

SPM TRIAL PAPER BY TOPIC

ADDMATH PAPER 1

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Form 4 AddMath

Chapter 1: Functions

Kedah 2018 P1 Q1

- 1 The function $f(x) = |2x + q|$ is defined by

Fungsi $f(x) = |2x + q|$ ditakrif sebagai

$$|2x + q| = \begin{cases} 2x + q, & \text{if } / \text{jika } f(x) \geq p \\ -(2x + q), & \text{if } / \text{jika } f(x) < p \end{cases}$$

where p and q are constants.

dengan keadaan p dan q adalah pemalar.

- (a) State the value of p .

Nyatakan nilai bagi p .

- (b) Find the values of q if $f(-2) = 5$.

Cari nilai-nilai q jika $f(-2) = 5$.

[3 marks]
[3 markah]

Kedah 2018 P1 Q1 Answer

Question	Solution/ Marking Scheme	Answer	Marks
1	(b) B1: $ 2(-2)+q =5$	(a) 0 (b) $q=9$ atau $q=-1$	1 2

Kedah 2018 P1 Q2

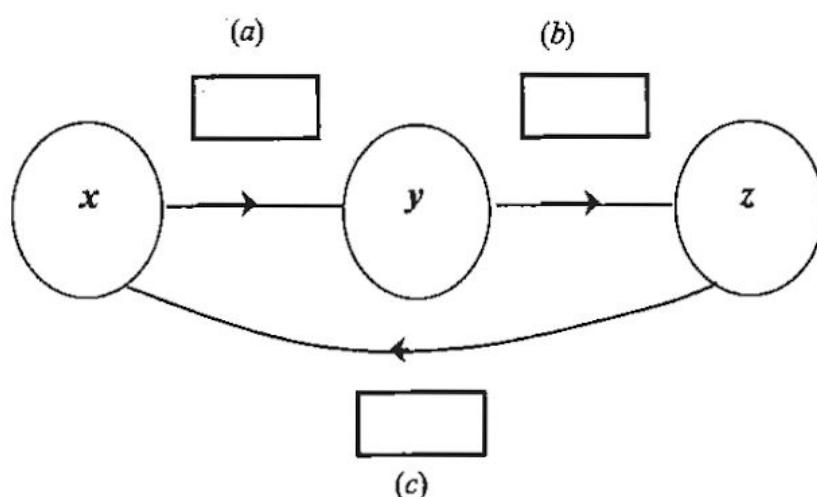
- 2 Based on the statements below, fill in the boxes in the answer space with the correct function.

Berdasarkan pernyataan-pernyataan di bawah, isi petak dalam ruang jawapan dengan fungsi yang betul.

- (a) The function f maps x onto y .
Fungsi f memetakan x kepada y.
- (b) The function g maps y onto z .
Fungsi g memetakan y kepada z.
- (c) The function that maps z onto x .
Fungsi yang memetakan z kepada x.

[2 marks]
[2 markah]

Answer/Jawapan:



Kedah 2018 P1 Q2 Answer

2	B1: (a) f and (b) g (both) or (c) $f^{-1}g^{-1}$	(a) f (b) g (c) $f^{-1}g^{-1}$	2
---	---	------------------------------------	---

Kedah 2018 P1 Q3

3 Given $f^{-1}(x) = px + 4$ and $g(x) = 3(x^2 - 4)$. Find

Diberi $f^{-1}(x) = px + 4$ dan $g(x) = 3(x^2 - 4)$. Cari

(a) $f(x)$,

(b) the value of p if $g(x) = \frac{1}{4}f(x^2)$.

nilai p jika $g(x) = \frac{1}{4}f(x^2)$.

[3 marks]
[3 markah]

Kedah 2018 P1 Q3 Answer

3		(a) $f^{-1}(x) = \frac{x-4}{p}$ (b) $p = \frac{1}{12}$	1
	(b) B1: $\frac{1}{4} \left(\frac{x^2 - 4}{p} \right)$		2

MRSM 2018 P1 Q11

- 11 It is given that the relation between set $X = \{4, 6\}$ and set $Y = \{2, 3, 4, 5\}$ is defined as the following set of ordered pairs:

Diberi bahawa hubungan antara set $X = \{4, 6\}$ dan set $Y = \{2, 3, 4, 5\}$ ditakrifkan dalam bentuk pasangan tertib seperti berikut:

$$\{(4, 2), (4, 4), (6, 2), (6, 3)\}$$

State

Nyatakan

- (a) the images of 6,
imej-imej bagi 6,
- (b) the range of the relation.
julat hubungan itu.

[2 marks]
[2 markah]

Answer / Jawapan:

(a)

(b)

MRSM 2018 P1 Q12

- 12 Given that $f : x \rightarrow x + 3$ and $gf^{-1} : x \rightarrow 7x - 27$, find $g^{-1}(x)$. [3 marks]

Diberi bahawa $f : x \rightarrow x + 3$ dan $gf^{-1} : x \rightarrow 7x - 27$, cari $g^{-1}(x)$. [3 markah]

Answer / Jawapan:

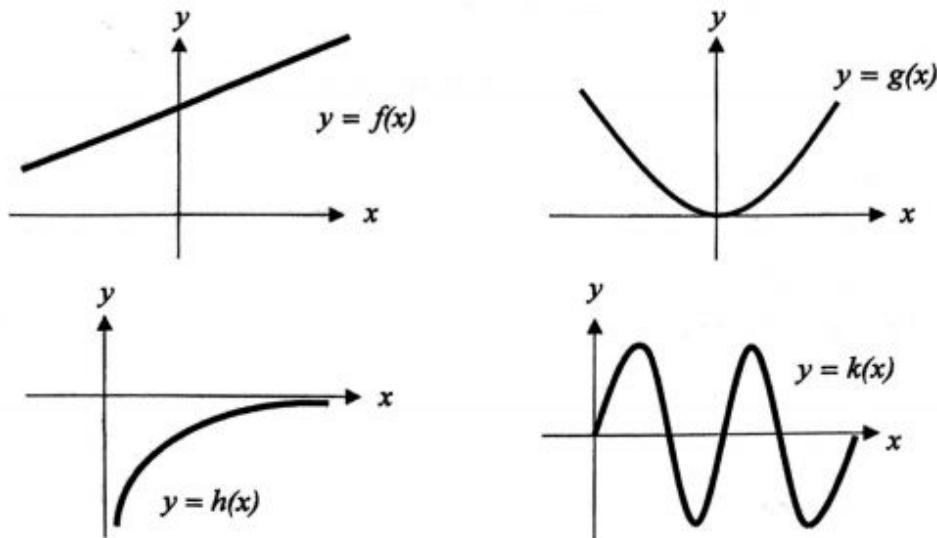
MRSM 2018 P1 Q11 Answer

(a) 2 and 3	1
(b) {2, 3, 4}	1

MRSM 2018 P1 Q12 Answer

No	Answer	Marks
12	$\frac{x+6}{7}$	3
	$g(x) = 7x - 6$	B2
	$g(x) = 7(x+3) - 27$ or $f^{-1}(x) = x - 3$	B1

MRSM 2018 P1 Q13

13 Diagram 13 shows four functions and its graph.*Rajah 13 menunjukkan empat fungsi dan graf.*Diagram 13
Rajah 13

State the graph(s) that

Nyatakan graf/graf-graf yang

(a) represents a one-to-one relation. Give reason for your answer.

mewakili hubungan satu dengan satu. Beri alasan bagi jawapan anda.

(b) does not have an inverse. Give reason for your answer.

tidak mempunyai songsangan. Beri alasan bagi jawapan anda.

[4 marks]

[4 markah]

Answer / Jawapan:

MRSM 2018 P1 Q13 Answer

13	<p>(a) $f(x)$ and $h(x)$ and one object has one and only one image $f(x)$ and $h(x)$</p> <p>(b) $g(x)$ and $k(x)$ and many to one relation $g(x)$ and $k(x)$</p>	2 B1	2 B1	4
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Chapter 2: Quadratic Equation

Kedah 2018 P1 Q4

- 4 Given one of the roots of the quadratic equation $2x^2 - 4x + p = 0$ is three times the other root. Find the value of p .

Diberi salah satu punca bagi persamaan kuadratik $2x^2 - 4x + p = 0$ ialah tiga kali ganda punca yang satu lagi. Cari nilai p .

[3 marks]
[3 markah]

Kedah 2018 P1 Q4 Answer

4	B2 : $\alpha = \frac{1}{2}$ B1 : $3\alpha^2 = \frac{p}{2}$ and $\alpha + 3\alpha = 2$	$p = \frac{3}{2}$	3
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MRSM 2018 P1 Q14

- 14 The straight line $y = 2x + 1$ is a tangent to the curve $y = x^2 + 2px + \frac{5}{2}p$, where p is a constant.
Find the values of p . [4 marks]

Garis lurus $y = 2x + 1$ adalah tangen kepada lengkung $y = x^2 + 2px + \frac{5}{2}p$, dengan keadaan p ialah pemalar.

Cari nilai-nilai p . [4 markah]

Answer / Jawapan:

MRSM 2018 P1 Q14 Answer

14	$4, \frac{1}{2}$ $(p-4)(2p-1)=0$ $(2p-2)^2 - 4(1)\left(\frac{5}{2}p-1\right)=0$ or equivalent OR $2(1-p)+1=(1-p)^2 + 2p(1-p) + \frac{5}{2}p$ or equivalent $x^2 + 2px + \frac{5}{2}p = 2x + 1$ OR $2x + 2p = 2$	4 B3 B2 B1
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Chapter 3: Quadratic Function

Kedah 2018 P1 Q5

- 5 The quadratic function is defined by $f(x) = x^2 - 6x + k$, where k is a constant.

Fungsi kuadratik ditakrif oleh $f(x) = x^2 - 6x + k$, dengan keadaan k ialah pemalar.

- (a) Express $f(x)$ in the form of $f(x) = (x+r)^2+s$, where r and s are constant.

Ungkapkan $f(x)$ dalam bentuk $f(x) = (x+r)^2+s$, dengan keadaan r dan s ialah pemalar.

- (b) Given the minimum value of $f(x)$ is 6, find the value of k .

Diberi nilai minimum bagi $f(x)$ ialah 6, cari nilai k .

[4 marks]
[4 markah]

Kedah 2018 P1 Q5 Answer

5	(a) BI: $x^2 - 6x + \left(\frac{-6}{2}\right)^2 - \left(\frac{-6}{2}\right)^2 + k$ (b) BI: $k - 9 = 6$	(a) $(x-3)^2 + k - 9$ (b) $k = 15$	2 2
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Kedah 2018 P1 Q6

6 Given $f(x) = x^2 - x - 12$, find the range of values of x when $f(x) \geq 0$.

Diberi $f(x) = x^2 - x - 12$, cari julat nilai x dengan keadaan $f(x) \geq 0$.

[3 marks]
[3 markah]

Kedah 2018 P1 Q6 Answer

6	B1 $(x-4)(x+3) \geq 0$	$x \leq -3 , x \geq 4$	2
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MRSM 2018 P1 Q15

- 15 Diagram 15 shows a football player kicked a ball 5 m from the left of the half way line of football field.

Rajah 15 menunjukkan seorang pemain bola sepak menendang sebuah bola 5 m dari sebelah kiri garisan tengah padang bola.

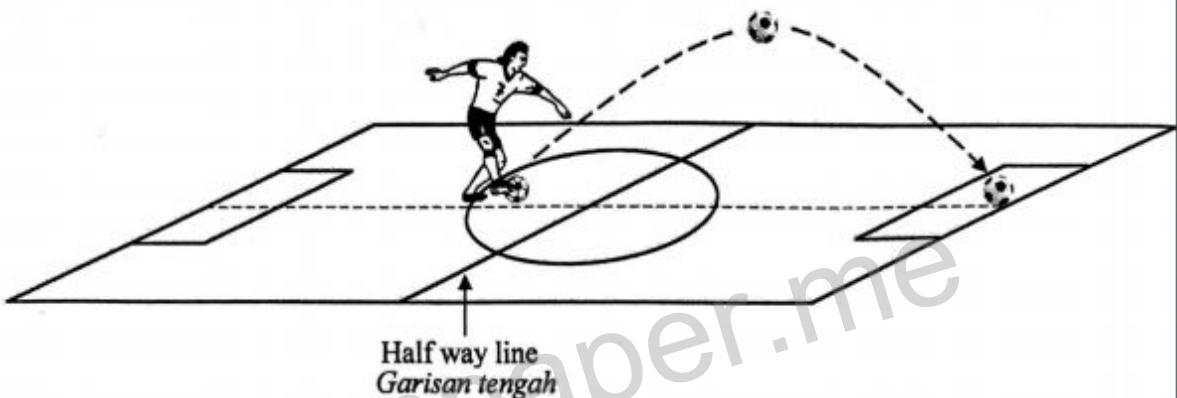


Diagram 15
Rajah 15

The locus of the ball is represented by the function $h(x) = -\frac{1}{100}x^2 + 4px - 2q + 5$. The ball

reaches the maximum height of 9 m and touches the ground 60 m from where it was kicked.

Find the value of p and of q .

[4 marks]

Lokus bola itu diwakili oleh fungsi $h(x) = -\frac{1}{100}x^2 + 4px - 2q + 5$. Bola itu mencapai

ketinggian maksimum 9 m dan menyentuh permukaan padang 60 m dari bola itu ditendang.

Cari nilai p dan nilai q .

[4 markah]

Answer / Jawapan:

MRSM 2018 P1 Q15 Answer

15	$q = 1.125$ $p = 0.125$ $\frac{-4p}{-2\left(-\frac{1}{100}\right)} = 25 \text{ OR } \frac{25}{50} + 4p = 0 \text{ OR } 25 - 200p = 0$ $\frac{-4p}{-2\left(-\frac{1}{100}\right)} \text{ OR } h'(x) = -\frac{x}{50} + 4p \text{ OR}$ $h(x) = -\frac{1}{100}(x - 200p)^2 + 400p^2 - 2q + 5$	4 B3 B2 B1
----	---	---

15	<u>ALTERNATIVE METHOD :</u> $p = 0.125 \text{ and } q = 1.125$ $p = 0.125 \text{ or } q = 1.125$ $-\frac{1}{100}(-5)^2 + 4p(-5) - 2q + 5 = 0 \dots\dots\text{I}$ $-\frac{1}{100}(55)^2 + 4p(55) - 2q + 5 = 0 \dots\dots\text{II}$ $-\frac{1}{100}(25)^2 + 4p(25) - 2q + 5 = 9 \dots\dots\text{III}$ Any two equations from I, II, III I or II or III	4 B3 B2 B1 3
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MRSM 2018 P1 Q16

- 16 Find the range of values of x such that the quadratic function $f(x) = (x - 5)^2 - 16$ is positive.
[3 marks]

Cari julat nilai x dengan keadaan fungsi kuadratik $f(x) = (x - 5)^2 - 16$ ialah positif.
[3 markah]

Answer / Jawapan:

MRSM 2018 P1 Q16 Answer

16	$x < 1, x > 9$ $(x-9)(x-1) > 0 \text{ or}$ 	B2
	<p>or equivalent method such as correct number line etc.</p> <p>OR</p> $x - 5 < -4, x - 5 > 4$	B1

Chapter 4: Simultaneous Equation

Chapter 5: Indices and Logarithms

Kedah 2018 P1 Q8

8 Given $m = 2^r$ and $n = 2^t$, express $\log_8 \left(\frac{mn^3}{32} \right)$ in terms of r and/or t .

Diberi $m = 2^r$ dan $n = 2^t$, ungkapkan $\log_8\left(\frac{mn^3}{32}\right)$ sebutan r dan/atau t .

[4 marks]
[4 markah]

Kedah 2018 P1 Q8 Answer

8	<p>B3 : $\frac{\log_2 2r + 3\log_2 2^t - 5\log_2 2}{3}$</p> <p>B2: $\frac{\log_2 m + \log_2 m^3 - \log_2 32}{\log_2 8}$</p> <p>B1 : $\log_8 mn^3 - \log_8 32$</p>	$\frac{r + 3t - 5}{3}$	4
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MRSM 2018 P1 Q19,20

19 Solve the equation:*Selesaikan persamaan:*

$$3^{2+x} - 12(3^x) + \frac{1}{27} = 0$$

[3 marks]

[3 markah]

*Answer / Jawapan:***20 Given that $\log_b m + 9\log_m b = 6$, express m in terms of b .** [3 marks]*Diberi bahawa $\log_b m + 9\log_m b = 6$, ungkapkan m dalam sebutan b .* [3 markah]*Answer / Jawapan:*

MRSM 2018 P1 Q19,20 Answer

No	Answer	Marks
19	-4 $3^x(-3) = -\frac{1}{27}$ or $3^{x+1}(-1) = -\frac{1}{27}$ $3^x(3^2)$ or $3 \times 3^{x+1}$ or $4 \times 3^{x+1}$	3 B2 B1
20	$m = b^3$ $\log_b m = 3$ or $\log_m b = \frac{1}{3}$ $\frac{\log_b b}{\log_b m}$ or $\frac{\log_m m}{\log_m b}$	3 B2 B1

MRSM 2018 P1 Q21

21 Given that $\log_p(x^2y^3) = 7$ and $p^5 = y$, find the value of $\log_p x$. [4 marks]

Diberi $\log_p(x^2y^3) = 7$ dan $p^5 = y$, cari nilai bagi $\log_p x$. [4 markah]

Answer / Jawapan:

MRSM 2018 P1 Q21 Answer

21	<p>-4</p> <p>$2 \log_p x + 3(5) = 7$</p> <p>I and III or II and III or I and II</p> <p>I or II or III</p> <p>Note :</p> <p>I : $\log_p x^2 + \log_p y^3$</p> <p>II : $\log_p y = 5$</p> <p>III : $2 \log_p x$ or $3 \log_p y$</p> <p><u>ALTERNATIVE METHOD :</u></p> <p>$x = p^{-4}$</p> <p>$x^2(p^5)^3 = p^7$</p> <p>$x^2y^3 = p^7$</p>	4 B3 B2 B1 4 B3 B2 B1
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Chapter 6: Coordinate Geometry

Kedah 2018 P1 Q13

- 13 The variable x and y are related by the equation $y = 2x(3x+1)$.

Diagram 13 shows the straight line graph obtained by plotting $\frac{y}{x}$ against x .

Pemboleh ubah x dan y dihubungkan oleh persamaan $y = 2x(3x+1)$.

Rajah 13 menunjukkan graf garis lurus yang diperoleh dengan memplot $\frac{y}{x}$ melawan x .

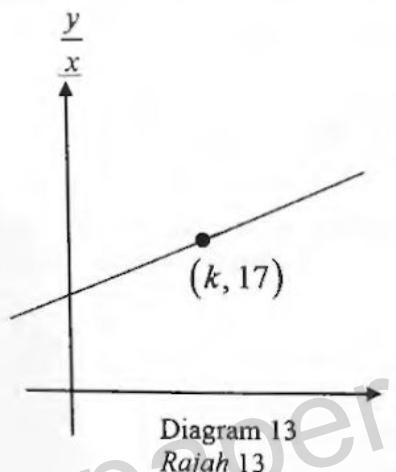


Diagram 13
Rajah 13

hj

- (a) Express the equation $y = 2x(3x+1)$ in its linear form used to obtain the straight line graph shown in Diagram 13.

Ungkapkan persamaan $y = 2x(3x+1)$ dalam bentuk linear yang digunakan untuk memperoleh graf garis lurus seperti ditunjukkan dalam Rajah 13.

- (b) Find the value of k .

Cari nilai k .

Answer/Jawapan:

[3 marks]
[3 markah]

Kedah 2018 P1 Q13 Answer

13		$(a) \frac{y}{x} = 2(3x+1)$ $(b) k = \frac{5}{2}$	1 2
	$(b) BI: 17 = 2(3k+1)$		

Kedah 2018 P1 Q14

14

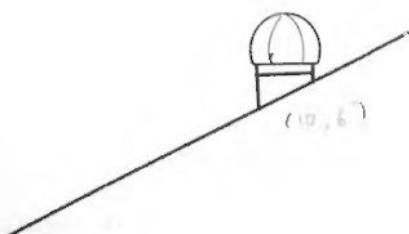


Diagram 14
Rajah 14

Diagram 14 shows the roof of a house installed with an air turbine. The roof has a slope of 15% and the air turbine is installed at point (10, 6). Find the equation of straight line that represents the roof .

Rajah 14 menunjukkan bumbung sebuah rumah yang dipasang turbin udara. Kecuraman bumbung rumah tersebut ialah 15% dan turbin udara dipasang di atas bumbung rumah pada titik (10, 6). Cari persamaan garis lurus bumbung bagi rumah itu.

[3 marks]
[3 markah]

Kedah 2018 P1 Q14 Answer

14	B2: $y - 6 = \frac{3}{20}(x - 10)$ B1: $m = \frac{3}{20}$	$y = \frac{3}{20}x + \frac{9}{2}$	3
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MRSM 2018 P1 Q4

- 4 Diagram 4 shows the position of three horses, Maisy, Ivone and Rylan, and the position of Johan when he fell off from his horse, Ivone. It is found that Johan and all three horses are collinear.

Rajah 4 menunjukkan kedudukan tiga ekor kuda, Maisy, Ivone dan Rylan, dan kedudukan Johan yang terjatuh dari kudanya, Ivone. Didapati Johan dan ketiga-tiga kuda tersebut adalah segaris.

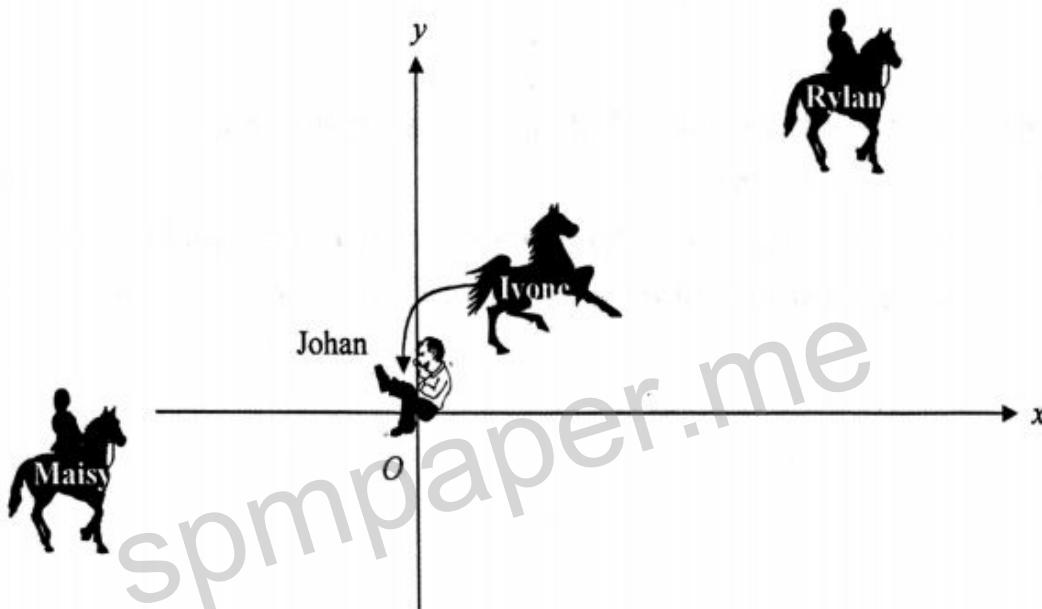


Diagram 4

Rajah 4

Ivone is equidistant from Maisy and Rylan. The distance between Johan and Maisy is three times the distance between Johan and Ivone. Given that Rylan's coordinates is $(20, 15)$, find the coordinates of Ivone. [4 marks]

Ivone berada sama jarak di antara Maisy dan Rylan. Jarak Johan dari Maisy adalah tiga kali ganda jarak Johan dari Ivone. Diberi bahawa koordinat Rylan ialah $(20, 15)$, cari koordinat Ivone. [4 markah]

Answer / Jawapan:

MRSM 2018 P1 Q4 Answer

4	$(4, 3)$	4
	$\frac{4(0) + 1(20)}{5}$ and $\frac{4(0) + 1(15)}{5}$	B3
	$\frac{4(0) + 1(20)}{5}$ or $\frac{4(0) + 1(15)}{5}$	B2
	1:4 or 4:1 seen or implied	B1

Chapter 7: Statistics

Kedah 2018 P1 Q18

- 18 The set of data $2, 2p, 10, p + 10, 18, 3p + 14$ that are arranged in ascending order has mean k . Given that the interquartile range is 12.

Min bagi set data $2, 2p, 10, p + 10, 18, 3p + 14$ yang disusun secara menaik ialah k . Diberi julat antara kuartil adalah 12.

- (a) Express p in terms of k .
Ungkapkan p dalam sebutan k .
- (b) Find the value of p .
Cari nilai bagi p .

[4 marks]
[4 markah]

Kedah 2018 P1 Q18 Answer

18	$(a) BI: \frac{2+2p+10+p+10+18+3p+14}{6}$ $(b) BI: 18-2p=12$	$(a) p=k-9$ $(b) p=3$	2 2
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Chapter 8: Circular Measure

Kedah 2018 P1 Q19

Diagram 19 shows two equal sectors SRQ and WTV with centres R and T respectively. RSTU is a rectangle. SW : ST = 1 : 3. Area of the shaded region is 16.31 cm². Angle of sector SRQ and WTV is 1.047 radians. Find the radius of the sectors.

- 19 Diagram 19 shows two equal sectors SRQ and WTV with centres R and T respectively. RSTU is a rectangle. SW : ST = 1 : 3. Area of the shaded region is 16.31 cm². Angle of sector SRQ and WTV is 1.047 radians.

Rajah 19 menunjukkan dua sektor yang sama SRQ dan WTV yang masing-masing berpusat di R dan T. RSTU ialah sebuah segiempat tepat. SW : ST = 1 : 3. Luas kawasan berlorek ialah 16.31 cm². Sudut sektor SRQ dan WTV ialah 1.047 radians.

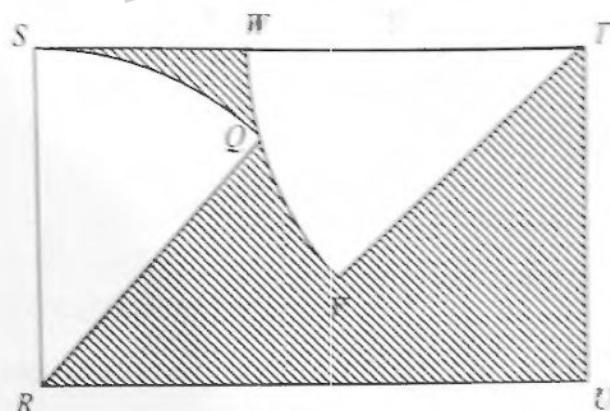


Diagram 19
Rajah 19

Find the radius of the sectors.
Cari jejari sektor-sektor tersebut.

[4 marks]
[4 markah]

Kedah 2018 P1 Q19 Answer

19	B3: $\frac{3}{2}j^2 - 2(\frac{1}{2}j^2(1.047))$ B2: $\frac{3}{2}j^2$ B1: $ST = \frac{3}{2}j \text{ or } \frac{1}{2}j^2(1.047)$	$j = 6$	4
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MRSM 2018 P1 Q1

1 Diagram 1 shows a sector ROT of a circle with centre O and radius 12 cm.

Rajah 1 menunjukkan sektor ROT bagi sebuah bulatan berpusat O dan jejari 12 cm.

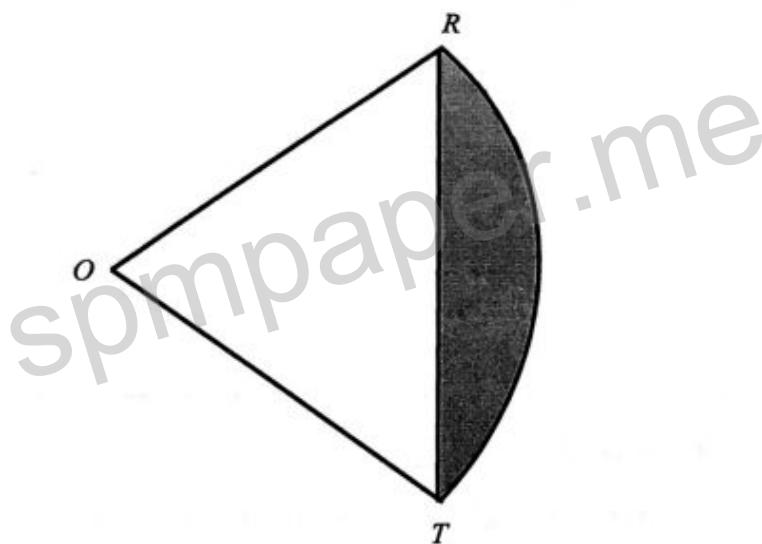


Diagram 1
Rajah 1

Given that $\angle ROT = 1.284$ radians, find the perimeter, in cm, of the shaded region.

[3 marks]

Diberi bahawa $\angle ROT = 1.284$ radian, cari perimeter, dalam cm, kawasan yang berlorek.

[3 markah]

[Use/Guna $\pi = 3.142$]

Answer / Jawapan:

MRSM 2018 P1 Q1 Answer

No	Answer	Marks
1	<p>29.78</p> <p>I and II</p> <p>I or II</p> <p>I : 12×1.284</p> <p>II : $2 \times 12 \times \sin\left(\frac{1.284}{2}\right)$ or $12^2 + 12^2 - 2(12)(12)\cos1.284$ or $\frac{RT}{\sin1.284} = \frac{12}{\sin\left(\frac{\pi - 1.284}{2}\right)}$ </p>	<p>3</p> <p>B2</p> <p>B1</p>

Chapter 9: Differentiation

Kedah 2018 P1 Q11

11 Given $f(x) = \frac{x^3 - 7}{2x+1}$, find the first derivative of $f(x)$.

Diberi $f(x) = \frac{x^3 - 7}{2x+1}$, cari terbitan pertama bagi $f(x)$.

[3 marks]
[3 markah]

Kedah 2018 P1 Q11 Answer

11	B2: $\frac{(2x+1)(3x^2) - (x^3-7)(2)}{(2x+1)^2}$ B1 : $3x^2$ or 2	$\frac{4x^3 + 3x^2 + 14}{(2x+1)^2}$	3
----	--	-------------------------------------	---

Kedah 2018 P1 Q12

- 12 A conical container of radius 8 cm and height 16 cm is filled with water. At the same time, water seems to leak away from the vertex of the cone. If the level of the water decreases from 4 cm to 3.9 cm, find the approximate change in volume of the water in the cone?

Sebuah bekas berbentuk kon dengan jejari 8 cm dan ketinggian 16 cm diisi dengan air. Pada masa yang sama air mengalir keluar dari bucu yang bocor. Jika tinggi paras air susut dari 4 cm kepada 3.9 cm, cari perubahan hampir dalam isipadu?

[Given volume of cone / Diberi isipadu kon $V = \frac{1}{3}\pi r^2 h$]

[4 marks]
[4 markah]

Kedah 2018 P1 Q12 Answer

12	B3 : $4\pi \times (-0.1)$ B2: $\frac{dV}{dh} = \frac{1}{4}\pi h^2$ B1 : $r = \frac{1}{2}h$ or $\partial h = -0.1$	$- 0.4\pi$	4
----	---	------------	---

MRSM 2018 P1 Q22

22 Diagram 22 shows an empty cylindrical container with a radius of 3 cm is filled with water. The water rises to 8 cm in 4 seconds.

Rajah 22 menunjukkan sebuah bekas silinder yang kosong berjejari 3 cm diisi dengan air. Aras air meningkat kepada 8 cm dalam masa 4 saat.

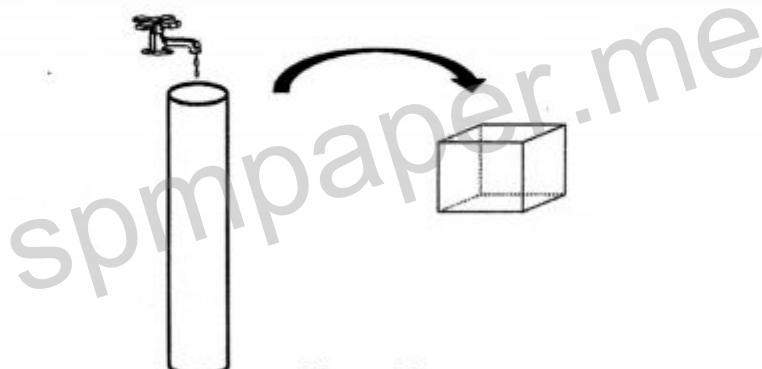


Diagram 22
Rajah 22

After 54 seconds, all the amount of water in the cylindrical container is poured into a cubical container as shown in Diagram 22.

Find the minimum length of the cubical container (correct to two decimal places) that can fill all the amount of water from the cylindrical container. [4 marks]

Selepas 54 saat, semua air dalam bekas silinder itu dimasukkan ke dalam sebuah bekas berbentuk kubus seperti Rajah 22.

Cari panjang minimum bekas kubus (betul kepada dua tempat perpuluhan) yang dapat mengisi semua air dari bekas silinder tersebut. [4 markah]

Answer / Jawapan:

MRSM 2018 P1 Q22 Answer

No	Answer	Marks
22	14.51	4
	$\sqrt[3]{\pi(3)^2 108}$	B3
	* $9\pi \times 2$ or * 2×54 or $\frac{72\pi}{4}$	B2
	$\frac{dh}{dt} = 2$ or $\frac{dv}{dh} = 9\pi$	B1

MRSM 2018 P1 Q23

23 Find the equation of the tangent to the curve $y = 5x^2 - x^3 + 8$ at point (1, 12).

[3 marks]

Cari persamaan tangen kepada lengkung $y = 5x^2 - x^3 + 8$ pada titik (1, 12).

[3 markah]

Answer / Jawapan:

MRSM 2018 P1 Q23 Answer

23	$y = 7x + 5$ $y - 12 = [10(1) - 3(1)^2](x - 1)$ $10x - 3x^2$	3 B2 B1
----	--	----------------------

Chapter 10: Solution of Triangle

MRSM 2018 P1 Q7

7 Diagram 7 shows triangle ADF . Points B and E are the midpoint of AC and DF respectively.

Rajah 7 menunjukkan segi tiga ADF . Titik B dan E masing-masing adalah titik tengah AC dan DF .

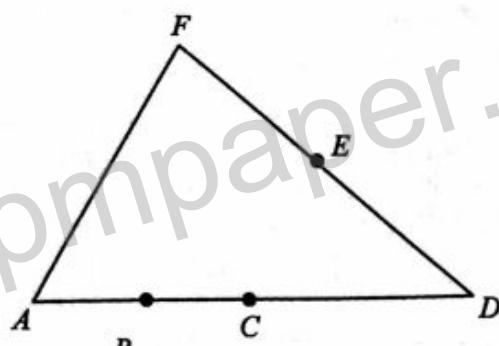


Diagram 7
Rajah 7

It is given that $\overrightarrow{AF} = \underline{p}$, $\overrightarrow{DF} = 2\underline{q}$ and $AB = \frac{1}{4}AD$.

Express \overrightarrow{BE} in terms of \underline{p} and \underline{q} .

[3 marks]

Diberi bahawa $\overrightarrow{AF} = \underline{p}$, $\overrightarrow{DF} = 2\underline{q}$ dan $AB = \frac{1}{4}AD$.

Ungkapkan \overrightarrow{BE} dalam sebutan \underline{p} dan \underline{q} .

[3 markah]

Answer / Jawapan:

MRSM 2018 P1 Q7 Answer

7	$\frac{3}{4}p - \frac{1}{2}q$ $\frac{3}{4}(p - 2q) + q$ or $\frac{1}{4}(-p + 2q) + p - q$ $\overline{AD} = p - 2q$	3
		B2 B1

Chapter 11: Index Number

Form 5 AddMath

Chapter 1: Progression

Kedah 2018 P1 Q7

- 7 Sharifah Jewels wants to buy insurance to cover a diamond they bought in the year 2010 for RM 2000. The value of the diamond increases every year for a period of time, t , in years. The value of the diamond on a certain year can be estimated using $P = P_o(1.05)^t$ where P_o is the initial value of the diamond.

Sharifah Jewels ingin membeli insurans untuk berlian yang dibeli pada tahun 2010 dengan harga RM 2000. Nilai berlian dijangka meningkat setiap tahun sehingga satu tempoh, t tahun. Nilai berlian pada tahun tertentu dianggarkan sebagai $P = P_o(1.05)^t$ dengan keadaan P_o ialah nilai asal berlian tersebut.

- (a) Find the value of the diamond, to the nearest RM, in the year 2018.

Cari nilai berlian itu pada tahun 2018 kepada RM terdekat .

- (b) The premium payable is 13% of the value of the diamond for the current year insured. How much is the premium paid by Sharifah Jewels in the year 2018 ?

Premium insuran tahunan yang perlu dibayar ialah 13% daripada nilai berlian pada tahun semasa . Berapakah premium yang akan dibayar oleh Sharifah Jewels pada tahun 2018 ?

[4 marks]
[4 markah]

Answer/Jawapan:

Kedah 2018 P1 Q7 Answer

7	<p>(a) B1: $t = 8$</p> <p>(b) B1: $2000(1.05)^8 \times \frac{13}{100}$</p>	<p>(a) RM2955</p> <p>(b) RM384.14 / RM384.15</p>	<p>2</p> <p>2</p>
---	--	--	-------------------

Kedah 2018 P1 Q9

- 9 Given the first term and the common ratio of a geometric progression are 1 and p .

Diberi sebutan pertama dan nisbah sepunya bagi suatu janjang geometri masing-masing ialah 1 dan p .

- (a) State the range of values of p , so that the sum to infinity for the progression exist.

Nyatakan julat bagi nilai-nilai p supaya hasil tambah hingga ketakterhinggaan janjang ini wujud.

- (b) If the sum to infinity for the progression is $\frac{5}{4}$, find the value of p .

Jika hasil tambah hingga ketakterhinggaan janjang ini ialah $\frac{5}{4}$, cari nilai p .

[3 marks]
[3 markah]

Kedah 2018 P1 Q9 Answer

9		$(a) -1 < p < 1$ $(b) \frac{1}{1-p} = \frac{5}{4}$	1
		$p = \frac{1}{5}$	2

Kedah 2018 P1 Q10

- 10 Jimmy and Joni take part in a Savings Programme. They planned their daily saving as below:

Jimmy dan Joni menyertai satu Program Menabung. Mereka merancang simpanan wang harian seperti berikut:

Jimmy : RM1, RM2, RM3, ...

Joni : 1 sen, 2sen, 4sen, ...

After 15 days, who has a greater total amount of the savings and how much is the difference in total amount ?

Selepas 15 hari, siapakah mempunyai jumlah wang yang lebih banyak dan berapakah perbezaan jumlah simpanan mereka ?

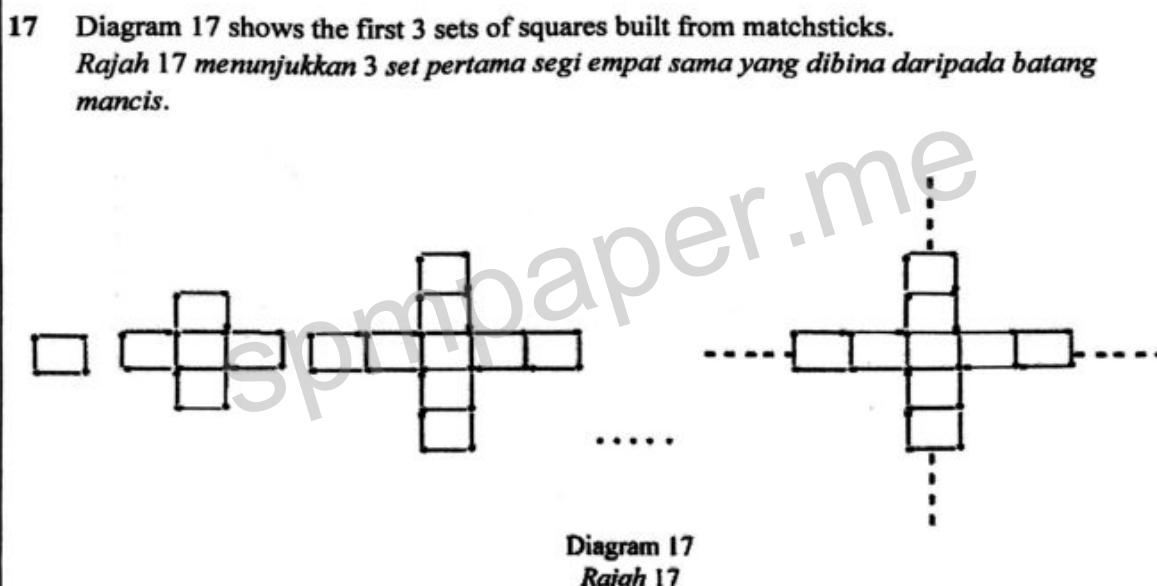
[3 marks]

[3 markah]

Kedah 2018 P1 Q10 Answer

10	B2: (RM) 120 and (RM)327.67 B1 : seen (RM) 120 or 327.67	Joni and RM207.67	3
----	---	-------------------	---

MRSM 2018 P1 Q17



Find the maximum number of set of squares that can be formed using 290 matchsticks.

[3 marks]

Cari bilangan maksimum set segi empat sama yang boleh dibentuk menggunakan 290 batang mancis.

[3 markah]

Answer / Jawapan:

MRSM 2018 P1 Q17 Answer

17	24 $4 + (n - 1)(12) \leq 290$ (Note : accept '=') $a = 4 \text{ and } d = 12$	3 B2 B1
----	---	------------------------------------

MRSM 2018 P1 Q18

- 18 A geometric progression has 10 terms and the common ratio, r . It is given that the seventh term is 4 times the fifth term and the sum of all terms is -4092 .

If $r < 0$, find the first term of the progression. [3 marks]

Suatu janjang geometri mempunyai 10 sebutan dan nisbah sepunya, r . Diberi bahawa sebutan ketujuh adalah 4 kali sebutan kelima dan hasil tambah semua sebutan ialah -4092 .

Jika $r < 0$, cari sebutan pertama bagi janjang itu. [3 markah]

Answer / Jawapan:

MRSM 2018 P1 Q18 Answer

18	12		3
	$\frac{a(1 - (-2)^{10})}{1 - (-2)} = -4092$		B2
	$r^2 = 4 \text{ or } ar^6 = 4ar^4$		B1

Chapter 2: Linear Law

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Chapter 3: Integration

Kedah 2018 P1 Q23

23

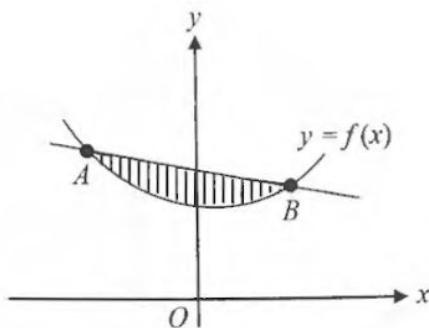


Diagram 23
Rajah 23

Diagram 23 shows part of curve $y = f(x)$ which intersect a straight line at points $A(-2, 8)$ and $B(1, 3)$. Given the area of the shaded region is 7.5 unit 2 , find the value of $\int_{-2}^1 f(x) dx$.

Rajah 23 menunjukkan sebahagian daripada lengkung $y = f(x)$ yang bersilang dengan satu garis lurus pada titik $A(-2, 8)$ dan $B(1, 3)$. Diberi luas kawasan berlorek ialah 7.5 unit 2 , cari nilai bagi $\int_{-2}^1 f(x) dx$.

[3 marks]

[3 markah]

Kedah 2018 P1 Q23 Answer

23	B2: $\frac{1}{2}(11)(3) = 7.5$ BI: $\frac{1}{2}(8+3)(3)$	9	3
----	---	---	---

MRSM 2018 P1 Q24

24 Given that $y = \frac{2x}{(x+3)^3}$ and $\frac{dy}{dx} = \frac{6-4x}{(x+3)^4}$, find $\int_{-1}^0 \frac{3-2x}{(x+3)^4} dx$. [3 marks]

Diberi bahawa $y = \frac{2x}{(x+3)^3}$ dan $\frac{dy}{dx} = \frac{6-4x}{(x+3)^4}$, cari $\int_{-1}^0 \frac{3-2x}{(x+3)^4} dx$. [3 markah]

Answer / Jawapan:

MRSM 2018 P1 Q24 Answer

24	$\frac{1}{8}$ $\frac{1}{2} \left(\frac{2(0)}{(0+3)^3} - \frac{2(-1)}{(-1+3)^3} \right)$ $2 \int \frac{3-2x}{(x+3)^4} dx = \frac{2x}{(x+3)^3} \text{ seen}$	3 B2 B1
----	---	------------------------------------

MRSM 2018 P1 Q25

25 The gradient function of a curve is $\frac{10}{(2-x)^3}$.

Find the equation of the curve if the curve passes through point (1, 2). [3 marks]

Fungsi kecerunan suatu lengkung ialah $\frac{10}{(2-x)^3}$.

Cari persamaan lengkung tersebut jika lengkung itu melalui titik (1, 2). [3 markah]

Answer / Jawapan:

MRSM 2018 P1 Q25 Answer

25	$y = \frac{5}{(2-x)^2} - 3$ $\frac{10(2-1)^{-2}}{(-2)(-1)} + c = 2$ $\frac{10(2-x)^{-2}}{(-2)(-1)} (+c)$	3 B2 B1
----	--	---------------

Chapter 4: Vectors

Kedah 2018 P1 Q21

Given that $\underline{p} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$, $\underline{q} = \begin{pmatrix} -4 \\ m \end{pmatrix}$, $\underline{r} = \begin{pmatrix} n \\ 4 \end{pmatrix}$. If $\underline{p} + \underline{q} - \underline{r}$ is a unit vector, find the value of m and of n .

Diberi bahawa $\underline{p} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$, $\underline{q} = \begin{pmatrix} -4 \\ m \end{pmatrix}$, $\underline{r} = \begin{pmatrix} n \\ 4 \end{pmatrix}$. Jika $\underline{p} + \underline{q} - \underline{r}$ ialah vektor unit, cari nilai m dan nilai n .

[3 marks]
[3 markah]

Answer/Jawapan:

Kedah 2018 P1 Q21 Answer

21	B2: $n = -3$ atau $m = 8$ B1: $2 - 4 - n = 1$ atau $-3 + m - 4 = 1$	$n = -3$ and $m = 8$	3
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Kedah 2018 P1 Q22

22

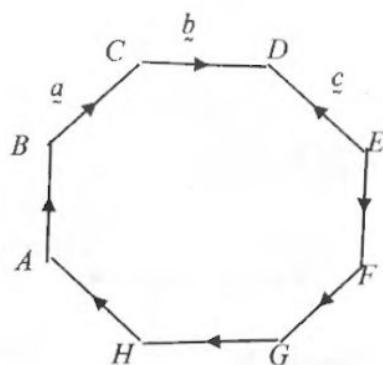
Diagram 22
Rajah 22

Diagram 22 is a regular octagon.

Rajah 22 ialah sebuah oktagon sekata.

(a) State the vectors that are equal.

Nyatakan vektor yang sama.

(b) Express \overrightarrow{AF} in terms of a , b and c .Ungkapkan \overrightarrow{AF} dalam sebutan a , b dan c .

[2 marks]
[2 markah]

Kedah 2018 P1 Q22 Answer

22		(a) $\overrightarrow{HA} = \overrightarrow{ED}$ (b) $\underline{a} + \underline{b} - \underline{c}$	1 1
----	--	--	--------

MRSM 2018 P1 Q6

6 It is given that $\underline{a} = 5\underline{i} - 7\underline{j}$ and $\underline{b} = 4\underline{i} + 3\underline{j}$.

Find the unit vector in the direction of $\underline{a} - \underline{b}$.

[2 marks]

Diberi bahawa $\underline{a} = 5\underline{i} - 7\underline{j}$ dan $\underline{b} = 4\underline{i} + 3\underline{j}$.

Cari vektor unit dalam arah $\underline{a} - \underline{b}$.

[2 markah]

Answer / Jawapan:

MRSM 2018 P1 Q6 Answer

6	$\frac{i - 10j}{\sqrt{101}}$ or $\frac{1}{\sqrt{101}} \begin{pmatrix} 1 \\ -10 \end{pmatrix}$ or equivalent $i - 10j$ or $\sqrt{101}$	2 B1
---	--	---------------------------

Chapter 5: Trigonometry Functions

Kedah 2018 P1 Q16

16 Solve the equation $2\cot\theta\sin\theta = -1$ for all angles $0 \leq \theta \leq 360^\circ$

Selesaikan persamaan $2\cot\theta\sin\theta = -1$ untuk semua sudut $0 \leq \theta \leq 360^\circ$

[3 marks]
[3 markah]

Kedah 2018 P1 Q16 Answer

16	B2: $\cos \theta = -\frac{1}{2}$ or 60° seen B1: $\cot \theta = \frac{\cos \theta}{\sin \theta}$	$\theta = 120^\circ, 240^\circ$	3
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Kedah 2018 P1 Q17

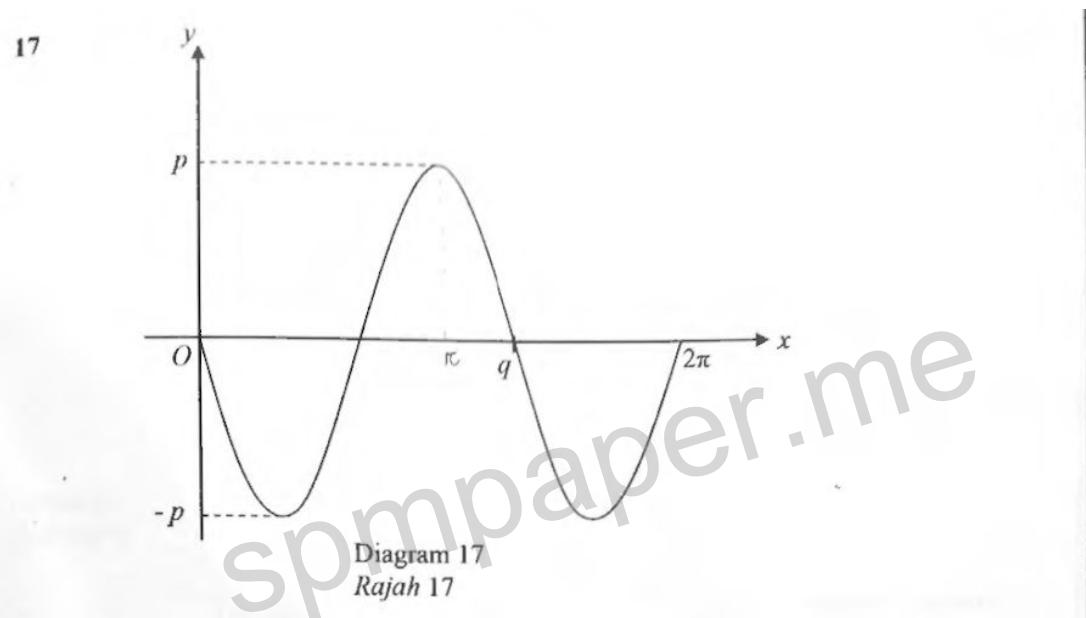


Diagram 17 show the graph of trigonometric functions $y = -5 \sin mx$.

State the value of

Rajah 17 menunjukkan graf fungsi trigonometri $y = -5 \sin mx$.

Nyatakan nilai bagi

- (a) p ,
- (b) q ,
- (c) m .

[3 marks]
[3 markah]

Kedah 2018 P1 Q17 Answer

17		(a) $p = 5$ (b) $q = \frac{4}{3}\pi$ (c) $m = \frac{3}{2}$	1 1 1
----	--	--	-------------

Kedah 2018 P1 Q2

- 2 It is given that $\tan \theta = k$, such that θ is an acute angle.

Find $\cos(-\theta)$ in terms of k .

[2 marks]

Diberi bahawa $\tan \theta = k$, dengan keadaan θ adalah sudut tirus.

Cari $\cos(-\theta)$ dalam sebutan k .

[2 markah]

Answer / Jawapan:

Kedah 2018 P1 Q2 Answer

2	$\frac{1}{\sqrt{1+k^2}}$ $\sqrt{1+k^2}$ seen	2
		B1

Kedah 2018 P1 Q3

3 Solve the equation $8\sin x + \cos(180^\circ - x) = \cos x$ for $0^\circ \leq x \leq 360^\circ$. [3 marks]

Selesaikan persamaan $8\sin x + \cos(180^\circ - x) = \cos x$ untuk $0^\circ \leq x \leq 360^\circ$ [3 markah]

Answer / Jawapan:

Kedah 2018 P1 Q3 Answer

3 $14.04^\circ // 14^\circ 2' , 194.04^\circ // 194^\circ 02'$ $\tan x = \frac{1}{4}$ $\cos 180^\circ \cos x + \sin 180^\circ \sin x$	3 B2 B1
---	------------------------------------

Chapter 6: Permutation & Combination

Kedah 2018 P1 Q20

20 Given that $6\binom{10}{r} = {}^{10}P_r$, find the value of r .

Diberi $6\binom{10}{r} = {}^{10}P_r$, cari nilai r .

[3 marks]
[3 markah]

Kedah 2018 P1 Q20 Answer

20	<p>B2 $r! = 6$</p> <p>B1: $6 \left(\frac{10!}{r!(10-r)!} \right) = \frac{10!}{(10-r)!}$</p>	3	3
----	--	---	---

MRSM 2018 P1 Q5

- 5 Diagram 7 shows a vehicle registration number.

Rajah 7 menunjukkan nombor pendaftaran kenderaan.



Diagram 5
Rajah 5

Find the number of different ways of vehicle registration number that can be formed by using the 3 letters followed by the 4 digits. [3 marks]

Cari bilangan cara yang berlainan bagi nombor pendaftaran kenderaan yang boleh dibentuk dengan menggunakan 3 huruf dan diikuti dengan 4 digit tersebut. [3 markah]

Answer / Jawapan:

MRSM 2018 P1 Q5 Answer

No	Answer	Marks
5	108 $3! \times 3 \times 3!$ or $3 \times 2 \times 1 \times 3 \times 3 \times 2 \times 1$	3
	$3!$ or $3 \times 3!$ or $3 \times 2 \times 1$ or $3 \times 3 \times 2 \times 1$ or 3P_3	B2
		B1

Chapter 7: Probability

Kedah 2018 P1 Q15

- 15 The probability of Ibrahim goes fishing is 0·6, if he wakes up early in the morning. In any given week, he wakes up late for two days. The probability that he goes fishing by bicycle is $\frac{5}{8}$. Find the probability he did not go fishing on a certain day.

Kebarangkalian Ibrahim pergi memancing ikan adalah 0·6, dia hanya akan pergi memancing jika dia bangun awal pagi. Dalam satu minggu didapati dua hari dia akan bangun lewat. Kebarangkalian dia akan pergi memancing dengan menaiki basikal adalah $\frac{5}{8}$. Cari kebarangkalian dia tidak pergi memancing pada suatu hari tertentu.

[3 marks]
[3 markah]

Kedah 2018 P1 Q15 Answer

15	B2: $\frac{2}{7} + \left(\frac{5}{7} \times \frac{5}{8} \times 0.4 \right) + \left(\frac{5}{7} \times \frac{3}{8} \times 0.4 \right)$ B1: $\left(\frac{5}{7} \times \frac{5}{8} \times 0.4 \right)$ or $\left(\frac{5}{7} \times \frac{3}{8} \times 0.4 \right)$	$\frac{4}{7}$	3
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MRSM 2018 P1 Q8

- 8 Table 8 shows the format of a Diagnostic Test consisting of 25 questions. Each correct answer is awarded one mark.

Jadual 8 menunjukkan format suatu Ujian Diagnostik yang terdiri daripada 25 soalan. Setiap jawapan yang betul diperuntukkan satu markah.

Section <i>Bahagian</i>	Number of Question <i>Bilangan Soalan</i>	Type of Question <i>Jenis Soalan</i>
I	13	Multiple-choice (A, B, C, D) <i>Aneka pilihan (A, B, C, D)</i>
II	7	Tick "✓ or ✗" <i>Tandakan "✓ atau ✗"</i>
III	5	Fill in the blank with the correct answer. <i>Isikan tempat kosong dengan jawapan yang betul.</i>

Table 8
Jadual 8

Kalsom sits for the test and she answered all questions in Section I and II and only 3 questions from Section III. It is found that 9 of her answers in Section I, 5 answers in Section II and all her answers in Section III are correct.

Calculate the chances Kalsom will score 80% in the Diagnostic Test. [4 marks]

Kalsom menduduki ujian tersebut dan dia menjawab semua soalan Bahagian I dan II dan hanya 3 soalan daripada Bahagian III. Didapati bahawa 9 jawapannya dalam Bahagian I, 5 jawapan dalam Bahagian II dan semua jawapannya dalam Bahagian III adalah betul.

Hitung peluang Kalsom untuk mendapat 80% dalam Ujian Diagnostik itu.

[4 markah]

Answer / Jawapan:

MRSM 2018 P1 Q8 Answer

8	$\frac{7}{64} // 0.1094 // 10.94\%$ $(0.25)^3 + (0.25)^2(0.5) + (0.25)(0.5)^2$ $(0.25)^3 \text{ or } (0.25)^2(0.5) \text{ or } (0.25)(0.5)^2$ $0.25 \text{ or } 0.5 \text{ or } 20 \text{ or } 3$	4
		B3
		B2
		B1

MRSM 2018 P1 Q9

- 9 In a survey carried out in a certain area, it is found that 4 out of 10 families own a car.

The mean of the family that own a car is 150.

Dalam satu kajian di suatu kawasan, didapati 4 daripada 10 keluarga mempunyai sebuah kereta. Min keluarga yang mempunyai sebuah kereta ialah 150.

Find

Cari

- (a) the number of families that involve in the survey,

bilangan keluarga yang terlibat dalam kajian tersebut,

- (b) the variance of the number of families who own a car.

varians bagi keluarga yang memiliki sebuah kereta.

[3 marks]

[3 markah]

Answer / Jawapan:

(a)

(b)

MRSM 2018 P1 Q9 Answer

9	(a) 375 $n(0.4) = 150$ (b) 90	2 B1 1
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Chapter 8: Probability Distribution

Kedah 2018 P1 Q24

- 24 An experiment tossing a biased coin for three times was carried out. H denotes the event of obtaining the head and T denotes the event of obtaining the tail. The outcome of the experiment and its probability are shown in Table 24.

Satu ujikaji melambung sekeping duit syiling yang tidak adil sebanyak tiga kali telah dijalankan. H mewakili peristiwa mendapat kepala dan T mewakili peristiwa mendapat ekor. Kesudahan ujikaji serta kebarangkalian berlakunya sesuatu peristiwa ditunjukkan dalam Jadual 24.

Outcome Kesudahan	TTT	TTH	THT	HTT	THH	HTH	HHT	HHH
Probability kebarangkalian	0.216	0.144	0.144	0.144	0.096	0.096	0.096	0.064

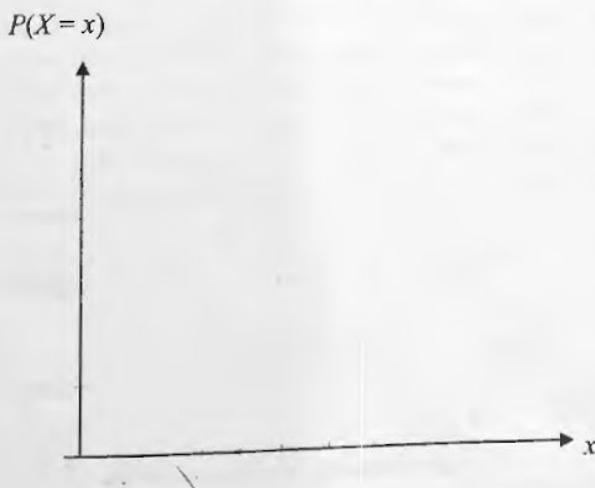
Table 24/ Jadual 24

If getting heads is a success event, draw a binomial distribution graph for the above experiment.

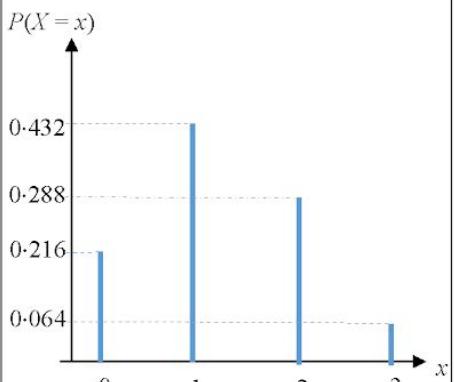
Jika mendapat kepala adalah suatu kejayaan, lukiskan graf taburan binomial bagi ujikaji di atas.

[3 marks]
[3 markah]

Answer/Jawapan:



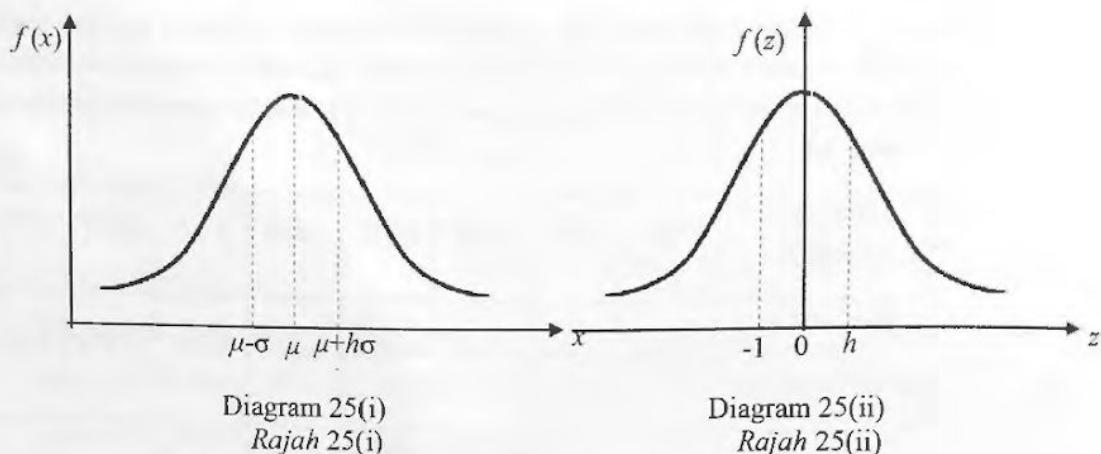
Kedah 2018 P1 Q24 Answer

24	B2 : 2 turus betul termasuk turus untuk $x = 1$ atau $x = 2$ B1: {0, 1, 2, 3} atau 0.432 dan 0.288	 <p>A probability mass function (PMF) graph for a discrete random variable X. The vertical axis is labeled $P(X=x)$ and has tick marks at 0.064, 0.216, 0.288, and 0.432. The horizontal axis is labeled x and has tick marks at 0, 1, 2, and 3. Blue bars represent the probabilities for each value: $P(X=0) = 0.216$, $P(X=1) = 0.432$, $P(X=2) = 0.288$, and $P(X=3) = 0.064$.</p>	3
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Kedah 2018 P1 Q25

- 25 Diagram 25 (i) shows a normal distribution graph and Diagram 25 (ii) shows a standard normal distribution graph.

Gambarajah 25 (i) menunjukkan graf taburan normal dan graf 25 (ii) adalah graf taburan normal piawai



- (a) State the equation that relates the two graphs.

Nyatakan persamaan yang menghubungkan kedua-dua graf tersebut.

- (b) A normal distribution has a min of 16 and a standard deviation of 5. Find the normal distribution variable, X if given $P(z > h) = 0.3264$.

Suatu taburan normal mempunyai min 16 dan sisihan piawai 5. Cari nilai pemboleh ubah taburan normal, X jika diberi $P(z > h) = 0.3264$.

[4 marks]
[4 markah]

Kedah 2018 P1 Q25 Answer

25		$(a) \quad z = \frac{x - \mu}{\sigma}$ $(b) \quad B2: \quad \frac{x - 16}{5} = 0.45$ B1: $h = 0.45$	1 3
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MRSM 2018 P1 Q10

10 The random variable X has a normal distribution with a mean of 4.8 and a standard deviation of σ . Given $X = 6.6$ and $Z = 1.2$, find the value of

Pembolehubah rawak X mempunyai taburan normal dengan min 4.8 dan sisihan piaawai σ . Diberi $X = 6.6$ dan $Z = 1.2$, cari nilai

(a) σ

(b) k if $P(-k < Z < k) = \frac{1}{2}\sigma$.

k jika $P(-k < Z < k) = \frac{1}{2}\sigma$.

[4 marks]

[4 markah]

Answer / Jawapan:

(a)

(b)

MRSM 2018 P1 Q10 Answer

1)	(a) 1.5 (b) 1.151 //1.15 0.125 seen $1 - \frac{1.5}{2}$ (note : *accept for B1 only)	1 3 B2 B1
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Chapter 9: Motion Along a Straight Line

Chapter 10: Linear Programming