

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.

ALGEBRA

$$1 \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$8 \quad \log_a b = \frac{\log_c b}{\log_c a}$$

$$2 \quad a^m \times a^n = a^{m+n}$$

$$9 \quad T_n = a + (n-1)d$$

$$3 \quad a^m \div a^n = a^{m-n}$$

$$10 \quad S_n = \frac{n}{2}[2a + (n-1)d]$$

$$4 \quad (a^m)^n = a^{mn}$$

$$11 \quad T_n = ar^{n-1}$$

$$5 \quad \log_a mn = \log_a m + \log_a n$$

$$12 \quad S_n = \frac{a(r^n - 1)}{r - 1} = \frac{a(1 - r^n)}{1 - r}, r \neq 1$$

$$6 \quad \log_a \frac{m}{n} = \log_a m - \log_a n$$

$$13 \quad S_\infty = \frac{a}{1 - r}, |r| < 1$$

$$7 \quad \log_a m^n = n \log_a m$$

CALCULUS

$$1 \quad y = uv, \quad \frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$$

$$4 \quad \text{Area under a curve} = \int_a^b y \, dx \quad \text{or} \quad \int_a^b x \, dy$$

$$2 \quad y = \frac{u}{v}, \quad \frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$$

$$3 \quad \frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

5 Volume generated

$$= \int_a^b \pi y^2 \, dx \quad \text{or}$$

$$= \int_a^b \pi x^2 \, dy$$

STATISTICS

$$1 \quad \bar{x} = \frac{\Sigma x}{N}$$

$$8 \quad {}^n P_r = \frac{n!}{(n-r)!}$$

$$2 \quad \bar{x} = \frac{\Sigma fx}{\Sigma f}$$

$$9 \quad {}^n C_r = \frac{n!}{(n-r)!r!}$$

$$3 \quad \sigma = \sqrt{\frac{\Sigma(x-\bar{x})^2}{N}} = \sqrt{\frac{\Sigma x^2}{N} - \bar{x}^2}$$

$$10 \quad P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$4 \quad \sigma = \sqrt{\frac{\Sigma f(x-\bar{x})^2}{\Sigma f}} = \sqrt{\frac{\Sigma fx^2}{\Sigma f} - \bar{x}^2}$$

$$11 \quad P(X = r) = {}^n C_r p^r q^{n-r}, p + q = 1$$

$$5 \quad m = L + \left(\frac{\frac{1}{2}N - F}{f_m} \right) C$$

$$12 \quad \text{Mean} = np$$

$$6 \quad I = \frac{Q_1}{Q_0} \times 100$$

$$13 \quad \sigma = \sqrt{npq}$$

$$7 \quad \bar{I} = \frac{\Sigma W_i I_i}{\Sigma W_i}$$

$$14 \quad Z = \frac{X - \mu}{\sigma}$$

GEOMETRY

$$1 \quad \text{Distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$5 \quad |\vec{r}| = \sqrt{x^2 + y^2}$$

$$2 \quad \text{Midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$6 \quad \hat{r} = \frac{x\hat{i} + y\hat{j}}{\sqrt{x^2 + y^2}}$$

3 A point dividing a segment of a line
(x, y) =

$$\left(\frac{nx_1 + mx_2}{m+n}, \frac{ny_1 + my_2}{m+n} \right)$$

4 Area of a triangle =

$$\frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$$

TRIGONOMETRY

1 Arc length, $s = r\theta$

2 Area of a sector, $A = \frac{1}{2}r^2\theta$

3 $\sin^2 A + \cos^2 A = 1$

4 $\sec^2 A = 1 + \tan^2 A$

5 $\operatorname{cosec}^2 A = 1 + \cot^2 A$

6 $\sin 2A = 2 \sin A \cos A$

7 $\cos 2A = \cos^2 A - \sin^2 A$
 $= 2\cos^2 A - 1$
 $= 1 - 2\sin^2 A$

8 $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$

9 $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$

10 $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$

11 $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$

12 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

13 $a^2 = b^2 + c^2 - 2bc \cos A$

14 Area of triangle = $\frac{1}{2}ab \sin C$

Answer **all** questions.
Jawab semua soalan.

1. Fungsi f memetakan unsur dari set $P = \{ m - 3, 4, 9, 16, 25 \}$ kepada set $Q = \{ 0, 3, 8, 15, 24 \}$, ditunjukkan dalam bentuk pasangan tertib:
A function f maps the elements from set $P = \{ m - 3, 4, 9, 16, 25 \}$ to set $Q = \{ 0, 3, 8, 15, 24 \}$ as shown below in ordered pairs:

$$\{ (m - 3, 0), (4, 3), (9, 8), (16, 15), (25, 24) \}$$

- a) Tuliskan tatatanda fungsi bagi f
Write down the function notation for f
- b) Tentukan nilai m
State the value of m

[2 markah/marks]

Answer / *Jawapan:*

a)

b)

2. Fungsi h ditakrifkan oleh $h(x) = \frac{3}{2+x}, x \neq -2$
The function h is defined as $h(x) = \frac{3}{2+x}, x \neq -2$.

Cari

Find

- a) $h^{-1}(x)$
- b) $h^{-1}(2)$

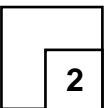
[3 markah/marks]

Answer / *Jawapan*

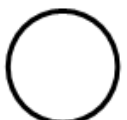
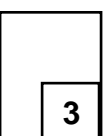
a)

b)

1



2



3. Diberi fungsi $f(x) = 2x^2 + 5x$, cari
Given the function $f(x) = 2x^2 + 5x$, find

(a) $f(3)$

(b) Nilai-nilai x yang memetakan kepada diri sendiri oleh $f(x)$

The values of x which maps onto itself by $h(x)$

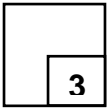
[3markah/marks]

Answer / Jawapan:

a)

b)

3

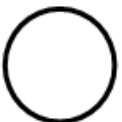
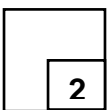


4. Cari julat nilai x bagi $x^2 + 20 < 9x$
Find the range of values of x for $x^2 + 20 < 9x$

[2markah/ marks]

Answer / Jawapan:

4



5. Pak Aziz ingin memagari sebidang tanah berbentuk segi empat tepat di tepi sebuah sungai. Dia menggunakan sungai itu sebagai satu sempadannya. Sekiranya dia mempunyai 40 meter dawai untuk dijadikan pagar, apakah dimensi tanah untuk memaksimumkan saiz tanah itu?

Pak Aziz intends to fence up a plot of rectangular land beside a river. He uses the river as one of the boundaries. If he has 40 metres of wire netting for fencing, what are the dimensions of the land to maximize the size of the land?

[4markah/marks]

Answer / Jawapan:

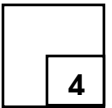
6. Diberi $5^{3n} \div 25^{n+1} = \frac{1}{125}$, cari nilai n

Given $5^{3n} \div 25^{n+1} = \frac{1}{125}$, find the value of n

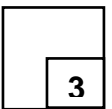
[3markah/ marks]

Answer / Jawapan:

5



6

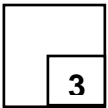


7. Diberi $\log_2 P + \log_4 Q = 6$, ungkapkan P dalam sebutan Q
Given that $\log_2 P + \log_4 Q = 6$, express P in terms of Q

[3 markah/ marks]

Answer / Jawapan:

7



8. Dalam suatu jangjang geometri , hasil tambah sebutan pertama dan sebutan ketiga ialah 50 manakala hasil tambah sebutan kedua dan sebutan keempat ialah 150. Cari
In a geometric progression the sum of the first and third terms is 50 while the sum of the second and fourth terms is 150. Find

(a) Sebutan pertama jangjang itu

The first terms of the progression

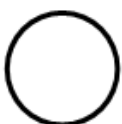
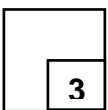
(b) Hasil tambah tiga sebutan yang pertama selepas sebutan kedua

The sum of the first three term after the second term

[3 markah/marks]

Answer / Jawapan:

8



9. Dalam suatu jualan lelong sebuah meja antik, setiap tawaran baru mestilah 10% lebih daripada harga tawaran sebelumnya. Encik Rizal berjaya dalam tawarannya untuk meja antik itu dengan harga RM 38 906.14. Jika harga tawaran permulaan yang ditetapkan ialah RM 15 000, berapa orangkah yang telah membuat tawaran sebelum Encik Rizal?

In an auction for an antique table, every bid must be 10% more than the previous bid. Mr. Rizal is successful in the bidding for the antique table with a price of RM 38 906.14. if the initial fixed bidding price is RM 15000, how many persons have been involved in the bidding before Mr Rizal?

[4 markah/marks]

Answer / Jawapan:

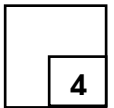
10. Bucu-bucu satu segi tiga ialah $A(1, 3)$, $B(4, m)$ dan $(-5, -1)$. Diberi luas segi tiga ialah 30 unit^2 . Cari nilai-nilai m

The vertices of a triangle are $A(1, 3)$, $B(4, m)$ and $C(-5, -1)$. Given the area of the triangle is 30 unit^2 . Find the values of m .

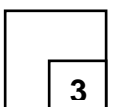
[3 markah/marks]

Answer / Jawapan:

9

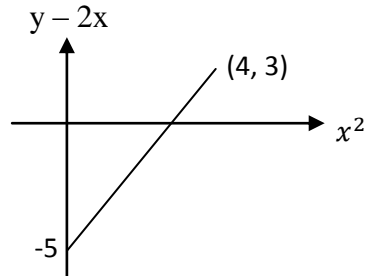


10



11. Rajah 11 menunjukkan graf $(y - 2x)$ melawan x^2 . Pembolehubah x dan y dihubungkan oleh persamaan $= px^2 + 2x + 5q$, dengan keadaan p dan q ialah pemalar. Cari nilai p dan q

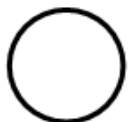
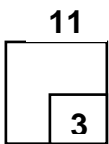
Diagram 11 shows a straight line graph $(y - 2x)$ melawan x^2 . The variables x and y are related by the equation $= px^2 + 2x + 5q$, where p and q are constants. find the value of p and q



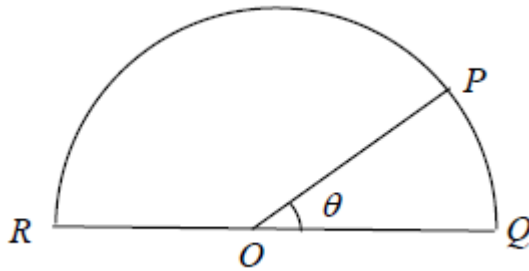
Rajah 11 / Diagram 11

[3 markah/marks]

Answer / Jawapan:



12. Rajah 12 menunjukkan semibulatan RPQ berpusat O dengan diameter 10cm
Diagram 12 shows a semicircle RPQ with centre O and diameter 10 cm



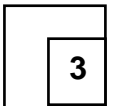
Rajah 12 / Diagram 12

Diberi panjang lengkok ROP adalah sama dengan perimeter sektor POQ.
Given the length of arc ROP is equal with the perimeter of sector POQ.
Cari nilai θ dalam radian.
Find the value of θ in radian.

[3 markah/marks]

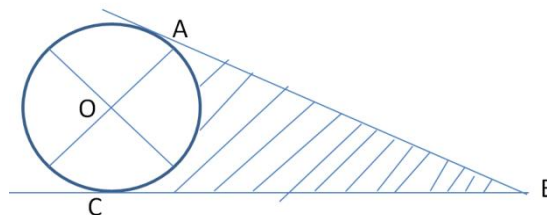
Answer / Jawapan:

12

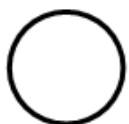


13. Rajah 13 menunjukkan pelan cadangan sebahagian kawasan rekreasi disebuah hotel. Sebuah kolam renang berbentuk bulatan dengan pusat O akan dibina dan kawasan berlorek ialah halaman rumput. AB ialah garis lurus yang menyentuh bulatan pada titik A dan C. Panjang AB ialah 21m dan jejari bulatan ialah 9m. Hitung luas halaman berumput.

Diagram 13 shows part of the proposed plan in a recreational area hotel. A circular pool with centre O will be build and shaded region is lawn. AB is a straight line that touches the circle at the point A and C. AB distance is 21m and radius of the circle is 9 m . Calculate the area of the lawn.



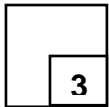
Rajah 13/ Diagram 13



[3 markah/marks]

Answer / Jawapan:

13

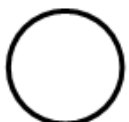
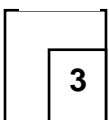


14. Selesaikan persamaan $2\sec^2 x - \tan x = 8$ bagi $0 \leq x \leq 360^\circ$
Solve the equation $2\sec^2 x - \tan x = 8$ for $0 \leq x \leq 360^\circ$

[3 markah/marks]

Answer/Jawapan

14



15. Diberi bahawa $\sin \theta = t$, $90^\circ < \theta < 180^\circ$, ungkapkan $\tan^2 x$ dalam sebutan t
Given that $\sin \theta = t$, $90^\circ < \theta < 180^\circ$, express $\tan^2 x$ in terms of t .

[3 markah/ marks]

Answer / Jawapan:

16. Diberi vector $\underline{a} = 14\underline{i} + 2\underline{j}$ dan $\underline{b} = 9\underline{i} - k\underline{j}$, dengan keadaan k ialah pemalar.
Given vector $\underline{a} = 14\underline{i} + 2\underline{j}$ and $\underline{b} = 9\underline{i} - k\underline{j}$, where k is a constant.

Cari/Find

- (a) $\underline{a} - \underline{b}$ dalam bentuk $x\underline{i} + y\underline{j}$,
 $\underline{a} - \underline{b}$ in a form $x\underline{i} + y\underline{j}$,
(b) Nilai-nilai k jika $|\underline{a} - \underline{b}| = 13 \text{ unit}$.
The values of k if $|\underline{a} - \underline{b}| = 13 \text{ units}$.

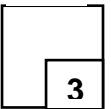
[3markah/ marks]

Answer / Jawapan:

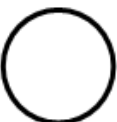
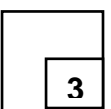
a)

b)

15



16



17. Rajah 17 menunjukkan segi tiga OPQ.

Diagram 17 shows triangle OPQ.

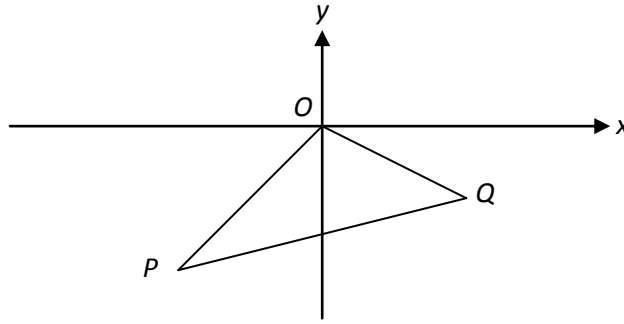


Diagram 17 /
Rajah 17

Diberi bahawa $\overrightarrow{OP} = -5\mathbf{i} - 4\mathbf{j}$ dan $\overrightarrow{OQ} = 6\mathbf{i} - 2\mathbf{j}$. Cari

Given that $\overrightarrow{OP} = -5\mathbf{i} - 4\mathbf{j}$ and $\overrightarrow{OQ} = 6\mathbf{i} - 2\mathbf{j}$. Find

(a) \overrightarrow{PQ}

(b) unit vector in the direction of \overrightarrow{PQ}

vektor unit dalam arah \overrightarrow{PQ}

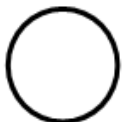
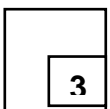
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Answer / Jawapan:

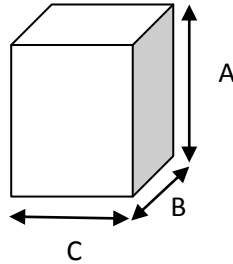
a)

b)

17



18. Sebuah syarikat penerbangan menetapkan bahawa setiap kotak yang didaftar masuk mestilah berbentuk kuboid dan had dimensi kotak adalah seperti ditunjukkan dalam rajah di bawah. Ali ingin membawa sebuah kotak yang tapaknya berbentuk segiempat sama . Cari dimensi kotak itu, dalam cm, supaya isi padu kotak adalah maksimum untuk membolehkan dia memuatkan seberapa banyak barang yang mungkin
An airplane requires that all check-in box must be cuboid in shape and the limit dimensions is as shown in below. Ali wants to bring a box that has square base. Find the dimension of the box, in cm so that the volume is a maximum and he can fill in as much things as possible.

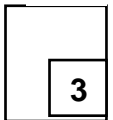


$$A + B + C \leq 204 \text{ cm}$$

[3 markah/ marks]

Answer / Jawapan:

18



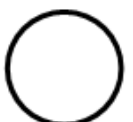
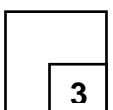
19. Diberi $\int \frac{1}{(3x+4)^8} dx = k(3x + 4)^n + c$, cari nilai k dan nilai n .

Given that $\int \frac{1}{(3x+4)^8} dx = k(3x + 4)^n + c$, find the values of k and n .

[3 markah/marks]

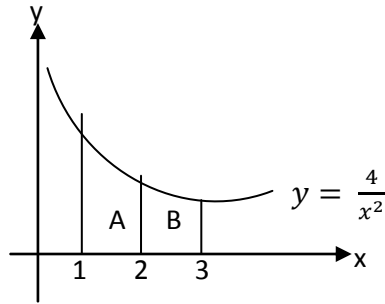
Answer / Jawapan:

19



20. Rajah 20 menunjukkan sebahagian daripada lengkung $y = \frac{4}{x^2}$

Diagram 20 shows part of the curve $y = \frac{4}{x^2}$



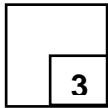
Cari nisbah luas rantau A kepada luas rantau B

Find the ratio of the area of region A to the area of region B

[3 markah/marks]

Answer / Jawapan:

20



21. Min bagi set data $2m - 3$, 8 , $m + 1$ ialah 7 . Cari

The mean of a set data $2m - 3$, 8 , $m + 1$ is 7 . Find

a) Nilai m

The value of m

b) Min baharu jika setiap data didarab dengan 3

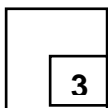
The new mean if each of the data is multiplied by 3

[3 markah/marks]

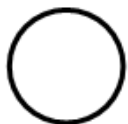
Answer / Jawapan:

a)

21



b)



22. Satu set 15 nombor mempunyai min 9 dan varians, 150. Jika satu nombor, m , dikeluarkan daripada set nombor itu, min menurun sebanyak 2.5. Cari
A set of 15 numbers have a mean of 9 and a variance of 150. If a number, m , is taken out of the set of number, the mean decreases by 2.5. Find

(a) nilai m

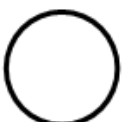
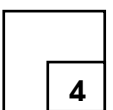
the value of m

(b) hasil tambah kuasa dua bagi 14 nombor itu.

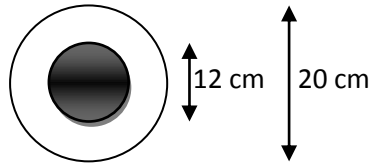
The sum of squares of the 14 numbers.

.[4 markah/marks]

Answer / Jawapan:



23. Rajah 22 menunjukkan satu papan dart.
Diagram 22 below shows a dart board.



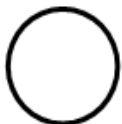
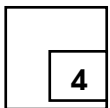
Rajah 22 / Diagram 22

Cari kebarangkalian dart yang dilontar oleh Lim terkena kawasan berlorek.
Find the probability that the dart that Lim throws hits the shaded region.

[4 markah/ marks]

Answer / Jawapan:

23



24. Dalam suatu pemilihan seorang ketua pasukan badminton, kebarangkalian Balqis dipilih ialah $\frac{1}{4}$, manakala kerangkaian sama ada Balqis atau Mohan dipilih ialah $\frac{3}{8}$, cari kebarangkalian bahawa

In a selection of the captain of a badminton team, the probability that Balqis is chosen is $\frac{1}{4}$, while the probability that either Balqis or Mohan is chosen is $\frac{3}{8}$, Find the probability that

- a) Mohan dipilih
Mohan is chosen
- b) Balqis atau Mohan **tidak** dipilih
*Balqis or Mohan is **not** chosen*

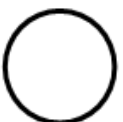
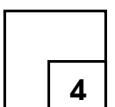
[4markah / marks]

Answer / Jawapan:

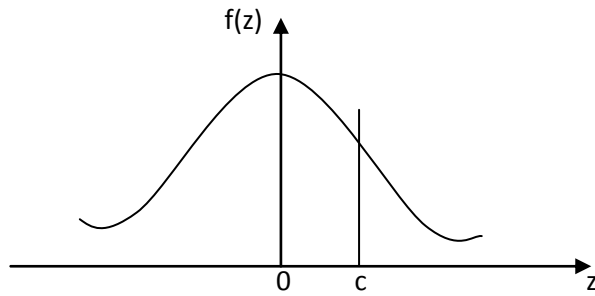
a)

b)

24



25. Rajah 25 menunjukkan satu graf taburan normal piawai
Diagram 25 shows a standard normal distribution graph



Rajah 25

(a) Jika $P(0 < Z < c) = 0.3184$, cari $P(Z > c)$
If $P(0 < Z < c) = 0.3184$, find $P(Z > c)$

(b) X ialah pembolehubah rawak bagi suatu taburan normal dengan min 36 dan varians 25. Cari nilai X apabila skor- z ialah c .
 X is random variable of a normal distribution with a mean of 36 and a variance of 25. Find the value of X when z -score is c .

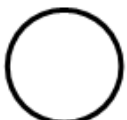
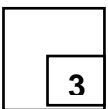
[3markah / marks]

Answer / Jawapan:

(a)

(b)

25



END OF QUESTIONS
SOALAN TAMAT