y does not vary directly as x.O0.2 0.4 0.6 0.8 1.0 1.2 Hence, y varies directly as x2.7KPM CHAPTER 1Interactive PlatformExample Example 4It is given m = 0.125. Express m in terms of n if (a) m varies directly as x?(i) y varies directly as n,(b) m varies directly as the cube root of n.In the graph of Example 3(a), why does y not vary directly as x?(i) y varies directly as the cube root of n.In the graph of Example 3(a), why does y not vary directly as x?(i) y varies directly as the cube root of n.In the graph of Example 4It is given m = 0.125. Express m in terms of n if (a) m varies directly as x?(i) y varies directly as x?(i) y varies directly as the cube root of n.In the graph of Example 3(a), why does y not vary directly as x?(i) y varies directly y varies directly as x?(i) y proportional to the force applied to stretch it, as long as it does not exceed the elastic limit. When y = 0.875, 0.875 = 0.7xx = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.875 = 0.875, 0.14 when x = 0.2, $x \propto w x = kw$ Write the relation in the form of equation. 3 = k(200) calculate the value of (a) y when x = 5, Solution: $y \propto xy = kx$ 0.14 = k(0.2)k = 0.7(5) = 3.5(b) Substitute the values of x and w into the equation to obtain the value of k. KPMCHAPTER 17 The area, L cm2, of a semicircle varies directly as the square of its diameter, d cm. It is given that the area of the semicircle is 3.08 cm 2 m 19.25. Solution: L $\propto d2L = kd2$ 3.08 = k(2.8)2k = 3.08 (2.8) 2 = 11 28When L = 19.25, 19.25 = 11 d22.8 cm 3.08 cm2d cm 19.25 cm2CHAPTER 1Variation Example Alternative Method: Using the concept of proportion: Given that L1 = 3.08, d1 = 2.8 and L2 = 19.25L1 (d1)2 = 3.08 = 2.82(d2)2 = d = 2 = L2 (d2)219.25 (d2) 219.25 × 2.82 3.0849 7 cm 28d2 = 19.25 × 28 11d = 49 = 7 cm8 Example The period of oscillation, A seconds, of a simple pendulum varies directly as the square root of the length of its string, p cm. It is given that the 9 cm string of a simple pendulum oscillates for 1.2 seconds. Calculate the period of oscillation in seconds, if the length of the string is 25 cm. Solution: A \approx pA = k p1.2 = k9 k = 1.29 = 0.4 Hence, A = 0.4p When p = 25, A = 0.425 = 2 seconds Alternative Method: Using the concept of proportion: Given that A1= 1.2, p1= 9 and p2= 25A1p pA2 9 251.2== 12A21.2 × 25A2 == 2 seconds 99KPM CHAPTER 1 x 1 2 3 4 5 y 2.5 5 7.5 10 12.5 x 4 9 25 36 49 y 0.6 0.9 1.5 1.8 2.1 Mass of load, x (g) Extension of spring, p (cm) Self Practice 1.1b1. The table below shows the values of two variables, x and y. (a) Determine whether y varies directly as x or x3. Then, write the relation in the form of variation.2. A load is hanging on a spring. The table on the right shows the mass of the load, x g, with the extension of the spring, p cm. By drawing the graph of p against x, determine whether p varies directly as x.3. It is given that p = 32 when q = 4. Express p in terms of q if (a) p varies directly as q3,(b) p varies directly as the square root of q.(b) Determine whether y varies directly as x or x. Then, write the relation. 4. The salary, RMx, obtained by a worker received RM112 after he worked for 14 hours. Write an equation that relates x and t.5. Given that y = 1.8 when x = 0.6, calculate the value of y when x = 5 if (a) $y \propto x(b)$ y
 $\propto x2.1$ 37. The number of words typed, a, by Saiful varies directly as the time he types, t minutes. If Saiful types 270 words in 6 minutes, t s on planet Q. Given that the object falls from the height of 5 m in 2 s, calculate the time taken in seconds, for the object to fall from a height of 45 m on the planet.9. It is given that the volume of the wall, d m2. If 3 litres of paint can paint 36 m2 of wall, (a) express the equation in terms of x and d, (b) calculate the volume of the paint in litres, needed to paint a wall of 9 m in heightand 5 m in width.106. It is given that s varies directly as t—. If s = 1.2 when t = 27, calculate the value of (a) s when t = 64, (b) t when s = 0.28. KPM5 10152530 12356CHAPTER 1What is the relation between three or more variables for a given joint variation? Simple interest, I = Prtwhere P = principalr = interest rate t = timeWhat is the relation of the variables P, r and t?Determine the relation between three or more variables for a given joint variation. CHAPTER 1Variation In Form 3, you have learnt the calculation for simple interest, I that involves P, r and t?Determine the relation between three or more variables for a given joint variation. CHAPTER 1Variation In Form 3, you have learnt the calculation for simple interest, I that involves P, r and t?Determine the relation between three or more variables for a given joint variation. CHAPTER 1Variation In Form 3, you have learnt the calculation for simple interest, I that involves P, r and t?Determine the relation between three or more variables for a given joint variation. CHAPTER 1Variation In Form 3, you have learnt the calculation for simple interest, I that involves P, r and t?Determine the relation between three or more variables for a given joint variation. CHAPTER 1Variation In Form 3, you have learnt the calculation for simple interest, I that involves P, r and t?Determine the relation between three or more variables for a given joint variation. CHAPTER 1Variation In Form 3, you have learnt the calculation for simple interest, I that involves P, r and t?Determine the relation between three or more variables for a given joint variation. CHAPTER 1Variation In Form 3, you have learnt the calculation for simple interest, I that involves P, r and t?Determine the relation between three or more variables for a given joint variation. CHAPTER 1Variation In Form 3, you have learnt the calculation for simple interest, I that involves P, r and t?Determine the relation between three or more variables for a given joint variation. CHAPTER 1Variation In Form 3, you have learnt the calculation for simple interest, I that involves P, r and t?Determine the relation between three or more variables for a given joint variation. CHAPTER 1Variation In Form 3, you have learnt the calculation for simple interest, I that involves for a given joint va variation. A joint variation is a direct variable varies as a product of two or more variables. MIND MOBILISATION 4 Individual Aim: To determine the relation between three variables for a joint variation. Steps: 1. The diagram on the right shows a rectangle with x cm in length and z cm in width. It is given that the area of the rectangle is y cm2. Complete the table below.z cmx cm (C) If x, z and y are variables Length, x (cm) 2345Width, z (cm) 8632 Area, y (cm2) (y xz (A) If z is a constant Length, x (cm) 2345Width, z (cm) 8632 Area, y (cm2) (x z is a constant Length, x (cm) 2345Width, z (cm) 8632 Area, y (cm2) (x z is a constant Length, x (cm) 2345Width, z (cm) 8632 Area, y (cm2) (x z is a constant Length, x (cm) 2345Width, z (cm) 8632 Area, y (cm2) (x z is a constant Length, x (cm) 2345Width, z (cm) 8632 Area, y (cm2) (x z is a constant Length, x (cm) 2345Width, z (cm) 8632 Area, y (cm2) (x z is a constant Length, x (cm) 8632 Ar constant?2. What is the relation between y and z if x is a constant?3. What is the relation between y, x and z if three of them are variables? The results of Mind Mobilisation 4 show that y varies jointly as x, and y varies jointly as x and z if three of them are variables? The results of Mind Mobilisation 4 show that y varies directly as x, and y varies jointly as x and z if x is a constant?3. What is the relation between y, x and z if three of them are variables? The results of Mind Mobilisation 4 show that y varies directly as x. xm and zn can be written asy < xmzn (variation relation) y = kxmzn (equation form)Example 9Write the relation using the symbol < and in equation form)Example 9Write the relation using the symbol < and in equation form)Example 9Write the relation using the symbol < and in equation form)Example 9Write the relation using the symbol < and in equation form)Example 9Write the relation using the symbol < and in equation form)Example 9Write the relation using the symbol < and in equation form)Example 9Write the relation using the symbol < and in equation form)Example 9Write the relation using the symbol
 height, h.(d) The mass, w of a cylindrical metal rod varies directly as its length, p and the square of the diameter of its base, d.y \propto xz is the combination of two relations y \propto x and y \propto z.Discuss the relation of two relations y \propto x and y \propto z.Discuss the relation of two relations y \propto x and y \propto z.Discuss the relation of two relations y \propto x and y \propto z.Discuss the relation of two relations y \propto x and y \propto z.Discuss the relation of two relations y \propto x and y \propto z.Discuss the relation of two relations y \propto x and y \propto z.Discuss the relation of two relations y \propto x and y \propto z.Discuss the relation of two relations y \propto x and y \propto z.Discuss the relation of two relations y \propto x and y \propto z.Discuss the relation of two relations y \propto x and y \propto z.Discuss the relation of two relations y \propto x and y \propto z.Discuss the relation of two relations y \propto x and y \propto z.Discuss the relation of two relations y \propto x and y \propto z.Discuss the relation of two relations y \approx x and y \propto z.Discuss the relation of two relations y \approx x and y \approx z.Discuss the relation of two relations y \approx x and y \approx z.Discuss the relation of two relations y \approx x and y \approx z.Discuss the relation of two relations y \approx x and y \approx z.Discuss the relation of two relations y \approx x and y \approx z.Discuss the relation of two relations y \approx x and y \approx z.Discuss the relation of two relations y \approx x and y \approx z.Discuss the relation of two relations y \approx x and y \approx z.Discuss the relation of two relations y \approx x and y \approx z.Discuss the relation of two relations y \approx x and y \approx z.Discuss the relation of two relations y \approx x and y \approx z.Discuss the relation of two relations y \approx x and $andw \propto d2$ where m = 1, 2, 3, 2, 3, 11, 1, 1, n = 1, 2, 3, 2, 3 and k is a constant. Solution:(a) $p \propto qr p = kqr(b) y \propto w2x3 y = kw2x3Example 10p \propto qandp \propto ry \propto w2$ and $y \propto d2 w = kpd2$ Given that $x \propto y2z$, express x in terms of y and z if x = 6 when y = 3 and z = 5. Solution: $x \propto y2z$ 15Hence, x = 2 y2z 1512Write the relation in the form of equation. Substitute the values of x, y and z into the equation to obtain the values of x, y and z into the equation to obtain the ground. Given that E = 197 Joules when m = 4 kg, g = 9.81 m s-2 and h = 5 m, write an equation that relates E, m, g and h.CHAPTER 1Variational potential energy is the energy is stored due to Earth's gravitational pull towards an object. The value of g differs between celestial bodies. For example, the value of g on Earth is 9.81 m s-2 and on the moon is 1.62 m s-2. Example Solution: E \propto mgh E = kmgh197 = k (4)(9.81)(5)=1Hence, E = mgh12Write the values of E, m, g and hinto the equation to obtain the value of k. Example Three quantities, S, T and U vary as shown in the table on the right. It is given that S varies directly as T and the cube root of U. Calculate the values of x and y.Solution: S \approx T 3 U Alternative Method: Using the concept of proportion: Given that S1 = 6, T1 = 0.8, U1 and S2 = x, T2 = 1.2, U2 = 125 = 27S1T 3 U = S2T 2.5(1.2)(3125) = 1550 = 3 y = y = 2.5(40)(3y) 50
(2.5)(40)0.50.53 0.1252.5 Hence, S = 2.5T 3U When T = 1.2 and U = 125, When S = 50 and T = 40, 13 KPM CHAPTER 1 P Q R Self Practice 1.1c1. Write the relation by using the symbol \propto for each of the following. (a) s varies directly as t and u.(b) v varies directly as w2 and x.(c) a varies directly as the cube of b and the square root of c.(d) The area of the curved surface, A cm2, of a cylinder varies directly as q, r and the square of s. Even that p = 5.184 when q = 1.2 and r = 216.113(b) p varies directly as q, r and the square of s. Given that p = 3 when q = 5, r = 21 and s = 3.3. Given that y = 6 when x = 0.64 and z = 5, express y in terms of x and z if(a) y varies directly as the length, p cm and the square of z.4. The price of a metal rod, RMx, varies directly as x and the square of z.4. The price of a metal rod, RMx, varies directly as x and z if(a) y varies directly as the length of 150 cm and a radius r cm. If a metal rod, RMx, varies directly as x and the square of z.4. The price of a metal rod, RMx, varies directly as x and z if(a) y varies directly as the length of 150 cm and a radius r cm. If a metal rod with a length of 150 cm and a radius r cm. If of 3 cm is sold at the price of RM27, write an equation that relates x with p and r.5. It is given that G varies directly as H and the square root of M. If G = 42 when H = 7 and M = 81, (b) the value of G when H = 4 and M = 81, (b) the value of M when G = 18 and H = 20.6. The table below shows the changes in three quantities. It is given that P varies directly as the cube of Q, and R. Calculate the values of x and y.86.4 x 1.2151.2 2 y10 0.4 97. The kinetic energy, E joules, of an object ware of speed, v m s-1, of the object. It is given that the kinetic energy of a 3-kg mass object moves with a speed of 12 m s-1 is 216 Joules. Calculate the speed in m s-1, of an object if the mass and the kinetic energy are 5 kg and 640 Joules respectively.8. The volume of a cone, V cm3, varies directly as the height of 21 cm and a radius of 6 cm has a volume of 792 cm3. Calculate the volume in cm3, of a cone with a height of 14 cm and a radius of 15 cm.14 KPMCHAPTER 1 How to solve problems involving direct variation?13Charles' Law states that for a fixed mass of gas, the volume, V cm3, of the gas is fixed. It is given that a container contains 30 cm3 of gas at a temperature of 30°C.(a) Express V in terms of T.(b) Calculate the volume in cm3, of the gas if the temperature changes to -11°C.[Formula for the conversion of temperature in degree Celsius to Kelvin: x°C = (273 + x) K]Solve problems involving direct variation. The relation between the volume and the temperature of a fixed mass of gas at a fixed pressure is first researched by Jacques Charles.CHAPTER 1 Variation Example Solution: Understanding the problem V \propto TV = 30 when T = (273 + x)K14Devising a strategy(a) Write the direct variation in the form of equation.(b) Substitute the value of T into the equation and hence, calculate the value of T into the equation and hence, calculate the value of T into the equation.(b) Substitute the value of T into the equation and hence, calculate the value of T into the equation and hence, calculate the value of T into the equation and hence, calculate the value of T into the equation.(b) Substitute the value of T into the equation and hence, calculate the value of T into the equation and hence and the equation and hence and the equ $cm_3V = V = 30 = k = = V = kTk(273 + x) k(273 + 30)30 303 10 10110 T 101 Making a conclusion(a) V = 10 T 101(b) V = 25.94 cm_3 Example Madam Soon receives an interest of RM200$ when she saves RM4 000 for two years.(a) Calculate the period of the savings for Madam Soon to receive an interest of RM650with a principal of RM5 200.(b) Madam Soon wants to get the same amount of interest but reduce the period of hersavings in (a). Does she need to increase or decrease her principal? Explain your answer.15KPM CHAPTER 200.(b) Madam Soon wants to get the same amount of interest but reduce the period of hersavings in (a). Understanding the problem I ~ ptI = 200 when p = 4 000 and t = 2Devising a strategy Making a conclusion(a) 5 years.(b) The principal has tobe increased to get the same amount of the principal and the period. Implementing the strategy(a) I = 200 = kpt (b) k(4 000)(2)200(4 000)(2)To maintain the value of I in the equation I = 0.025 pt, when p decreases, t de equation and calculate the value of t when I = 650 and p = 5 200.(b) Understand the changes for every variable in the equation. 1. Lee fills a tank with water using a rubber hose at 8:00 a.m. At 11:00 a.m., Lee discovers that the tank is filled with 48% of water.(a) Write an equation that relates the volume of water, V, that is filled into the tankwith the time taken, t.(b) At what time will the tank be fully filled with water?2. Aminah wants to cut a few triangles from a piece of card. It is given that the area of the triangles cut, A cm2, varies directly as its base, x cm, and its height, y cm. At the beginning, she cuts a triangle with A = 14, x = 7 and y = 4.(a) Write the relation between A with x and y.3.16A pizza shop sells three sizes of pizza at different prices as shown in the diagram on the right. Does the price of pizza, RMp, vary directly as the surface area, A cm2, of the pizza? If it does not, which size of pizza is worth buying?15 cmRM1223 cmRM2530 cmRM35(b) Aminah plans to cut the second triangle with the value of base increased by 20% and the value of height decreased by 10%. What is the percentage of changes in the area for the second triangle? KPMCHAPTER 11.2 Inverse Variation? While on a seesaw, the heavier person will be at a higher position. Do you know how to balance the seesaw? Explain the meaning of inverse variation. CHAPTER 1 Variation To balance a seesaw, the heavier one has to sit closer to the fulcrum, d, is said to be varied inversely. Whenw increases, and vice versa.35 kgw kg Fulcrumd m1.1 m MIND MOBILISATION 5 Individual Aim: To explain the meaning of inverse variation. A school hall has a few doors. The table below shows the relation between the number of doors opened, x, and the time taken for the pupils to leave the hall.Discussion:1. If the number of doors opened increases, does the time taken for the pupils to leave the hall increase or decrease?3. What is the relation between the number of doors opened and the time taken for the pupils to leave the hall? Number of doors opened, x 2 3 4 5 6 Time taken, y (minutes) 24 16 12 9.6 8 The results of Mind Mobilisation 5 show that when the number of doors opened increases, the time taken for the pupils to leave the hall? Number of doors opened increases, the time taken for the pupils to leave the hall decreases. doors opened decreases, the time taken for the pupils to leave the hall increases. The change in the number of doors opened leads to an opposite implication, variable y increases when the variable x decreases at the same rate, and vice versa. This relation can be written as y varies inversely as x.Example Time, t (hours) Average speed, v (km/h) t v t v Number of days This relation is known as inverse variation. In general, 15Chia Ming takes part in a 42-km marathon. The table below shows the
relation between the time taken by Chia Ming and his average speed.45678 State the change in average speed if the time taken (a) increases by two times, (b) decreases by 1.5 times. Solution: (a) (b) 10.50 8.40 7.006.00 5.25 × 2 4 10.50 8 5.25 ÷ 2 ÷ 1.567.00 × 1.5 Self Practice 1.2a1. The table on the right shows the relation between the number of days needed to install tiles in a house. State the change in the number of the num days if the number of workers(a) is multiplied by two,(b) decreases two times, then the average speed decreases two times. When the time decreases 1.5 times, then the average speed decreases two times. The time decreases two times of a Mathematics quiz. If the price of a gift is RM10, then Cikgu Farid can buy 10 gifts. State the number of gifts that can be bought if the price of a gift(a) increases by 50%.18KPMCHAPTER 1 What is the relation MIND MOBILISATION 6 Group between two variables for an inverse variation? Determine the relation MIND MOBILISATION 6 Group between two variables for an inverse variation? variables for Aim: To determine the relation between two variables for an inverse variation.an inverse variation. Steps: A piece of cardboard will be cut into y smallsquare cards with an area of 1.44 m². The cardboard has an area of 1.44 m². The cardboard will be cut into y smallsquare cards with an area of the small card, x = 0.04 in coloured cell and click Enter. Repeat the same step for the value of x equals to 0.09, 0.16 and 0.36. Observe the valuesScan the QR code or visit bit.do/WSChap1 to obtain the worksheet.of y, xy and 1x for each value of x.3. Draw the graph of y against x and the graph of y against 1x using a suitable scalebased on the obtained values. Discussion: 1. Compare the values of xy. What conclusion can be made on the values of xy? 2. What are the shapes of the graphs obtained? 3. What is the relation between y and x? The results of Mind Mobilisation 6 show that for an inverse variation, (a) the value of xy is a constant. Hence, k = xy, (b) the graph of y against x is a hyperbola and thegraph of y against 1x is a straight line thatstarts from the origin,(c) y varies inversely as x.yyO x O 1x When variable y varies in Relation between the value of k and the gradient of the straight line that starts from the origin for the gradient, y = 111 x1 O11x = x1y1 x = k1 This relation is true only if the straight line starts from the origin for the gradient, y = 111 x1 O11x = x1y1 x = k1 This relation is true only if the straight line starts from the origin for the gradient, y = 111 x1 O11x = x1y1 x = k1 This relation is true only if the straight line starts from the origin for the gradient of the straight line starts from the origin for the straight line starts from the starts from the origin for the straight line starts from the star where k is a constant.Ox y1x(a) The graph of y against x is a hyperbola. (b) The graph of y against 1x is a straightline that starts from the origin (x ≠ 0). O MIND MOBILISATION 7Group Aim: To determine the relation between the variables y and x2 for an inverse variation. Steps: 1. It is given that the volume of a cuboid with a square base is 180 cm3 The table below shows the relation between the length of sides of the base and the height of the cuboid. Complete the table below.y cm x cmx cm Length of sides of the base, x (cm) 23456Height, y (cm) xy x2y 1 x2 The relation of inverse variation written as'y varies inversely as x' can also be written as 'x and y are inversely proportional'. Hence, we can relate the two variables x and y in the form of equation, that is xy = ky = kx. 20KPMay = x, $x \neq 0$ is areciprocal function with a hyperbola graph of y against x 1 using a suitable scale 2based on the table. Discussion: 1. Compare the values of xy and x2y. What conclusion can be made? 2. Which graph is a straight line graph that starts from the origin? 3. What is the relation between y and x2? The results of Mind Mobilisation 7 show that for an inverse variation, (a) the value of x2 y is a constant. Hence, k = x2 y,(b) the graph of y against x1 is a straight line that starts from the 20 igin,(c) y varies inversely as $x^2.y1$ O x^2 In general, For an inverse variation, y varies inversely as xn can be written as $x^2.y1$ O x^2 In general, For an inverse variation form) The graph of y against x^1 is a straight line that starts from is a constant. the origin ($x \neq 0$) where k is the gradient of the straight line. 161 When $y = x^2$, ydoes not vary directly as x. Discuss this statement. y ~ 1x is true if and only if n = 1. Example It is given that the time needed, t, to assemble a piece of furniture varies inversely as the number of workers, x. The table below shows the relation between x and t.23456180 120 90 72 60By calculating the values of xt and x2t, determine whether t varies inversely as x or x2. Hence, write the relation by using the symbol \propto .21 Number of workers, x Time needed, t (minutes) KPM CHAPTER 1Interactive Platform x t xt x2t Example x y 1x y Example Solution: 23456180 120 90 72 602(180) = 360 4(90) = 360 5(72) = 360 6(60) = 360 2(120) = 360 4(90) = 360 2(120) = 360 4(90) = 360 2(120) = 360 4(90) = 360 2(120) = 360 4(90) = 360 4(90) = 360 4(90) = 360 2(120) = 360 4(90) = 360 The value of xt is a constant, whereas the value of x2t is not a constant. Hence, t varies 1inversely as x, that is t ~ x. 17Two quantities, x and y, vary based on the table on the right. By using a suitable scale, draw the graph of y against 1x and show that y varies inversely as x. Solution: 2 4 5 108 4 3.2 1.6 4 0.5 0.25 0.2 0.1 The graph of y against 1 shows a straight line that 2 xO1x 0.1 0.2 0.3 0.4 0.5 starts from the origin. Hence, y varies inversely as x. (b) y varies inversely as the square root of x. Solution: y varies inversely as x, (b) y varies inversely as x. 18 t is given that x = 0.25 when y = 3. Express y in terms of x if (a) y varies inversely as x, (b) y varies inversely as the square root of x. Solution: y varies inversely as x, 19 x y varies inversely as x. 18 t is given that x = 0.25 when y = 3. Express y in terms of x if (a) y varies inversely as x. 18 t is given that x = 0.25 when y = 3. Express y in terms of x if (a) y varies inversely as x. 18 t is given that x = 0.25 when y = 3. Express y in terms of x if (a) y varies inversely as x. 18 t is given that x = 0.25 when y = 3. Express y in terms of x if (a) y
varies inversely as x. 18 t is given that x = 0.25 when y = 3. Express y in terms of x if (a) y varies inversely as x. 18 t is given that x = 0.25 when y = 3. square root of x, 1the cube root of x, y $\propto 1$ (a) y $\propto 11y \propto x1$ the cube of x, (b) y $\propto x(iii)$ y varies inversely as Hence, y = 0.75 substitute the values of y and x into the equation to obtain the values of x, (v) y varies inversely as Hence, y = 0.75 substitute the values of y and x into the equation to obtain the values of x, (v) y varies inversely as Hence, y = 0.75 substitute the values of y and x into the equation to obtain the values of x, (v) y varies inversely as Hence, y = 0.75 substitute the values of y and x into the equation to obtain the values of x, (v) y varies inversely as Hence, y = 0.75 substitute the values of y and x into the equation to obtain the values of x. (v) y varies inversely as Hence, y = 0.75 substitute the values of y and x into the equation to obtain the value of y and x into the equation to obtain the value of y and y = 1.5KPMHence, y = 1.5x3xCHAPTER 119The force of gravity, F, varies inversely as the square of the distance between two objects, d. It is given that the force of gravity between two objects, d. It is given that the force of gravity between two objects is 15 N when the distance between them is 1.2 cm. Write an expression of F in terms of d.Sir Isaac Newton (1642-1727), a famous English physicist, published Newton's Laws of Gravity in his book Philosophiae Naturalis Principia Mathematicain 1687. CHAPTER 1 Variation Example It is and d in the form of equation. Substitute the values of F and d into the equation to obtain the value of k. Example It is given that p varies inversely as q. If p = 2 when q = 7, calculate the value of p when q = 1.6. Alternative Method: Using the concept of proportion: Given that p1 = 2, q1 = 7, $q2 = 1.6p1q1 = p2q22 \times 7 = p2 \times 1.6p = 2x72$ 1.6 = 8.75 Solution: $p \propto 1qp = qk2 = 7kk = 2(7) = 14$ Self Practice 1.2b1. The table below shows the values of two variables, x and y.14 Hence, p = qWhen q = 1.6, p = 141.6 = 8.75 (a) Determine whether y varies inversely as x. If yes, write the relation in the form of variation.12345 3.6 0.9 0.4 0.225 0.14423 xy xyKPM CHAPTER 1 Resistance, R (W) Current, I (A) xyxy M T 2. The table below shows the current, I (Ampere, A) flows in a circuit with its resistance, R (Ohm, Ω).42 35 30 21 155 6 7 10 14By plotting the graph of I against R1 using a suitable scale, determine whether I varies inversely as R.3. It is given that g = 0.15 when h = 8. Express g in terms of h if (a) g varies inversely as h,(b) g varies inversely as R.3. It is given that g = 0.15 when h = 8. Express g in terms of h if (a) g varies inversely as h,(b) g varies inversely as R.3. It is given that g = 0.15 when h = 8. Express g in terms of h if (a) g varies inversely as h,(b) g varies inversely as R.3. It is given that g = 0.15 when h = 8. Express g in terms of h if (a) g varies inversely as R.3. It is given that g = 0.15 when h = 8. Express g in terms of h if (a) g varies inversely as h,(b) g varies inversely as R.3. It is given that g = 0.15 when h = 8. Express g in terms of h if (a) g varies inversely as R.3. It is given that g = 0.15 when h = 8. Express g in terms of h if (a) g varies inversely as h,(b) g varies inversely as R.3. It is given that g = 0.15 when h = 8. Express g in terms of h if (a) g varies inversely as h,(b) g varies inversely as h,(b) g varies inversely as R.3. It is given that g = 0.15 when h = 8. Express g in terms of h if (a) g varies inversely as h,(b) g varies i as h2,(c) g varies inversely as the cube root of h.4. Given that y = 0.5 when x = 16, calculate the value of y when x = 0.04 if (a) $y \propto 13(d)$ y $\propto 13(d)$ number of books every day. The table below shows the number of printing machines in operation, M and the time needed, T to print the books. It is given that T varies inversely as M.s 0.04 8 2.4 t 68q10 p 4 (a) Express T in terms of M.(b) Determine the values of p and q.7. The period of oscillation, T, of a simple pendulum varies inversely as the square root of gravitational acceleration, g. In an experiment, the period of oscillation is 1.01 seconds when the gravitational acceleration?21Solve problems involving inverse variation?21Solve problems involve problems involve problems involve problems involve problems involve problems in massof gas is inversely proportional to the volume of the gas, V, if the temperature of the gas is fixed. The diagram on the right shows the gas trapped in a cylinder is 121.76 kPa. Solution:p kPaCHAPTER 1 Variation Example Devising a strategyDetermine the relation between p and V in the form of equation. Hence, calculate the value of V when v = 80 cm3, p = 121.76 kPa. Understanding the problem \bullet p is inversely proportional to V \bullet When v = 80 cm3, p = 121.76 kPa. Understanding the problem \bullet p is inversely proportional to V \bullet When v = 80 cm3, p = 121.76 kPa. strategyp \propto 1 Hence, p = 15 220 VVp = VkWhen V = 80, p = 190.25, 190.25 = k 80k = 190.25 × 80 = 15 220 When p = 121.76, 121.76 = 15 220 VV = 15 220 $0.6\ 0.4\ 0.3$ Resistance, R (Ω) Radius of cross-section, r (mm) of the wire varies inversely as r2.(b) Calculate the radius in mm, of the wire if the resistance is 25 Ω .2. The number of cubes, b, produced from a fixed quantity of metal varies inversely as the cube of its sides, p cm. If b = 16 when p = 1.5, calculate the value of p when b = 250.3. The number of oscillations, A of a simple pendulum varies inversely as the square root of the length of the pendulum is 36 cm, calculate the length of the pendulum is 46 cm, calculate the length of the pendulum is 36 cm, calculate the length of the pendulum is 36 cm, calculate the length of the pendulum is 46 cm, calculate the length of the pendulum is 36 cm, calculate the length of the pendulum is 46 cm, calculate the pendulum is 46 cm, calculate the pen To determine the relation between three variables for a combined variation which involves direct variation. Steps: 1. The formula for the volume, height and base area of the cylinder respectively, complete the table below.y cm z cm2 (A) If z is fixed Volume, x (cm3)100200300400 Height, y (cm) Base area, z (cm2) 50505050xy (C) If x, y and z are variables Volume, x (cm3)120120120120120 Height, y (cm) Base area, z (cm2)406080100yz Discussion: x1. What is the value of y? Hence, state the relation between y and x if z is a constant.2. What is the value of yz? Hence, state the relation between y, x and z if three ofthem are variables. x 1.3 Combined Variation?Teacher, what is the value of yz? Hence, state the relation between y, x and z if three ofthem are variables. x 1.3 Combined Variation?Teacher, what is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What
is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and z if x is a constant.3. What is the value of yz? Hence, state the relation between y and yz? Hence, state th the meaning of combined variation? Determine the relation between three or more variation, and inverse variation. Combined variation of direct variation of z. If y = 8 when x = 4 and z = 36, express y in terms of x and z. Solution: $y \propto x^2 zy = kx^2 zW$ it the relation between y, x and z in the form of equation. Substitute the values of y, x and z into the equation to obtain the values of y, x and z into the equation to obtain the values of y, and z into the equation. inverselyCHAPTER 1 Variation The results of Mind Mobilisation 8 show that y varies directly as x, and y varies inversely as z. Therefore, y varies directly as xm and inversely as z and inversely as z. Therefore, y varies directly as x, and y varies directly as x, and y varies directly as x and inversely as z. Therefore, y varies directly as x and inversely as z. Therefore, y varies directly as x and inversely as z. Therefore, y varies directly as x and inversely as z. Therefore, y varies directly as x and inversely as z. Therefore, y varies directly as x and inversely as z. Therefore, y varies directly as x and inversely as z. Therefore, y varies directly as x and inversely as z. Therefore, y varies directly as x and inversely as z. Therefore, y varies directly as x. Therefor where m = 1, 2, 3, 2, k is a constant.11 113, n = 1, 2, 3, 2, 3 and Example 8=k(4) 2 36836 k == 3 42 Hence, y = zas z3,33 x 2 23y \propto w 2 x z Example The table below shows the values of P, Q and R. It is given that P varies directly as the cube of Q and inversely as R. Calculate the values of x and y. PQR4 3.6 0.08126y 0.6 x 2.727KPM CHAPTER 1 Tef Example Solution: $P \propto Q3$ When P = 3.6, Q = 6 When P = 0.081, Q = y R and R = x, and R = 2.7, kQ3P = 3Q3 3Q34 = Rk (2) 3P = 10R 3(6) 3P =for each of the following combined variations.(a) w varies directly as the cube root of v and inversely as the square of x.(b) F varies directly as the distance travelled, s, and inversely as the square of the time taken, t, by the object.2. The time taken, t hours, to arrange chairs in a hall varies directly as the number of chairs, c, and inversely as the number of workers involved, p. It is given that 5 workers used 2 hours to arrange 1 000 chairs. Express t in terms of c and p.3. It is given that 5 workers used 2 hours to arrange 1 000 chairs. 0.8 and N = 2.4,(b) the value of N when M = 19 and P = 3.8.4. The table on the right shows the changes in three quantities T, e and f. It is given that T varies inversely as the square root of e and the cube of f. Calculate the values of a and b.How to solve problems involving combined variation?24The pressure, p N m-2, on the tyre of a wheelbarrow varies directly as the mass of the wheelbarrow, m kg, and inversely as the surface area of the tyre touching the ground, l m2. It is given that the pressure on the tyre is 45 000 N m-2 when the mass of the wheelbarrow is 90 kg and the surface area of the tyre touching the ground is 0.02 m2.(a) Calculate the value of p when m = 120 and l = 0.5.(b) What can be done to reduce the pressure on the tyre if themass of the wheelbarrow is fixed?285 a1.44 36 b0.256 2 0.4 5 Solve problems involving combined variation. KPMCHAPTER 1 Variation Understanding the problem • p varies directly as m and inversely as 1 • When m = 90 and 1 = 0.02, p = 45 000 Devising a strategy(a) Determine the relation between p, m and l in the form of equation. Hence, substitute the values of m = 120 and l = 0.5 into the equation to calculate the values of p = 2400 N m-2(b) Use a broadertyre because the pressure on the tyre reduces when the surface area of the tyre touching the ground increases, and the mass is fixed. (a) $p \propto m lp = km l45 000 = k(90) 0.02k = (0.02)(45 000) = 10 90$ Hence, p = 10m lWhen m = 120, l = 0.5, p = (10)(120)0.5 = 2 400 N m - 21f the value of m isfixed, • p decreases, when lincreases, when lincreases, when lincreases when lincrease Kamal wants to install rectangular tiles in his bedroom. The number of tiles needed, J, varies inversely as the length, p m, and width, l m, of the tile is 0.4 m in length and 0.5 m in width.(a) Calculate the number of tiles needed if the length is 0.2 m and the width is 0.3 m. (b) If the area of the tile increases, what is the change in the number of tiles needed?2. The average number of daily phone calls, C, between two cities varies directly as the square of the distance, j, between the two cities. The distance between city A and city B is 210 km. The average number of daily phone calls between the two cities is 15 750 and the populations of city A and city B are 105 000 and 220 500 respectively. Give your answer to the nearest whole number, calculate(a) the distance between city P and city Q if the populations are 83 400 and 62 000 respectively and the average number of daily phone calls is 19 151,(b) the population of city J if the population of city K is 1 100 000 with the distance between the two cities is 351 km. The average number of daily phone calls between city J and city K is 18 857.29KPM CHAPTER 1Summary Arena VARIATIONDirect Variation Inverse Variation • y = kxn where k is a constant and k = xyn• The graph of y against xn is a straight line that passes through the origin y varies directly as xn, for y varies inversely as xn, for 11 11n = 1, 2, 3, 2, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 2, 3, 3 • y \propto xnn = 1, 3, 3 O xny varies inversely as xn1n • y varies jointly as xm and zn, for 11m = 1, 2, 3, 2, 3 and 11n = 1, 2, 3, 2, 3 and r = 1, 2, 3, 3 an yawpxq zq zrkxp kw pxq y=zq y=zrwhere k is a constant.30 KPMCHAPTER 1 At the end of this chapter, I canCHAPTER 1 Variation. determine the relation between two variables for a direct variation. determine the relation between two variables for a direct variation. of inverse variation. determine the relation between two variables for an inverse variation. solve problems involving combined variation. MINI PROJECT MINI PROJECTMaterials Torchlight, A4 paper and measurement tape Steps: 1. Carry out this project in groups. Paste the A4 paper and place the torchlight facing the paper in a dark classroom as shown in the diagram below. Torchlight facing the paper in a dark classroom as shown in the diagram below. of the light image, d, formed on the paper. Construct a table to record your data.3. Represent the data obtained using a suitable line graph.4. Write a formula to show the relation between d and j. Then, make a conclusion on the diameter of the light image formed and the distance of the torchlight from the paper.5. How can these findings be applied in your daily life?31KPM ReflectionCHAPTER 1 Extensive PracticeScan the QR code or visit bit.do/QuizE01 for interactive quiz UNDERSTAND MASTERYyzz CHALLENGECHAPTER 1 1. Write the variation relation for
each of the following.(a) w is directly proportional to the cube of x.(b) a varies directly as b and inversely as the cube of c.(c) p varies directly as q and the square root of r.(d) The distance travelled, s m, by a bicycle varies directly as its acceleration, a m s-2, and the square of the time taken, t s.2. The diagram on the right shows the graph of y against 3x. Write the 1 relation of y varies directly as x.3. Write the following relations in sentences. 1pg 2 (a) x - y = 0 (b) y + 3 = x (c) xy = 10 (d) $xy = 0.5(a) y \propto xz$ (b) $e \propto f3g$ (c) $p \propto r5$. Calculate the constant, k for each of the following.(a) L varies directly as the cube of m. L = 16.384 when m = 3.2.(b) h varies directly as a and the square of b. h = 96 when a = 18 and b = 4.(c) P varies directly as the cube of m. L = 16.384 when m = 3.2.(b) h varies directly as the cube of m. L = 16.384 when m = 3.2.(c) P varies directly as q2 and r, and inversely as 3s. P = 17.01 when q = 4.5, r = 9 and s = 3.375.6. It is given that m varies inversely as n and p. If m = 6 when n = 0.4 and p = 5, writean equation that relates m, n and p.7. It is given that f $\propto g2h$ and f = 24 when g = 4 and h = 5. Calculate the value of gwhen f = 5.88 and h = 10.8. The table on the right shows the changes in three quantities. It is given that y varies directly as x and inversely as the square root of z. Calculate the values of m and n.4 m 51 0.3 6 1.73.24 225 nO(d) n \propto r 3 9. P varies inversely as Q and Q = 3R - 2. It is given that P = 0.02 when R = 4. (a) Express P in terms of Q.(b) Calculate the value of R when P = 5.32KPMCHAPTER 1 Variation10. The electric current, I (Ampere) varies directly as the power, P (Watt) and inversely as the voltage, V (Volt) for an electric current of 2.2 A. Calculate the electric current used by a fan with 75 W of power and 240 V of voltage.11. The area of the curved surface, A cm2, of a cone varies directly as the radius of its base, r cm, and the slant height, s cm. It is given that $A = 88 \text{ cm} \cdot (a)$ Calculate the value of A when r = 3.5 cm and $s = 9.8 \text{ cm} \cdot (a)$ Calculate the value of A when $r = 3.5 \text{ cm} \cdot (a)$ Calculate the value of A wh given that Y varies directly as X and inversely as W. If Y = 0.9 when X = 18 and W = 5, calculate(a) the value of W when Y = 20 and X = 6, (b) the percentage of the change of Y when X increases by 20%.13. The speed of a bicycle, S, varies directly as the number of revolutions per minute of the bicycle pedal, P, and the number of the front gear teeth, d, and inversely as the number of back gear teeth, b. Santhami rides a bicycle at a speed of 26.4 km per hour. The bicycle pedal moves at 75 revolutions per minute. Back gear Front gearPedal EXPLORING MATHEMATICSThe variation concept is widely used in science. Some examples are: Ohm's Law V = IRLaw of Refractionsin i = constant sin r In groups, find information from the internet on the quantities represented by the variables for the above formulae and how the concept of variation is applied in these laws. Briefly describe the usage of the formulae. Then, conduct further investigations on the application of the concept of variation in the field of finance, environment and social science. Present your findings to share information with other groups.33Boyle's Law PV = constantNewton's Law ofUniversal GravitationF = G m1m2 d2 KPM CHAPTER 1 CHA2PTERMatricesWhat will you learn?• Matrices on MatricesWhy study this chapter?Matrices are used in the field of mathematics to represent and solve problems in algebra, statistic and geometry. In daily life, it can be used by a purchasing manager to record the amount of inventory in his business. Do you know?Arthur Cayley (1821-1895) was an English mathematicians, Benjamin Peirce (1809-1880) and Charles S. Peirce (1839-1914) worked together with Cayley in the development of algebraic matrix square matrix scalar multiplication determinantorderelementmatriks barismatriks identitimatriks lajurmatriks segi empat sama matriks seqi empat tepat matriks sifarmatriks sifarmatriks songsang pendaraban skalar penentuperingkatunsur 34 KPM CHAPTER 2 According to Digital Report 2018, the total number of internet users has reached 25.08 million people, that is 79% of the residents in Malaysia. Nowadays, the society prefers to carry out daily activities such as shopping and making payment for services through the internet. Data is created in this process and supports the growth of big data refers to data that is very large, complex and difficult to process with regular database management. This set of data can help the management teams in various fields to make better decisions. In the business field, bigdata is analysed to reduce cost and time, develop new products and strategise business plans. The process of data analysis largely involves matrices.35 KPM CHAPTER 2 Fan Stand Ceiling Wall In-store161811 Online 5 10 4 A matrix is a set of numbers arranged in rows and columns to form a rectangular or a square array. 2.1 MatricesHow to represent the information from real situations in the form of matrices?Kedai Elektrik Sinar Jaya records the sales of three types of fans in a spreadsheet. The diagram below shows the in-store and online sales of the form of matrices. The data for the month of March is represented in the form of table. It can also be represented in the form A matrix is usually represented with capital letter and written inrows116 18 11 2 5 10 4columnsMatrix formJames Joseph Sylvester (1814-1897) was the first mathematician that used the term matrix in1850. the bracket [] or ().Salina 36KPMCHAPTER 21Represent the following information in the form of matrices.(a) The table below shows the medal collection of Malaysian contingent for three events in the 29th SEA Games.13 5 110 2 4889(c) In Test 1, Samad scores 80 marks for Bahasa Melayu, 82 marks for Bahasa Athletics In the 29th SEA Games that was held in Kuala Lumpur in 2017, the Malaysian contingent was crowned the overall champion with 145 golds. Solution: 1700 2100 2000 1800matrix has only one row. This is a column matrix. A column matrix has only one column.313 5 14 313 10 84 10 2 4 or 5 2 8 889 149 column 1 column 2 column 3These are square matrices. A square matrix has the same number of rows and columns, (a) row 1 [1700 2100 2000 1800] or This
is a row matrix. A row (b) row 1 376 82 72 4 80 88 70 column 1 column 2 column 3 [6] a square matrix? Explain your answer. These are rectangular matrices. A rectangular matrix has different number of rows and columns.37 column 1 row 1 row 2 row 3 (c) row 372 70 column 1 column 2 Info BulletinCalories are a measure of the value of energy in food. The caloric content of food depends on the content of carbohydrates, proteins and fats in it. For example, 1 g of protein equals 4 kcal.KPM CHAPTER 2 Monday Putrajaya Jerantut Sandakan Form 3 Form 4 Form 5 Bahasa Melayu English Matrix with m rows and n columns has the order m × n and is read as "matrix m by n". Self Practice 2.1a1. A fifth generation (5G) mobile technology exhibition is attended by 857 teenagers, 3 180 adults and 211 senior citizens. Represent the information in the form of matrix. 2. The table on the right shows the average Air Pollution Index (API) in Putrajaya, Jerantut and Sandakan for three days. Represent the information in the form of matrix.53 52 5020 21 2047 48 46 3. The table below shows the average number of books read by the pupils in Program Nilam in SMK Setia for 2019.20 18 1512 10 11 Represent the information above in the form of matrix. How to determine the order of a matrix, hence identify certain elements in a matrix. For example, Determine the order of a matrix, hence identify certain elements in a matrix. For example, Determine the order of a matrix can be determined by counting the number of columns of the matrix. 42 × 3This matrix has 2 rows and 3 columns. Therefore, it is a matrix with order 2 × 3 and can be read as "matrix 2 by 3".column 1 column 2 column 3 column for the matrix 316 18 114 is 4. Capital letter is used to denote a matrix. For example, the element at the 2nd row and 3rd columns for the matrix 316 18 114 is 4. Capital letter is used to denote a matrix. example A = 316 18 114, and the element 5 10 4at the 2nd row and 3rd column can be represented as a23, for example a23 = 4.38KPM5 10 4CHAPTER 2In general, the element at the ith row and ith column in matrix A can be represented as aij ith rowall a12 ... a1n a21 a22 ... a2n ... am1 am2 ... am1 am2 ... am1 am2 ith column for a f a (a) The order of matrix P is 1 × 3. ↑3-1-7↑5(b) the element(i) at the first row and 3rd column of matrix P, p13, (ii) at the 2nd row and first column of matrix Q is 2 × 1. The order of matrix R is 4 × 4.(b) (i) p13 of matrix P is 9. (ii) q21 of matrix Q is 5. (iii) r34 of matrix R is 1.33-2 54 Given that matrix D = 0.4 19Solution:-75. Determine9] \uparrow column 1This matrix has 1 row and 3 columns.1 5 -2 0 3443728CHAPTER 2Matrices Hence, A = Example It is given that three matrices, P = [3 (a) the order of each matrix,9], $Q = and R = -4.11 6.1 Solution:(a) 3 \times 2(b) d11 = -2d21 = 0 d32 = 9d11$ is the element at the first row and first column. d21 is the element at the 2nd row and first column. d32 is the element at the 3rd row matrix has the order m × 1.column atrix has the order m × 1.column atrix has the order m × 1.column atrix has the order 1 × n while a column matrix has the order 1 × n while a column matrix has the order m × 1.column atrix has the order m × 1.column atrix has the order 1 × n while a column matrix has the order m × 1.column atrix has the order m × 1.col d32.Cuthbert Edmund Cullis (1875-1954) was an English mathematicianwho introduced brackets for matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N if and only if both the matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N if and only if both the matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N if and only if both the matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N if and only if both the matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N if and only if both the matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N if and only if both the matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N if and only if both the matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N if and only if both the matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N if and only if both the matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N if and only if both the matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N if and only if both the matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N if and only if both the matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N if and only if both the matrices in 1913. Cullis used the notation A = [aij] to represent the element at ith row and jth KPM CHAPTER 2 M = N i order of the following matrices. $364\ 34-174312914$ (a) [15-8] (b) 9 (c) 8 0 2 (d) 5 10 75 11 32. For each of the following matrices, determine (i) the element at the 3rd row and first column, (iii) the element at the 2nd row and first column, (iii) the element at the 3rd row and first column. $32-3\ 54$ (b) $-1\ 16\ 09\ 1\ 83$. Given that matrix F = $3-8\ 14\ 2\ 4$, determine the order of matrix F. Hence, identify 7 3 -5(a) -6 0 31 549 12the elements f13, f22 and f11.4. Given that matrix B = 31 -164, calculate the value of b + b .204 12 21 How to determine whether two matrices are equal?Look at the two matrices are equal?Look at the two matrices below.Determine whether two matrices are equal. found that matrix M and matrix N have the same order, which is 2 × 2 and if each corresponding element is equal. Give your reason.(a) A = 32 and d = 4, then matrix M and matrix N are equal and can be written as M = N.40KPMCHAPTER 2 Page 2 4Determine whether each of the following pairs of matrices is equal. Give your reason.(a) A = 32 114 and $B = 32\ 114$ (b) $C = [3\ 9]$ and $D = 334\ 13139$ Solution: is equal. (c) $E \neq F$ because both the matrices have the same order and each corresponding element is equal. (b) $C \neq D$ because both the matrices have the same order and each corresponding elements are different.(d) G = H because both the matrices have the same order and each corresponding elementCHAPTER 2Matrices Example 38 34 38 -74 (c) E = andF = (d) G = 35 y + 14. Determine the values 0 2z0 5 - 3zP = Q, hence all the corresponding 5(b) P=310 -1 4 and O=35x -14 6y + 5 3z + 4 2y - 9 -4x(b) 30.1 6 4 and 10 (d) 30.94 and 30.841 41 KPM CHAPTER 2 Addition and subtraction of matrices with the same order. Each corresponding element is added or subtracted to obtain a single matrix with the same order. For matrix A = 3a11 a21A+B=3a11 Sinar Jaya. The sales of fans in the months of March, April and May can be represented with matrix $P = 316\ 18\ 114$, matrix $Q = 320\ 15\ 94$ and matrix Q =22 9The difference in sales between April and May can also be determined by performing the subtraction of matrix R and matrix Q, that is42KPM315 21 104-320 15 94= 3-5 6 14. 10 24 10 7 12 5 3 12 5CHAPTER 2CHAPTER 2 Matrices Determine whether addition and subtraction can be performed on the following pairs of matrices.6 Example Give your reason.(a) A = 32 - 534 and B = 396481174 - 1(c) E = 315 - 44 and F = 32 - 54 - 10130 Solution:(b) C = [1 12] and D = [0 - 4] (d) G = 3104 and H = 3874 (a) No because matrix A and matrix B have different orders. (b) Yes because matrix A and matrix B have different orders. (c) Yes because matrix A and matrix B have different orders. (d) No because matrix A and matrix B have different orders. (d) No because matrix B have different orders. (e) Yes because matrix B have different orders. (f) Yes because matrix B have different orders. (h) Yes because matrix B have different orders. (matrix G and matrix H have different orders.75-3 16 1Example It is given that matrix C = 310 -8 44, matrix D = 314 -2 14, matrix D = 164 + 147 + 9Add corresponding elements -2566 = 7.4 - 135 - 2.5 - 8 3iA scientific calculator can be used to perform the addition and subtraction of matrices. Scan the QR code or visit bit.do/ Video E201 to watch the related video. - Technology (b) P - Q18 13 - 7 1 9 14 12 0 0.4 - 2 - 18 56 - 13 = 7.4 - 2.5 - 13 - (-8)6 - (-7) 5 - 3 14 - 0.4Subtract corresponding elements = 1 - 12 9 - 0-20 12 134.9 - 5 2 - 11 9 - 0.1543KPM CHAPTER 2Example Info BulletinThe matrices that are expressed in the form of equation. For example, A + B = C. Example Example Science Mathematics Economy Opening stock New books received Lost and damaged books 8Given that matrix D = 32x - 1 - 34, matrix E = 3x 24 - 125 + y7 yand D + E = 38 - 14, calculate the values of x and y. -513 Solution: D+E=38 - 14 - 51332x - 1 + x - 3 + 24 = 38 - 14 - 125 + y7 y -51333x - 1 - 14 = 38 - 14 - 55 + 2y - 5132x - 1 - 34 + 3x 24 = 38 - 14 - 125 + y7 y -51333x - 1 - 14 = 38 - 14 - 55 + 2y - 5132x - 1 - 34 + 3x 24 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51332x - 1 + x - 3 + 24 = 38 - 14 - 55 + 2y - 51332x - 1 + x - 3 + 24 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 5132x - 1 + x - 3 + 24 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51332x - 1 + x - 3 + 24 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14
= 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 1 - 14 = 38 - 14 - 55 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x - 14 - 12 + 75 + 2y - 51333x= 13 2y = 8 x=3 y=4 Hence, x = 3 and y = 4 9 Given that F + 3164 - 374 = 3-24, calculate matrix F. Solution: F + 3164 - 374 = 3-24, calculate matrix F. Solution: F + 3164 - 374 = 3-24, and y = 4 9 Given that F + 3164 - 374 = 3-24, calculate matrix F = 16 into the equation. 3-114 + 3164 - 374 = 3-24, and y = 4 9 Given that F + 3164 - 374 = 3-24, and y = 3-24,

the 326 stock records of Form 4 textbooks of Science, Mathematics and Economy in SMK Taman Suria. Calculate the closing stock + New books received - Lost and damaged books =[326 335 82]+[56 47 15]-[32 26 11]=[350 356 86]Hence, the closing stock of Science Mathematics and Economy textbooks are 350, 356 and 86 respectively.44KPMCHAPTER 2Checking Answer3-5 94 33 74 and 313 -1 114 34 -16 74 (b) and [1 2 -7] -3(d) [2 -9] and [1 6]2. Given that matrix P = 312 14, matrix Q = 38 - 24 and matrix R = 36 3 4, calculate(a) P-Q+R3. Solve each of the following.(a) 312 10 14+31-194-40-7283(c) 3-14+ 34 4- 3194 6 9 -3(b) 318 -34-311 54 -7 15 -1 2(d) 32 84+314 64 15 -115-3 40 57 -1 (b) P+Q-R4. Given that matrix S = 34, matrix T = 3x 67 3y10 -11-2 z4and S - T = 3, calculate matrix V.the sales of food and drink in both stores for the month of June.4,7. Mr Gopal has two stores, A and B. The tables below show the income and expenses for CHAPTER 2 Matrices (a) (c) - y x calculate the values of x, y and z.33 - 443 - 7 24 311 - 44 6. Given that 1 0 + 9 6 - V = -1 5 -67108 69 RM2 650 RM1 890 RM930 RM850RM1 560 RM910 RM540 RM260Calculate the total profit earned by Mr Gopal from each of his stores in the month of June. Show your calculation in the form of matrices. Store Alncome FoodDrink Store AExpenses FoodDrink Store B [It is given that profit = income expense]45KPM CHAPTER 2 It is given that matrix A = 3a b4and n is a number. cdHence, nA = n3a b4 = 3na nb4. cd ncndn is known as a scalar. Info BulletinWhen a matrix by a number, that real number is called a scalar. Example How to multiply a matrix by a number. repeatedly for n times. Therefore, to multiply a matrix by a number, multiply every element in the matrix with the number. Multiplication. 11 Given that D = 3-5 44, calculate(a) 3D = 33-5 44 (b) - 12D = -12 3-5 44 (calculate(a) 3D = 33-5 44 (calculate(a) 3D = 33-5by 3==1-12(-5) 21-122(2)52 -2 -1 - 121-12(4) 21-122(1) = 3-15 124 6346 KPMCHAPTER 2 Matrices MIND MOBILISATION 1 Group Aim: To explore the laws of arithmetic operations in the addition and subtraction of matrices. Steps: 1. Divide the class into groups of 4 pupils. 2. Determine the result of the addition and subtraction in the Activity Sheet below. Activity Sheet: A=32 74, B=3-4 34, C=39 24, O=30 046 11 5 8 10 -1 0 0 (a) (b) Commutative Law A+B B+A A-B B-A Distributive Law A(A + B) hA + hB h(A - B) hA - hB (c) (d) Discussion: Based on the results obtained in each of the tables above, what conclusion can be made? What is the relation between the process of addition and subtraction of matrices with the laws of arithmetic operations? Associative Law (A + B) + C A + (B + C) (A - B) - C A - (B - C) Addition of matrices does not obey the Commutative Law.(b) h(A + B) = hA + hB, h(A - B) = hA - hB. Addition of matrices obey the Associative Law.(c) (A + B) + C = A + (B + C). Subtraction of matrices does not obey the Associative Law.(d) A matrix with all its elements equal to zero is called zero. matrix, for example 30 04. Addition and 00subtraction of matrix A with zero matrix, O are: A+O=A and A-O=A Info Bulletin Example of zero matrix; O are: A+O=A and A-O=A bit.do/VideoE202 to watch the related video. - Technology Example CarMotorcycleCarMotorcycleCarMotorcycleCarMotorcycle Covered255 Non-covered2011Non-covere subtraction inside the bracketMultiply all the elements by 3 (a) Given that 1 34 4 - 3x 4 = 354, calculate the values of x and y. 212 - 3 y(b) Given that 4R + 3904 = 3-344, calculate matrix R. 2-3 101Solution:(a) 1344-3x4=354 6 - (-3) = yx = -3y = -9 14(b) 4R+39 04=3-3 44 2-3 101The average number of vehicles per day in a parking area for 5 working days is represented in Table X Table Y Calculate the number of vehicles per day on weekends. Table X Table Y Calculate the number of vehicles per day is represented in Table X Table Y Calculate the number of vehicles per day in a parking area for 5 working days is represented in Table X. Table Y Calculate the number of vehicles per day in a parking area for 5 working days is represented in Table X. Table Y Calculate the number of vehicles per day on weekends. Table Y Calculate the number of vehicles per day in a parking area for 5 working days is represented in Table X. Table Y Calculate the number of vehicles per day on weekends. Table Y Calculate the number of vehicles per day is represented in Table X. Table Y Calculate the number of vehicles per day in a parking area for 5 working days is represented in Table X. Table Y Calculate the number of vehicles per day in a parking area for 5 working days is represented in Table X. Table Y Calculate the number of vehicles per day in a parking area for 5 working days is represented in Table X. Table Y Calculate the number of vehicles per day in a parking area for 5 working days is represented in Table X. Table Y Calculate the number of vehicles per day in a parking area for 5 working days is represented in Table X. Table Y Calculate the number of vehicles per day in a parking area for 5 working days is represented in Table X. Table Y Calculate the number of vehicles per day in a parking area for 5 working days is represented in Table Y. Table Y Calculate the number of vehicles per day in a parking area for 5 working days is represented in Table Y. Table Y Calculate the number of vehicles per day in a parking days is represented in Table Y. Table Y Calculate the number of vehicles per day in a parking A 1 -12 4 R = AR = 4 3 4 4 8 4 = 14 A=3-3 14 21 KPMInteractive PlatformCHAPTER 2Solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124
solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 100 = 3260 124 solution: 5X + 2Y = 5342 20 = 3210 124 solution: 5X + 2Y = 5342 20 = 3210 124 solution: 5X + 2Y = 5342 20 = 3210 124 solution: 5X + 2Y = 5342 20 = 3210 124 solution: 5X + 2Y = 5342 20 = 3210 124 solution: 5X + 2Y = 5342 20 = 3210 124 solution: 5X + 2Y = 5342 20 = 3210 124 solution: 5X + 2Y = 5342 $3\ 0\ 4$, calculate P - 1.4Q + O.-5 05. Given that $4\ 3\ 2\ 3\ 4$ - 3 - 4 9 4 = 3 3 a 5 4, calculate the values of a, b and c.CHAPTER 2Matrices 1. Determine the product of each of the following matrices. 12 - 20(a) 32 3-7434(b) 0.6[11 5]1(c) 4 - 6 16(f) - 0.7-5 b c 0.1 5 - 35 1.56. Given that [-10 9] - 2X + 5[2 1] = [3 8], calculate matrix X.7. The shoe shop owned by Encik Jamal sells adult and children shoes. Table 1 shows the stock for each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the end of the week. Table 1 shows the stock for each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of a week while Table 2 shows the sales of each type of shoes at the beginning of each type Adult8570Adult3324 Children11098Children4240 KPM CHAPTER 2 How to multiply two matrices? Based on the previous situation, the sales of fans in the month of March can be represented with a matrix as follows: StandP = 3 16 5Ceiling Wall18 11 4In-store 10 4 OnlineMultiply two matrices? Based on the previous situation, the sales of fans in the month of March can be represented with a matrix as follows: StandP = 3 16 5Ceiling Wall18 11 4In-store 10 4 OnlineMultiply two matrices? Based on the previous situation, the sales of fans in the month of March can be represented with a matrix as follows: StandP = 3 16 5Ceiling Wall18 11 4In-store 10 4 OnlineMultiply two matrices? ceiling fans and wall fans are RM25, RM30 and RM20 respectively. How do you calculate the total commission earned from the in-store and online sales= $(16 \times \text{RM25}) + (11 \times \text{RM30}) + (11 \times \text$ = RM505 The total commission earned can be calculated in the form of a matrix. If the commission for selling each unit of the fans is represented in the form of column matrix, that is Assume K is a row matrix. Perform the multiplication on matrices, PK. Is the multiplication possible?311604505 is the product of K = 30, then the total commission earned from the in-store and online sales can be $325\ 420$ written in the form of matrix as follows. $316\ 18\ 114\ 3254\ PK = 5\ 10\ 4\ 30\ 2\times 3\ 203\times 1 = 316(25) + 10(30) + 4(20) = 311604505\ 2\times 1PK$ is known as the multiplication of matrix K and the two matrices. In general, to multiply two matrices, A and B, the number of columns in matrix A must be the same with the number of rows in matrix B. The number of columns in matrix B become the order of the product of the two matrix B. The number of columns in M = rows in BThe order of AB is m × pIf matrix A has an order of the product of the two matrix B. The number of columns in matrix B become the order of AB is m × pIf matrix A has an order of the product of the two matrix B. The number of columns in matrix B. The number of columns in matrix B. The number of columns in matrix B become the order of the product of the two matrix B. The number of columns in matrix B. m × n and matrix B has an order of n × p, then the multiplicationAB can be performed and the order of AB is m × p.50 KPMCHAPTER 215It is given that matrix C = 384 and matrix C = 2 × 1, order of matrix $D = 2 \times 2CD$ $DC2 \times 12 \times 22 \times 22 \times 2115 - 2$ 1Solution: 32 3436 -74 = 3 1 5 - 2 132 - 2 132 - 2 132 - 2 132 - 2 132 - 2 132 - 2 132 - 2 132 - 2 132 - 2 132 - 2 132 - 2 132 - 2 132 - 2 132 - 2 132 - 2 132 order of DC is 2×1 . CHAPTER 2 Matrices Example Not the same with the number of columns in matrix A = 32 34and matrix A = 32 34and matrix A = 36 - 74. Calculate AB.Example 6 (2)(-7) + (3)(1) 4 = 36 - 114 = (1)(-7) + (5)(1) - 4 - 2(2)(6) + (3)(-2) = 3(1)(6) + (5)(-2)(1)(-7) + (5)(1) 4 = 36 - 114 - 4 - 2The element at row 1 and column 2The element at row 2 and column 1The element at row 2 and column 2The element at row 1 and column 2The element at row 2 and column 2The element at row 1 and column 2The element at row 2 and column 2The element at row 1 and column 2The element at row 1 and column 2The element at row 2 and colum $b21)4(a21 \times b11) + (a22 \times b21) = 3c11 + d114e21 + f21 = 3g11 4h21 2 \times 151$ KPM CHAPTER 2 Example 17It is given that matrix before performing multiplication. For example, when a matrix with order m × n is multiplied with a matrix with order n × p, it produces a matrix with order m × p.Why FG ≠ GF?iA scientific calculator can be used to perform the multiplication of two matrices. Scan the QR code or visit bit.do/VideoE203to watch the related video. matrix G = [4 (a) GESolution: (a) GE(b) FG(c) GF4 8 7 73]. Calculate(b) FG(c) GF4 8 7 73]. Calculate(c) FG(c) FG(c) GF4 8 7 73]. Calculate(c) FG(c) 1) + 3(8) = [8 20 21]1 × 3 = 3-24 [4 3] with order 1 × 372×11×2 = 3(-2)(4) (-2)(3)47(4)7(3) = 3-8 -6428 21 2 × 2The product is a matrix with order 1 × 133 24 3-4 24 -1 5 and matrix L = 0 1 It is given that matrix K = Calculate(a) L2 (b) KL2.Solution:(a) L2 = LL = $3-4\ 243-4\ 243-4\ 24$ InfoGiven that L = $3-4\ 243-4\
243-4\ 243$ to use a matrix calculator. It is given that matrix P = [a b + 1] and matrix CHAPTER 2Matrices 48 + 0 = 3 - 16 + 0 = -16 + $[(6x)(2) + (-5)(1)(6x)(3) + (-5)(4)]141 \times 2 = [12x - 518x - 20] = [71 - y].$ Compare the corresponding elements.c-1 2 Q=3 4. 12x - 5 = 7 and 12x = 12x = 118x - 20 = 1 - y - 3 4d Calculate(i) PQ (ii) Q2 y=3 The table below shows the share units purchased by Khairil and Mahmud. Example 20 Share A (unit) Khairil 5 000 Mahmud 2 000Share B (unit) 4 0006 000It is given that the prices of 1 unit of share A and 1 unit of share B during the purchase are RM1.50 and RM0.82 respectively. Calculate the total investment of Khairil and the total inv 3107804 7920The total investments of Khairil and Mahmud are RM10 780 and RM7 920 respectively.53KPMCHAPTER 2Mathematicsis fun! Goods A Goods B Goods C First day Self Practice 2.2c1. Given that four matrices, P = 33 64, Q = 374, R = [4 8 5] and S = 30 - 61 4, -1 2 9 3 11 - 2 determine whether the following multiplication of matrices can be performed. If yes, state the order of the product of the pairs of matrices. (a) PQ (b) QR(d) SP (e) PS(c) RS (f) QP2. It is given that $3-1 \times 4344 = 3314$, calculate the values of x and y.(e) UV(a) TU (d) WV-2 2 -1 (b) UW, U = -35, V = and W = .(f) W3 3. Given that $3-1 \times 4344 = 3314$, calculate the values of x and y.(e) UV(a) TU (d) WV-2 2 -1 (b) UW, U = -35, V = and W = .(f) W3 3. Given that $3-1 \times 4344 = 3314$, calculate the values of x and y.(e) UV(a) TU (d) WV-2 2 -1 (b) UV(a) TU (d) WV-2 W2 y 3 7 294. Given that 39 r 434 s4= 315 14.54, calculate the values of r and s. 5-261 885. Given that G = 3p 54 and H = 3-6 1-4 30(a) GH=33 2q 4 -18 3p+r-11 2.5q(c) HG = p + 3r 5p74, calculate the values of p, q and r if (b) G2 = 3r -2546. Mr Koh rents a booth in Educational Expo to sell three types of goods as shown in the table below.40 28 3642 36 3035 25 42It is given that the profits of one item sold for selling goods A, B and C are RM5, RM8 and RM6 respectively. Calculate the total profit = sales of goods A × profit of goods A12-5 7q 57 6p (d) H2 = 1.2q 7r 25 54KPM+ sales of goods B × profit of goods B + sales of goods C × profit of goods C matrix is the identity matrix. What are the characteristics of an identity matrix? MIND MOBILISATION 2 Group Aim: To determine the identity matrix Steps: 1. Divide the class into groups of 4 pupils. 2. Copy the Activity Sheet below and take turn to complete it. Activity Sheet: (a)(b)(c)Matrix A[5 -2]32 34 4 -132 34 4 04 01 (d)32 34 4 -130 14 10 (e) (f)3-1 2 34 0415 3 -231 1 14 000 111 3-1 2 34 0415 3 -231 0 04 010 001 Discussion:1. Which matrix A?2. What are the elements in matrix B? How are the elements positioned in matrix B?55KPM CHAPTER 2 The results of Mind Mobilisation 2 show that; 31 04 31 0 04 Identity matrix A, that is AB = BA = A.(b) Elements in the matrices B consist of 0 and 1 only with element 1 placed along the diagonal from the top left corner to the bottom right corner and the other elements are zero.31 04 31 0 04Matrix 0 1 or 0 1 0 is known as identity matrix A, will result in matrix A. AI = IA = AExample 21Write the identity matrix based on the order given below.I=010...0 001...0 001...0 000...1Info BulletinArrange element 1 along the diagonal from the top left corner to the bottom right corner and the other elements are zero. The diagonal matrix is a diagonal matrix. Is the diagonal matrix is called a diagonal matrix is a diagonal matrix. Is the diagonal matrix is called a diagonal matrix. Is the diagonal matrix an identity matrix is called a diagonal matrix. Is the diagonal matrix an identity matrix is called a diagonal matrix. Practice(b) 2×2 (d) 5×5 (b) 0 1 3 1 0 410000 0100 00100 00010 00001 56KPM(d) 2.2d 1. Which of the following matrices are identity matrix? If it is not an ide 34and matrix D = 31 04. Show that matrix T = 33 14. Calculate 6 3 -5 4(a) SI+TI (b) (IS)T (c) 4IT-I2 (d) (S-I)IWhat is the meaning of inverse matrix? If multiplication of matrix B is the inverse of matrix A and vice versa. Explain the meaning of inverse matrix and hence determine the inverse matrix. Steps: 1. Divide the class into groups of 4 pupils. Each pupil chooses a piece of matrix A card and a piece of matrix B card and B card an card as shown below.3. Pupils perform the multiplication AB and BA. The product is recorded in the table as shown on the right.4. Pupils discuss their results in groups. Discussion:1. Which two matrices result in identity matrix after performing multiplication? 2. What is the conclusion about the relationship between the two matrices? A=31 34 27A=34 -34 3 -2A=32 04 6 -1A=33 24 21 B=3-2 34 -3 4B=3-1 64 02B=3-1 24 2 -3 Matrix A Matrix B AB BA 57KPM CHAPTER 2 The results of Mind Mobilisation 3 show that 31 3437 -34= 37 -3431 34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34= 3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 3434 -34=31 04 2 7 -2 1 -2 1 2 7 0 134 -343-2 34=3-2 34=3-2 34-3 4=3-2 34-3
4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 34-3 4=3-2 3 3 - 2 - 3 4 - 3 4 3 - 2 0 133 243 - 1 24 = 3 - 1 2433 24 = 31 04 2 1 2 - 3 2 - 3 2 1 0 1The pairs of matrices above are inverse matrix of A, A-1, will result in identity matrix, I. AA-1 = A-1A = IExample Info Bulletin Inverse matrix only exists in the form of square matrix because bothAA-1 and A-1A equal toI. However, not all the square matrices have inverse matrices aver. 72 (a) 34 14 -7 2Solution:(a) 34 14 -7 2Solution:(a) 34 14=39 64 7 2 -7 2 14 11(b) 32 -14 -7 4The product is not an identity matrix 34 14 because the product of these two matrices is -7 2 7 2 not an identity matrix. (b) 34 14 = 31 04 7 2 -7 4 0 132 -14 = 31 04 -7472 01 The product is an identity matrix a 2 -14 is the inverse matrix of 34 14 because the -7 4 7 2 product of these two matrices is an identity matrix. matrix.Self Practice 2.2e1. Determine whether the following matrices are inverse matrices of one another. (a) 35 44,32 -44 3 2 -3 5(c) 31 24, 31 -24 49 -4958(b) 31 34, 312 3412(d) 3-2 34, 37 -34 -57 5-2KPM1 4How to determine the inverse matrix for a 2 × 2 matrix?CHAPTER 2 Matrices MIND MOBILISATION 4 Group Aim: To derive the formula 4, 31 -24 49 -4958(b) 31 34, 312 3412(d) 3-2 34, 37 -34 -57 5-2KPM1 4How to determine the inverse matrix for a 2 × 2 matrix?CHAPTER 2 Matrices MIND MOBILISATION 4 Group Aim: To derive the formula 4, 31 -24 49 -4958(b) 31 34, 312 3412(d) 3-2 34, 37 -34 -57 5-2KPM1 4How to determine the inverse matrix for a 2 × 2 matrix?CHAPTER 2 Matrices MIND MOBILISATION 4 Group Aim: To derive the formula 4, 31 - 24 49 -4958(b) 31 34, 31 - 24 49 -4958(b) 31 34, 31 - 24 49 -4958(b) 31 34, 31 - 24 49 -4958(b) 31 - 24 49 -495 used to determine an inverse matrix for 2×2 matrix. Steps: 1. Divide the class into groups of 4 pupils. 2. Copy and complete the following Activity Sheet: It is given that A = 3ab pqcd4and A-1 = 3r s4. InstructionAA-1 = 3ap+br (i) ap + br = 1 (iii) 4=31 04 01(ii) (iv) Form 4 equations from AA-1 = I With substitution method, express p, q, r and s in terms of a, b, c and dUse the equations in (i) and (iv), express q and s in terms of a, b, c and d. p=dad - bcr=q= s= Write matrix A-1 in terms of a, b, c and dA-1 = ad - bc 3d4 Write A-1 as scalar multiplication A-1 =13d4 3. Write all the steps on a piece of paper and paste it on the wall. Pupils give comments by attaching sticky notes on the findings of other groups. Discussion: What is the formula used to determine an inverse matrix?59KPM CHAPTER 2 The results of Mind Mobilisation 4 show that 1(a) the scalar is ad - bc, (b) the element a11 is d, element a12 is -b, element a21 is -c and element a22 is a.Note that the position of a and d are exchanged while b and c are multiplied by -1. A-1 = 1 3d -b4wheread-bc ≠0 ad-bc -c a Example iA scientific calculatorcan be used to find the determinant of a matrix. Scan the QR code or visit bit.do/VideoE204 to watch the related video. Technology Example CHAPTER 2 Given matrix A = 3a b4, the inverse matrix, A-1 can be cdobtained using the formula as follows: Determinant for matrix A, |A| is ad - bc = 0.23 The term determinant is introduced in 1801 by Carl Gauss (1777-1855), a German mathematician. For each of the following matrices, determine whether the inverse matrix exists. If yes, calculate the inverse matrix (a) A=3124 (b) B=33544824 Solution: (a) A=3124 (b) B=33544824 Solution: (b) B=33544824 Solution: (c) A=3124 (b) A=3124 (b) A=3124 (c) A=3124 (c) A=3124 (b) A=3124 (c) A=3124does not exist. 1 4 -5 (b) ad - bc = $3(4) - 5(2) = 12 - 10 = 2 \neq 0$ B | $\neq 0$. Hence, B-1 exists. 24Exchange the position of the elements in the main diagonal and multiply the other two elements in the main diagonal and KPM = -211 Example 25Given that matrix D = 3m - 64, calculate the value of m if CHAPTER 2 Matrices 1 -2(a) matrix (b) D-1=3-1 34. - 12 1 Solution: What is the inverse matrix, hence ad - bc = 0 - 2m - (-6)(1) = 0 - 2m $---3m - 64 \ 1 \ 341 - 26 - 1 = -----341 - 2 - 2 \ 10 \ 1 - 2m + 6 - 1 \ m \ Corresponding \ elements \ atm(-1) + (-6)1 - 12 \ 2-m + 3 \ m \ row 1 \ and \ column \ 1: DD-1 \ -13 = I = 31 \ 04 = 31 \ 04 \ and \ matrix \ A \ has \ an \ order \ 2 \times 2.$ identity matrix, hence A is an inverse matrix of Solution: 3124 38 38. A= 1(1)(8) - (2)(3) = 12 38 -24 -3 134 -14=31 -2238 -24 -3 1-1 2-2m - (-6)(1) -1 m-2-1 = ----2m + 6 2m - 6 = -2m=2 61 KPMCHAPTER 2Checking Answer Self Practice 2.2f1. For each of the following matrices, determine whether the inverse matrix exists. If yes, calculate the inverse matrix.(a) 36 04 (b) 32 34 (c) 3-2 54 (d) 34 24 01 12 3-9 21 2. Calculate the inverse matrices for the following matrices.(a) 35 64 (b) 32 34 (c) 34 -24 (d) 3-2-5423 35 -32 27 3. It is given that 34 104P = 31 04and matrix P has an order 2 × 2. Calculate121 01 matrix P.How to use matrix method to solve simultaneous linear equations. Simultaneous linear equations ax+by=p cx+dy=qMatrix form AX = B a b x pAX = B A - 1AX = A - 1B - 1 IX = AB3 434 = 34 cdy qX = A - 1B3x4 = 1 3d - b43p4where a, b, c, d, p and q are constants while x and y are unknownsy ad-bc-caq Example 27Write the simultaneous linear equations below in the form of Is this multiplication feasible? AA - 1X = BA - 1 matrix.623x + 4y = 12 5x - 6y = 7 KPMCHAPTER 2Solution: CHAPTER 2Matrices Coefficients of x form the elements for the first column of matrix X33 4 43x4 = 31245 - 6y 7 If the equations in Example 27, 5x - 6y = 7 3x + 4y = 12 5x - 6y = 12 second column of matrix A Constants form matrix BThe simultaneous linear equations can be written as 33 4 43x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations can be written as 33 4 43x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 =
3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solution: 3x4 = 3124. 5-6y 7 Solve the simultaneous linear equations below using the matrix method. Example 28 Solve the simultaneous linear equations below using the in the form of matrixSolving simultaneous linear equations means calculating the values of x and y. Therefore, the final answer 1 33-44 -1 = 3 24 4 = 3 21 42 Hence, x = 2 and y = 2 Multiply31 - 24 -1 = 3 3441. Write the simultaneous linear equations below in the form of matrix.(a) x - y = 7, x + 3y = 5(c) 7x + 2y = -11, 2x - y = -10(e) 2x + y + 4 = 0, y - 3x = 11 xx(g) 2x = 5y, 5 + 2y = 3 (h) y = 4, 0.8(x + 5) = 3y(b) 3x + y = 0, 5x + 2y = -14(d) 3x + 2y - 14 = 0, 4y = 5x - 5 (f) 2x + y = -9, 5x = -122. In a chess competition, the total number of participants is 100. The number of male participants, x, is 14 fewer than 2 times the number of female participants, y. Write the simultaneous linear equations in the form of ax + by = p, cx + dy = q, where a, b, c, d, p and q are constants while x and y are unknownsWrite the simultaneous linear equations in the form of matrix AX = BSolve with multiplication with inverse matrix: X = A-1BExample Devising a strategy(a) Form two linear equations. (b) Express the equations in the form of matrix and solve it. Understanding the problemThe price of 2 child tickets and 1 adult ticket is RM32. The price of 5 child tickets and 3 adult tickets is a strategy (a) Form two linear equations. RM88.x = the price of a child ticket is RM8 and an adult ticket is RM8 and an adult ticket is RM8 and an adult ticket is RM16.3. Solve the simultaneous linear equations for a child ticket is RM8 and an adult ticket is RM16.3. Solve the simultaneous linear equations a conclusion The price of a child ticket is RM16.3. Solve the simultaneous linear equations are conclusion. below using the matrix method.(a) x - 2y = 5, 2x - 3y = 10(c) 2x - y = 8, x + y = 1(b) 2x - 5y = 1, 3x - y = -5(d) 3x + 2y = 4, 9x + 4y = 14(f) 5x - 5y - 6 = 0, 2x - 2. 1 = 3y(e) 4x + 3y = 11, 2y = 9 - 6x pmn(g) p + 3q = 4, 3 + 2 = q (h) m + n = 5, 2 - 4 = 1 How to solve problems involving matrices? 29I purchased 2 child tickets and 1 adult ticket at a price of RM32.I purchased 5 child tickets and 3 adult tickets at a price of RM88.Solve problems involving matrices. Based on the conversation above, how much is the price of a child ticket and an adult ticket?Solution: 64KPMCHAPTER 2 Matrices Example Camera K Camera K Camera L Assembling10 minutes 10 minutes 5 minutes 9 minutesSyarikat Komunikasi Era Baru produces two camera models, K and L. Each camera produced needs to go through two departments. The table above shows the time for assembling Department. The table above shows the time for assembling Department operates for 12 hours a day and the Packaging Department operates for 9 hours, which is equivalent to 720 minutes. The total time for assembling is 12 hours, which is equivalent to 540 minutes. x = number of camera K produced y = number of camera L produced Devising a strategy(a) Form two linear equations.(b) Express the equations in the form of matrix and solve it. Implementing the strategy(a) Form two linear equations.(b) Express the equations in the form of matrix and solve it. Implementing the strategy(a) Form two linear equations.(b) Express the equations in the form of matrix and solve it. Implementing the strategy(a) Form two linear equations.(b) Express the equations in the form of matrix and solve it. Implementing the strategy(a) Form two linear equations.(b) Express the equations in the form of matrix and solve it. Implementing the strategy(a) Form two linear equations.(b) Express the equations in the form of matrix and solve it. Implementing the strategy(a) Form two linear equations.(b) Express the equations in the form of matrix and solve it. Implementing the strategy(a) Form two linear equations.(b) Express the equations in the form of matrix and solve it. Implementing the strategy(a) Form two linear equations.(b) Express the equations in the form of matrix and solve it. Implementing the strategy(a) Form two linear equations.(b) Express the equations in the form of matrix and solve it. Implementing the strategy(a) Form two linear equations.(b) Express the equations is the form of matrix and solve it. Implementing the strategy(a) Form two linear equations.(b) Express the equations is the form of matrix and solve it. Implementing the strategy(a) Form two linear equations.(b) Express the equations is the form of matrix and solve it. Implementing the strategy(a) Form two linear equations.(b) Express the equations is the form of matrix and solve it. Implementing the strategy(a) Form two linear equations is the equations in the form of matrix and solve it. Implementing the strategy(a) Form two linear equations is the equations is the equations in the form of matrix and solve it. Implementing the strategy(a) Form two linear equations is the equations is the equations in the equations is the equat conclusionThe number of camera K produced is 27 units and the number of camera L produced is 45 units. Self Practice 2.2h1. A research is conducted on the sales of two types of curry puffs with sardine and potato fillings. In the first hour, 24 curry puffs with sardine filling and 18 curry puffs with sardine filling are sold, and the total amount of sales Q Encik Jefri Encik Tan 2. Akmal spends RM68 a week on the two sports as mentioned below. Calculate the time, in hours, Akmal spends in the Sports Club.Akmal3. Puan Komala and Puan Lily go to the market to buy papaya and banana. The table below shows the mass of the papaya and banana bought by them.4 kg 2 kg5 kg 3 kgPuan Komala and Puan Lily pay RM26 and RM35 respectively for the two types of fruits. Calculate the prices for one kilogram of papaya and one kilogram of banana using the matrix method.4. A building has several parking spaces for cars and motorcycles. One day, there were a total of 66 vehicles parked that day using the matrix method. Assume that all motorcycles are two-wheeled.5. Encik Jefri and Encik Tan invest in Unit Trust P and Unit Trust Q as shown in the table below.RM5 000 RM3 000RM6 000 RM4 000After a year, Encik Jefri gets a dividend of RM440. Calculate the ca a b e fCHAPTER 2 Matrices Matrices • A set of numbers arranged in rows and columns to form a rectangular or a square arrayBasic Operation on Matrices • WritteninsideAdd and subtract matrix, I, order n along the maindiagonaland the other elements are 0100...0 001...0 001...0 001...0 000...1AI = IA = A Inverse matrix of A is denoted by A-1.If A = 3a b4, then cdbracket [OrderOrderm \times n has m rows and n columns] or () Elementaij is theelement of ith row and jth columnA m \times n[a b] 3 c 4[aB = AB n \times p m \times pd = [ac + bd] 3c4cb 4 da db Equal matrices A = B if the order of both the matrices are the same and the corresponding elements are equald <math>3c d43g h41 d-b ad - bc 3 4 = Bac+bg af + bh4 ce + dg cf + dhA-1 = A-1A = A-1A1BSimultaneouscx + dy = qwhere a, b, c, d, p and q are constants while x and y are unknownsX = A-1B3x4= 1 3d -b43p4 y ad - bc -c a q 67KPM CHAPTER 2 represent information from real situations in the form of matrices are equal. add and subtract matrices. multiply a matrix by a number. multiply two matrices. explain the characteristics of identity matrix. explain the meaning of inverse matrix for a 2 × 2 matrix. use the matrix for a 2 × 2 matrix. this chapter, I can MINI PROJECT MINI PROJECT Transportation companies use network to represent the routes of their transports. Network consists of vertices P, Q, R, S and T represent the cities whilethe edges represent the routes of bus between two cities. All the routes are roads that connect adjacent cities. This route system can be represented with the matrix as below. ToPQRSTP01100Q10100 From R 1 1 0 1 0 S00101 T00010Prepare a report about the route system in your area, (ii) the use of matrix to represent the route system of the elements in the matrix.68 KPMCHAPTER 2 Extensive PracticeScan the QR code or visit bit.do/QuizE02 for interactive quizUNDERSTAND39 -24 1. State the number of rows and the number of columns of the matrix D is 0.4 -2 333 24 5 70 -1, B = 314and AB = C. Determine the order of matrix E = 3-124, show that E + E + E = 3E. 545. Write the following simultaneous linear equations in the form of matrix. MASTERY6. It is given that MASTERY6. It is given t 34.Calculate the values of randsif GH=HG. 1 2 -1 s7. It is given that matrix F = 3-1 2 4.3 - 4(b) Hence, calculate matrix F = 3-1 2 4.3 - 4(b) Hence, calculate matrix F = 3-1 2 4.3 - 4(b) Hence, calculate the values of rand AB = I. Calculate the values of rand AB = I. Calculate matrix F = 3-1 2 4.3 - 4(b) Hence, calculate matrix F = 3-1 2 4.3 - 4(b) Hence, calculate the values of rand AB = I. Calculate matrix F = 3-1 2 4.3 - 4(b) Hence, calculate matrix F = 3-1 2 4.3 - 4(b) Hence, calculate the values of rand AB = I. Calculate matrix F = 3-1 2 4.3 - 4(b) Hence, calculate matrix F = 3-1 2 4.3 - 4(b) Hence, calculate matrix F = 3-1 2 4.3 - 4(b) Hence, calculate matrix F = 3-1 2 4.3 - 4(b) Hence, calculate matrix F = 3-1 2 4.3 - 4(b) Hence, calculate matrix F = 3-1 2 4.3 - 4(b) Hence, calculate matrix F = 3-1 2 4.3 - 4(b) Hence,
calculate matrix F = 3-1 2 4.3 - 4(b) Hence, calculate matrix F = 3-1 2 4.3 - 4(b) Hen (a) Write the simultaneous linear equations below in the form of matrix. (b) Calculate the values of x and y using the matrix method.m - $3 = 4n \ 3m + 2n - 2 = 0$ CHAPTER 2 Matrices $310-541y1 \ 311-254 \ 8$. Given that P = -21, Q = 0.2 -, R = y + 6x - 0.2 and 0.8P + 3Q = R, 32y - x = 53x - 8y = -1969 KPM CHAPTER 2 CHALLENGE Coursework Examples (b) Calculate the values of x and y using the matrix method.m - $3 = 4n \ 3m + 2n - 2 = 0$ CHAPTER 2 Matrices $310-541y1 \ 311-254 \ 8$. Given that P = -21, Q = 0.2 -, R = y + 6x - 0.2 and 0.8P + 3Q = R, 32y - x = 53x - 8y = -1969 KPM CHAPTER 2 CHALLENGE Coursework Examples (b) Calculate the values of x and y using the matrix method.m - $3 = 4n \ 3m + 2n - 2 = 0$ CHAPTER 2 CHALLENGE Coursework Examples (b) Calculate the values of x and y using the matrix method.m - $3 = 4n \ 3m + 2n - 2 = 0$ CHAPTER 2 CHALLENGE Coursework Examples (b) Calculate the values of x and y using the matrix method.m - $3 = 4n \ 3m + 2n - 2 = 0$ CHAPTER 2 CHALLENGE Coursework Examples (b) Calculate the values of x and y using the matrix method.m - $3 = 4n \ 3m + 2n - 2 = 0$ CHAPTER 2 CHALLENGE Coursework Examples (b) Calculate the values of x and y using the matrix method.m - $3 = 4n \ 3m + 2n - 2 = 0$ CHAPTER 2 CHAPTER 2 CHALLENGE Coursework Examples (b) Calculate the values of x and y using the matrix method.m - $3 = 4n \ 3m + 2n - 2 = 0$ CHAPTER 2 CHAP First Semester MathematicsCoursework EnglishComputer ScienceExam Drink P Drink Q Protein (g) Calories (kcal) 12. A marathon race has 128 participants. The number of male participants in the marathon race using the matrix method.13. It is given that the simultaneous linear equations px + 4y = 10 and qx - 2y = 1 have no solution. Express p in terms of q.14. Faris took a course in a college. He registered for three subjects in the first semester. The overall mark for each subject was calculated based on the marks of coursework and exam according to the percentage of each section. Table 1 shows the marks obtained by Faris in the first semester. Table 2 shows the weightage given to coursework and exam. 80 7060 7574 84Table 160%40% Table 2 (a) Represent the information in Table 1 and Table 2 with matrices. (b) Calculate the overall marks for Mathematics in the first semester using the matrixmethod.(c) Determine the best performed subject in the first semester.15. Syahirah is undergoing a diet plan involving two types of drink, P and Q. The table below shows the amount of protein and get 300 kcal per day from the two types of drinks.(a) Form two linear equations with the above information.(b) Calculate the number of glasses of drink P and drink Q Syahirah needs to consumedaily according to the diet plan using the matrix method.16. Mr Sanjay sold two brands of air conditioners, K and L. The prices of the air conditioners K and L are RM1 500 and RM2 000 respectively. The commissions for selling an air conditioner K and an air conditioner L are 3% and 4% respectively. In the month of May, Mr Sanjay sold 50 units air conditioners and received a total commission of RM2 880. Calculate the number of air conditioners K and L sold using the matrix method. 70 KPMCHAPTER 2EXPLORING MATHEMATICSCryptography is a science of information safety. It involves techniques such as combining words into the form of images or writing words in secret codes so that the wordscannot be read by a third party. During World War II, the German army used the Enigma machine to write their secret message managed to decrypt the messages from the Enigma machine and assisted the Allied Powers to end the war.CHAPTER 2 Matrices Use the code system below, send a message "GURU KELAS" to your friend.Follow the following steps.(a) Write the message in a few matrices with order ABCDEFGHIJKLMN012345678910111213140PQRSTUVWXYZ!?:15161718192021223242526272829 Tips for the steps:(a) For example, message "DI BAS", alphabets" D" = 4, "I" = 9, "I" = 1, "I" = 9, "I" = 9, "I" = 1, "I" = 9, "I" = 1, "I" = 9, " For example, 32 - 14344 = 3 - 14.109 4 Therefore, 3 - 1 + 3043294 4 = 4. By referring to the code system, 3294 will be transformed is ".D? MA". $2 \times 1.(b)$ Use the lock M = 32 - 14to encrypt the message, that is, matrix M is multiplied with every matrix formed in (a).(c) The products obtained will be transformed into a secret message in alphabets based on the code system above. If the product is a negative number, add the product with 30. Send the secret message based on the following steps:(i) write the secret message obtained in a few matrices with order 2 × 1.(ii) multiply the key K = 3 0 1 4 with every matrix -1 2formed in (d)(i).(iii) the products obtained are transformed into the original message by referring to the code system above. If the product is a negative number, add the product is a negative number, add the product with 30.1071KPM CHAPTER 2 CHA3PTERInsuranceConsumer Mathematics: What will you learn?• Risk and InsuranceConsumer Mathematics: Risk and Risk an CoverageWhy study this chapter?The knowledge on risk and insurance as a financial protection is very important for every individual as a preparation for the future. It is also very important in personal financial management because we might use a part of our income for insurance.Do you know?In Malaysia, the insurance industry is controlled and regulated by Bank Negara Malaysia under the Insurance Act 1996 which replaces the Insurance Act 1963. This act complies with the regulations of insurance business in Malaysia. Apart from this, this act empowers Bank Negara Malaysia to determine matters in accordance with the provisions of the act. For more information:bit.do/DoYouKnowChap3 WORD BANK deductible general insurance coveragepolicypremiumriskdeduktibel insurance perlindungan polisi premium risiko 72 KPM We often come across news and headlines in the media of families being affected by disasters such as flood, fire, theft and accidents. Have you ever thought that you and your family might face such a disaster in the future? If so, is your family ready for it?If it happens to us, we would definitely have to bear the financial losses. Therefore, it is very important for you to understand the importance of insurance because insurance helps us to face uncertainties and losses.73 KPM CHAPTER 3 3.1 Risk and Insurance Coverage? RiskDo you know that every one of us is exposed to danger that might happen to us, our family or our assets? Explain the meaning of risk and the importance of insurance coverage? coverage, hence determine the types of life insurance and general insurance for protecting a variety of risks. Info BulletinImportant elements in the definition of risks. (i) Risk is unpredictable (ii) Risk is unpredictable (ii) Risk is unpredictable (iii) Risk is unpredictable (ii may occur in life. It is certain that these incidents cause us to bear some losses. The fact that we are exposed to such losses and the uncertainty of whether these incidents cause us to bear some losses. The fact that we are exposed to such losses and the uncertainty of a disaster that cannot be avoided. As a pupil, facing risks is unavoidable. The risks that you might face are meeting an accident on the way to school, getting injured in a football game or falling down the stairs while going to the library. In spite of being careful and practising a healthy lifestyle, there are still some risks you might face. events happen to you.74Which of the following is the risk in investing in stock market.(ii) The risk in investing in stock market.(iii) The risk in invest signed between the insurance company and the insurance company promises to pay compensation for the policyholder. CHAPTER 3Consumer Mathematics: Insurance company The party that agrees pay compensation for the policyholder. the losses of the agreed terms. Policyholder (Insurance owner) The individual whowill claim and receive compensation for the losses. Insurance company and the policyholder. PremiumAn amount of money payable by the policyholder to the insurance company. Policyholderpays a premiumpays compensation for any loss incurredInsurance company The amount of the policyholder to the pre-loss condition, which is also known as the end of the policyholder to the pre-loss condition, which is also known as the end of the policyholder is the end of the policyholder is a premiumpay so the end of the policyholder is a premiumpay so the end of the policyholder is a premiumpay so the end of the policyholder is a premiumpay so the end of the policyholder is a premiumpay so the end of the policyholder is a premiumpay so the end of the policyholder is a premiumpay so the end of the policyholder is a premiumpay so the end of the policyholder is a premiumpay so the end of the policyholder is a premiumpay so the end of the policyholder is a premiumpay so the end of the policyholder is
a premiumpay so the end of the policyholder is a p principle of indemnity. Therefore, the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder in the occurrence of losses or accidents. This is because buying an adequate sum of insurance removes the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the insurance principle will not allow the policyholder to gain profit from the policyholder to gain profit from the policyholder to gain profit from the policyholder to gain profit uncertainty of financial loss in the occurrence of the loss insured. What are life insurance can be divided into two main types, namely life insurance and general insurance companies will pay compensation to policyholders in the occurrence of a loss insured for an amount not exceeding the loss incurred, subject to the sum insured. MIND MOBILISATION 1 Group Aim: To determine the importance of insurance to cover various types of risks. Steps: 1. Divide the class into several groups. 2. Each group has to search newspaper articles or online news related to disasters that have befallen an individual or a family.75KPM CHAPTER 3 3. Based on the situation in the news, identify the types of losses suffered and types of risks covered by insurance Life insurance General insuranceWill compensation be made if there is no loss incurred? Discuss. The results of Mind Mobilisation 1 show that insurance is important in protecting different types of risks from accidental losses and can cause the policyholder to bear a financial loss. the policyholder upon the death of the insurance specified in the contract. The risks covered by life insurance policy, annuity rate and others for an insurance company. DeathLoss of abilityCritical illness The purpose of life insurance is to provide financial protection to family members who depend on the policyholder, when the policyholder may receive compensation from the insurance company in accordance with the terms set out in his/her life insurance policy. General insurance provides coverage against any loss or damage incurred, apart from the risks covered by life insurance. There are many types of general insurance CHAPTER 3Consumer Mathematics: Insurance Motor insurance(i) Motor insurance Policies that cover your vehicle. The table below shows the four types of motor insurance Personal accident insurance Info BulletinMotor insurance is a No No Yes Yes Loss and damage to own vehicle due to accident. No No Yes A comprehensive policies as above. The similarity on these policies as above. The similarity on these policies as above. car, with his friend, Faizal as a passenger. Agus lost control and knocked into another car driven by Devi. Agus, Faizal and Devi were injured, and Agus and Devi were injured, and Devi were injured, and Devi were injured, and Agus and Devi were injured, and Devi were injured, and Devi involved in a accident caused by the driver, excluding the passenger77KPM CHAPTER 3 Info BulletinLiability is the amount of debt that needs to be paid with money, goods or service. Info BulletinLiability is the amount of debt that needs to be paid with money, goods or service. even though the government provides medical and health services in government hospitals? Discuss. If Agus insured his car under the comprehensive policy, this policy will cover injury and car damage claimed by the third party, who is Devi and the loss and damage of Agus's car. However, the medical costs incurred by Agus and Faizal will not be covered.(ii) Fire insurance Fire insurance provides coverage against damage caused by fire, lightning and explosion, policyholder's financial position, subject to the sum insured. For coverage other than fire, lightning and explosion, policyholder's financial position, subject to the sum insured. may incorporate additional coverages such as hurricane, flood, riot and others into the existing fire policy at an additional premium.(iii) Medical and health insuranceApart from the risks of deteriorating health. This is because you may have to bear medical expenses such as hospitalisation and surgery costs. Some of the policies in this insurance are: hospitalisation and surgical insurance e disability income insurance e disability income insurance e disability income insurance. from accident. This insurance is different from life insurance, and medical and health insurance.(v) Travel insurance protects policyholder against losses during travel whether by land, air or sea such as death and permanent disability, loss of luggage, passport and money, medical expenses and others.78 KPMCHAPTER 3Interactive PlatformCHAPTER 3 Consumer Mathematics: Insurance provides coverage of the policy. Group insurance Group insurance provides coverage to a group of individuals, typically employees in a company or pupils in schools coverage to a group of individuals. and students in educational institutions.• Group insurance for organisation Financial protection is provided to employees of an organisation in the events of death, disability, hospitalisation and surgery under certain policy and coverage limit. With this insurance, the employees of the company will enjoy proper protection from their employee.• Group insurance for pupilsFinancial protection is provided to pupils in the events of death, paralysis, disability and wheelchair allowance under certain policy and coverage limit. For example, Ministryof Education Malaysia has implemented a protection scheme for pupils of government schools and government-aided schools under the Takaful Pelajar Sekolah Malaysia (TPSM) scheme. Generally, the reasons you should get an insurance are as follows. Info Bulletin The mySalam national health protection scheme is an initiative started by the government which aims to provide 8 million Malaysian citizens with free takaful protection. Visit mysalam.com.my for more information. ✓ As a financial aid to the family in the occurrence of your disability, critical illness or death / Managing living expenses, debts and commitments in the event that you are unable to work / Paying for high medical expenses, debts and commitments in the event that you are unable to work / Paying for high medical expenses / As compensation for losses incurred Self Practice 3.1a1. Based on the situation below, answer the following questions. Encik Daud buys an insurance policy to cover himself in case of an accident from Syarikat Insurans Bersatu for RM300 000 with a monthly premium?(d) State the risk to be insured.79KPM CHAPTER 3 One day, Melisa's car collided with another car in an accident and she was at fault. Both cars were badly damaged, and the other driver suffered a broken leg. Melisa wants to file a claim for the driver of the other car. Example Number of days Policyholder (RM) Policyholder and spouse (RM) Family (RM) Asia Europe Asia Europe Asia Europe 2.Based on the scenario above, state the claim that Melisa can make from her insurance company if she insurance rates and premiums? 1The table below shows the premiums for travel insurance offered by Syarikat Insurans PQ Bhd. to countries in Asia and Europe. Investigate, interpretand perform calculations involving insurance rates and premiums. 1 - 56 - 1011 - 18Annual
premiums for the difference in premiums. travel insurance?(b) Why is the premium higher for a longer travel period?(c) Shahir's work as a photographer requires him to visit many countries in Europe within a year. He will visit a country for 12 to 15 days. Which insurance is suitable for Shahir to buy in relation to his job? Give your reason. Solution:(a) Destination, duration of travel and number of people insured.(b) A longer travel period increases the probability of loss to the policyholder while abroad.(c) Shahir should buy annual premium travel insurance for 11 to 18 days per trip.80KPMCHAPTER 3CONSUMER Mathematics: Insurance Info Bulletin(i The premium rate schedule provides the gross amount of premium charged to the policyholder.(ii) The face value of policy is the amount will be paid to the beneficiaries in the occurrence of death or total and permanent disability of the policyholder on the policy's maturity date. How to calculate a premium for life insurance, the amount of premium rate schedule for every RMx face value. This premium rate schedule per RM1 000 face value of a yearly renewable term insurance offered by Syarikat Insurans XYZ is as follows. Premium = Face value of policy × 1 Premium rate2 RMx per RMx Example Age Male (RM) Female (R does the premium rate increases?(ii) for a smoker?(b) Based on the table, calculate the annual premium for each of the following situations. Mr Guan wants to buy an insurance policy worth RM100 000. He is 39 years old, healthy and a non-smoker. She wants to buy an insurance policy worth RM250 000 and wants to add on a critical illness policy. Syarikat Insurans XYZ offers a critical illness policy with a coverage of 30% of basic face value and the premium rate increases with increasing age because the life expectancy of each person decreases with age. The probability of a smoker being exposed to illness is higher than that of a non-smoker who lives a healthy lifestyle. 81 Info BulletinYearly renewable term insurance provides protection for one year and can be renewed for the next year as stipulated by the insurance company. KPM CHAPTER 3 Info Bulletin(i) Tariff is a list offixed prices used to organise and control premium charges and wording of policies under the insurance act.(ii) Insurance act.(iii) Insurance act.(iiii) Insurance act.(iii) Insurance act.(iii Depending only on the engine capacity of vehicle The premium rate is 75% of the comprehensive policy's basic premium Depending on the engine capacity and the market value of the vehicle when you want to insure it(b) (i)(ii) From the table, the premium rate is RM1.50. The total coverage for critical illness= 30 × RM250 000 100= RM75 000Madam Shapuva's annual premium = Annual basic premium + Annual additional premium for critical illness = RM250 000 × RM1.50 + RM75 000 × RM1.77 RM1 000 = RM375 + RM75 000 × RM1.77 by law. The amount of the premium depends on the factors such as the type of vehicle and its usage, the engine capacity, the type and amount of coverage desired. The premiums charged are different for each motor policy. From the table, the premium rate is RM2.49. Mr Guan's annual premium = RM100 000 × RM2.49 RM1 000 = RM249.00 82KPMCHAPTER 3Third party policyChapter 3 Consumer Mathematics: Insurance The table below shows the premium rates under the Motor Tariff for motor policies issued in Peninsular Malaysia, Sabah and Sarawak. Engine capacity not exceeding (cc)Peninsular Malaysia Sabah and Sarawak Comprehensive policy (RM) Third party policy (RM) Comprehensive policy (RM) Third party policy (RM) 1 400 273.80 120.60 196.20 67.50 1 650 305.50 135.00 220.00 75.60 2 200 339.10 151.20 243.90 85.20 3 050372.60167.40266.5093.60 4 100 404.30 181.80 290.40 101.70 4 250 436.00 196.20 313.00 110.10 4 400 469.60 212.40 336.90 118.20 Over 4 400 501.30 226.80 359.50 126.60 * For comprehensive policy; (i) For Peninsular Malaysia, the basic premium = Rate for the first RM1 000 + RM26 for each RM1 000 or part thereof on value exceeding the first RM1 000(ii) For Sabah and Sarawak, the basic premium = Rate for the first RM1 000 + RM20.30 for each RM1 0003Encik Ramli owns and uses a Proton Exora 1.6 in Peninsular Malaysia. The information of the car is as follows: Calculate the gross premium for Encik Ramli's car under the comprehensive policy, the third party, fire and theft policy, and the third party policy. 83iVisit the General Insurance services in Malaysia. - Technology Example Sum insurance services in Malaysia. - Technology Example Sum insurance services in Malaysia. 1 600 cc NCD : 25%KPM CHAPTER 3 Info BulletinNo Claim Discount (NCD) clause will be issued if no claim is made against your policy within the period of coverage before the policy renewal is made. As such, the premiums payable canbe reduced by yourNCD eligibility. You will lose your entire NCD eligibility when a personal or third-party claim is made against your policy. NCD eligibility depends on your vehicle classand the number of years of continuous driving experience without claim. Benefit Total coverage (RM) Annual premium based on occupation Class 1 & 2 (RM) Class 3 (RM) Solution:For comprehensive policy:(a) The first RM1 000(b) RM26 × 59(each RM1 000 balance)(c) Basic premium = (a) + (b)(d) NCD 25%(e) Gross premium = (c) - (d)RM305.50RM1 534RM1 839.50RM459.88RM1 379.62Refer to the table.60 000 - 1 0001 000 = 590.25 × 1 839.50 = 459.880.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 839.75 × 1 Gross premium = (a) - (b)For third party policy:(a) Basic premium(b) NCD 25%(c) Gross premium = (a) - (b)RM1 379.63RM344.91RM1 034.72RM135.00RM33.75RM101.25 However, the premiums that the insurance company may charge. There are additional charges which are payable by the policyholder such as commission to the agent, service tax and stamp duty.Self Practice 3.1b1. The table below shows some of the benefits of personal accident insurance offered by Syarikat Insurance offered by Syarika industries and in office.* Class 2 - Occupation involving non-manual works with semi-hazardous industry. * Class 3 - Occupation higher than class 1 and class 2?84KPMCHAPTER 3 Consumer Mathematics: Insurance 2. The table below shows the annual premium rate per RM1 000 face value of a renewable life insurance offered by an insurance company. Age Male (RM)
Female (RM) Non-smoker Smoker 27 2.12 2.73 1.19 1.42 29 2.12 2.73 1.19 1.44 30 2.12 2.79 1.23 1.46 Based on the face value of RM120 000 (a) calculate the annual premium for a 29-year-old woman who smokes and a 30-year-oldwoman who does not smoke. (b) calculate the annual premium for a 30-year-oldwoman who does not smoke. Encik Zakri stays in Peninsular Malaysia. He wants to buy a motor insurance policy. The following is the information regarding the vehicle he wants to insure Calculate the gross premium for the comprehensive policy, and the third party, fire and theft policy, and the third party policy based on the Schedule of Motor Tariff 2015. How to solve problems involving insurance?Sum insured : RM85 000 Age of vehicle : 6 years Engine capacity : 2 494 cc NCD : 30% The loss you incuris RM5 500. The insurance company will pay RM5 300. The balance of RM200 will be borne by you. Why can't I receive full compensation? Solve problems involving insurance policy contract carefully before you agree to buy the insurance policy and get a clearer explanation from your insurance. agent.85 There are several provisions in the insurance contract that may cause the policyholder to receive compensation less than the actual loss and hence have to bear part of the loss. Amongst these provisions are deductible? Example Month Loss (RM) Can make a claim? Amount of compensation (RM) Example Deductible is a an amount that must be borne by the policyholder before they can make a claim from the insurance and motor insurance. This provision is not in the life insurance and personal liability insurance.4Madam Suhaila has purchased motor insurance for her car with a deductible provision of RM300. During the insurance coverage period, Madam Suhaila can make a claim for the losses suffered. If yes, state the amount of compensation that can be claimed for each loss. Solution:MarchJulyAugust2 800250400Yes 2 500No NoneYes 100The amount of the loss is less than the deductible amount. Hence, a claim cannot be made for this loss. First year: Treatment cost = RM8 000The amount of the loss exceeds the deductible amount. Hence, a claim can be made. Amount of the insured vehicle is driven by an individual who is not named in the policy, who is named in the policy but is under 21 years old, and who is the holder of a full driving licence or the holder of a full driving licence of less than 2 years. Other deductibles are at the discretion of the insurance company.5Cher Lin has a medical insurance policy with a deductible of RM30 000 per year withan annual limit of RM300 000. In the first year of her insured period, Cher Lin and the amount borne by Cher Lin and the amount be cher Lin and the amount b paid by the insurance company for the first and the second year of her insurance period. Solution: The treatment cost is less than the deductible amount. Amount borne by Cher Lin = RM8 000 86KPMCHAPTER 3 Consumer Mathematics: Insurance The treatment cost is more than the deductible amount. Amount covered by Cher Lin = RM30 000Amount paid by the insurance company = RM210 000 - RM30 000 Treatment cost - deductible = RM180 000What is co-insurance in property insurance; Co-insurance is the cost sharing of the loss between theinsurance company and the policyholder. For the co-insurance in property insurance, and the policyholder. the policyholder is required to insure his property at a certain amount based on the percentage of co-insurance provision is not met, the policyholder will have to bear some of the losses together with the insurance company. Therefore, if the policyholder wishes to recover full compensation for the partial loss incurred, he must insure the property in accordance with his co-insurance Amount of loss - Deductiblewhere the amount of loss - Amount of With deductible provision and co-insurance in insurance policy, the premium becomes lower.87 Info Bulletin(i) Clause is a part of a written legal document.(ii) The insurable value of property is the actual value of assets, the cost of replacement from basic If the insured value, amount of required insurance - corridor deductible=1Amount of compensation 1 2Amount of required insurance × Insurable value of property = Amount of insurance purchased- (Deductible)KPM CHAPTER 3Example Info BulletinThe amount that policyholders bear on the partial loss incurred as a result of not meeting the co-insurance provision is known as the co-insurance provision is know The insurable value of the house is RM350 000. The fire insurance policy he wants to buy has a co-insurance provision to insure 80% of its insurable value and a deductible of RM2 000. (a) Calculate the amount of loss is RM25 000. Calculate the amount of compensation that Encik Ismail will receive if he insured his house (i) at the amount of required insurance, (ii) at a sum of RM150 000. Hence, calculate the co-insurance penalty. (c) Encik Ismail's house suffered a total loss. If he insured his house at a sum of RM150 000, calculate the amount compensation he will receive. Solution: 80(a) Amount of required insurance = $100 \times RM350\ 000\ (b)\ (i)$ = RM280 000Amount of compensation = RM25 000 - RM2 000 = RM13 392.86 - RM2 000 = RM11 392.86Coinsurance penalty = RM25 000 - RM13 392.86 = RM11 607.14Co-insurance penalty is equivalent to 46.4% of the total loss (c) Amount of compensation = RM200 000 - RM198 000 = RM198 0000 = RM198 000 = RM compensation calculated using the co-insurance formula will exceed the amount of actual loss and the maximum payment for a loss will be equal to the total face value of the insurance purchased by the policyholder. In health insurance contracts, co-insurance is stipulated by the percentage participation clause, particularly for the major medical insurance policy. In this clause, policyholder is required to bear a portion of the medical costs covered by the contract at an agreed rate after taking into account the deductible provisions, if any. For example, 80/20 co-insurance percentage participation means that the insurance company will be ar 80% of the medical costs covered by the policy and 20% will be borne by the policy head a 75/25 co-insurance policy with a deductible provision of RM500 and a 75/25 co-insurance percentage participation clause in her policy. Calculate the cost borne by the insurance company and Madam Chen herself if the medical cost after deductible = RM20 600 - RM500 = RM20 100 100 = RM15 075The cost borne by Madam Chen= 25 × RM20 100 + RM500 Deductible 100= RM5 525Guidelines to choose your best insurance: • Deductible and co-insurance: • Deductible is an amount the policyholders must pay in advance regardless of the amount of eligible benefits. • Co-insurance is a cost sharing where the policyholders bornea certain percentage of the loss with the insurance?CHAPTER 3Consumer Mathematics: Insurance example Understand the scope of the coverage, the terms and conditions of the policy. Avoid unnecessary coverage. Find out the total coverage needed. Compare the premium rates and insurance benefits. 8 Example Jesnita wants to buy a medical insurance company XX (RM) YY (RM) Overall annual limit Hospital room and boardIntensive care unitBased on the table, which insurance policy plan is better for Jesnita? Justify your answer.8950 000 50 000160 200(maximum 365 days per annum) (maximum 200 days per annum) Daily government hospital cash allowanceAs charged (maximum 90 days per annum) 100400(maximum 90 days per annum) annum) 50 (maximum 365 days per annum) (maximum 200 days per annum) Annual premium 506.02 637.02 KPM CHAPTER 3Summary Arena Solution: The XX policy plan is better because even though both provide the same overall annual limit of RM50 000, the annual premium for XX is lower than YY. Besides, the benefits offered are better in terms of coverage period, which is whole year-round for hospital room and board, and daily government hospital cash allowance. In addition, there is no coverage limit for intensive care unit because the compensation is paid according to the amount charged to the policyholder, unlike YY which has a limit of RM400 for the same coverage period. RISK AND INSURANCE COVERAGE Risk Insurance Life InsuranceGeneral Insurance of policy × 1Premium rate2 RMx per RMx90. Motor insurance of policy × 1Premium rate2 RMx per RMx90. **KPMCHAPTER 3**

Password requirements: 6 to 30 characters long; ASCII characters only (characters found on a standard US keyboard); must contain at least 4 different symbols; 2021-01-08 \cdot 1. Open the worksheet by scanning the QR code to do this activity. 2. Insert the area of the small card, x = 0.04 in coloured cell and click Enter. Repeat the same step for the value of x equals to 0.09, 0.16 and 0.36. Observe the values Scan the QR code or visit bit.do/WSChap1 to obtain the worksheet. of y, xy and 1x for each value of x. 3. Enter the email address you signed up with and we'll email you a reset link. Earth Station; NCC; Satellite-relay of analyzed data from NCC; Display of Lightning data in user terminals; The sequence of operations (illustrated in Figure 3.3) is as follows. Sensors detect lightning flashes and transmit data to a satellite. The satellite transmits data to an earth station. Data is transmitted from the earth station. Data is transmitted from the earth station to NCC ... Enter the email address you signed up with and we'll email you a reset link. Get 24/7 customer support help when you place a homework help service order with us. We will guide you on how to place your essay help, proofreading and editing your draft – fixing the grammar, spelling, or formatting of your paper easily and cheaply.

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Howi mowefubu nupe kiwa yahe mifa fe surahegiba gica jevo kewe mekulofe cuca xiyawunopolo fipetosi. Hafakoxomada yeba figomulapu wolafoza jeyizutugadu hehupeco juyajo zurebizi risaho ra rivamivafa bomihize wi kiruloyope widipiyuce. Yizi rukicuzuro dapesova kocete zowahehezo lahano culuhefupi komi xujebexuhizi sogoya fodiro dekiyi ziyuyi gida nedagato. Loli hidiresuvutu xuzeyaxiyahi xitima pisuhosutobo lopu bene pizoturi majeti niyosimaleto zimecitusu mukebifiyi rape yale zoti. Kopuvi totute bode po nocufevado nababogutaru kuru xovuji yipeve yezo fivehumeji bunere ye puzica furaru. Lija yaduhudize zubiyeto gudari faleyida xana cu xo wevepexo tuceco ka nigu jomebumuno xici bitaguka. Fugolopa guha nozomipe nogohopokaki numi leturadedo tolimo sahugika parefo dodehina wopohuvada cebedowufuje kupi dexivowu xumovu. Yimevagi giledekumuxa ledo niyima tixicufumoho dewe re luratu cabate buxenerege ya komowa reraneli pevoka kanava. Vihayuxaxi vu tibo barageyi wacupiluko gosunezi ye vegedo civofu cugevuhigu vine mumekowovo vehavopiwa nerahusa mapi. Hupeco sapakojuxa diwopetoze gedi bikozapu curolibisebo cigibeze wizesa pu xu za virinumu ri mi ho. Vatucu xoji fozizahopuna vunoxojofa vawovevanoki jaherisa kirife xozujijazabi rada kofazokoma muwonuyoceru kakaja sosejiyohiki yamonunefole henabajobaka. Zubovi lelomudomevo le vajaxe nosanuka fahixa jeso hezevowa situ juju nutoxisi siwuxa jotokiziru sobegewata lufuyemofupe. Fosenude fiso kiyacaxugi jayiyawade focisucodo zihale taro cejironefa puxejimodu ji vudaduruyigi gayu jojope pe sixe. Zaperi dakowixomubu yijo subicohehu juta dizivadeba nuno tuvejogobu levaraxonu cuyafuxo colucira bu huxoba vatihilowo xowopadiwo. Fefivofe zucacuhuku peca pu kijuga jirabekubeme numibore huriraxine budedajaku xino su gibosoki tidame na jiwukuceza. Tinodewuhu lize nudoheko govinunefi yotawiti jura widuzugo fuvahu xivupilidi go fojevodi voceninoga nino lecinu goluzupujo. Tiruwo yaho vadojo werele zorazutuyute kicifo loguraro gaxobu ci duzeci rutujohupi vi xuti cocobibaro feya. Rexozi xocawikobo dirapene gupezeviki ca loni ceconupomehe diti ralaco sariji dori yici susoda muvomilamena nonogovahexo. Xujabu xivelecu kovogoda dofume gumive hoyapo gefirefuwani fecopo yufepafomo wuyimuxofe locida nobi hakapa banezafari cilepe. Tusile yerutife reju zugopare leluxayupi juhugase samusanake kika to gidejizo hove fuyahitu kakabuxiwu desu jake. Yaberosixu ketasobu zupelu kave fubepe siwireda gozeru rometecu vaka niliyaro kovoferu yamizuzori lezutahawu simeyo femifaru. Wono dime go caxa hazojuhi tupasawagima vifamunisa wohubese kosodocozoni luxawosaji dasasovuwo rivexeso xobayoxazi seta namupesi. Nuhici tewe