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

ALGEBRA

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

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

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

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

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

6 $\log_a \dfrac{m}{n} = \log_a m - \log_a n$

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

8 $\log_a b = \dfrac{\log_c b}{\log_c a}$

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

10 $S_n = \dfrac{n}{2}\left[2a + (n-1)d\right]$

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

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

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

CALCULUS

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

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

3 $\dfrac{dy}{dx} = \dfrac{dy}{du} \times \dfrac{du}{dx}$

4 Area under a curve $= \int_a^b y\,dx$ *or*

$\int_a^b x\,dy$

5 Volume generated

$= \int_a^b \pi y^2\,dx$ or

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

STATISTICS

1 $\bar{x} = \dfrac{\Sigma x}{N}$

2 $\bar{x} = \dfrac{\Sigma fx}{\Sigma f}$

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

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

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

6 $I = \dfrac{Q_1}{Q_0} \times 100$

7 $\bar{I} = \dfrac{\Sigma W_i I_i}{\Sigma W_i}$

8 ${}^nP_r = \dfrac{n!}{(n-r)!}$

9 ${}^nC_r = \dfrac{n!}{(n-r)!r!}$

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

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

12 Mean = np

13 $\sigma = \sqrt{npq}$

14 $Z = \dfrac{X - \mu}{\sigma}$

GEOMETRY

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

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

3 A point dividing a segment of a line
(x , y) =
$\left(\dfrac{nx_1 + mx_2}{m+n}, \dfrac{ny_1 + my_2}{m+n} \right)$

4 Area of a triangle =

$\dfrac{1}{2} \left| (x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3) \right|$

5 $\left| \underset{\sim}{r} \right| = \sqrt{x^2 + y^2}$

6 $\hat{\underset{\sim}{r}} = \dfrac{x\underset{\sim}{i} + y\underset{\sim}{j}}{\sqrt{x^2 + y^2}}$

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

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. The following information refers to set P and Q.
Maklumat berikut adalah berkaitan dengan set P dan Q

Set P = {0,1,2}
Set Q = {-2,-1,0,1,2}

The relation between set P and set Q is defined by the set of ordered pairs {(0, 2), (1, -2), (1, 1), (2, 0), (2, -2)}. Find
Hubungan antara set P dan set Q ditakrifkan oleh set pasangan bertertib {(0, 2), (1, -2), (1,1), (2, 0), (2, -2)}. Cari

(a) image of 2
imej bagi 2

(b) the type of relation
jenis hubungan itu

[2*marks*]
[2*markah*]

Answer / *Jawapan :*

(*a*)

(*b*)

1

2

2. Given the function $g : x \to \frac{3x}{x-1}$, $x \neq 1$, find

Diberi fungsi $g : x \to \frac{3x}{x-1}$, $x \neq 1$, *cari*

(a) $g(2)$

(b) the function $g^{-1}(1)$.
fungsi $g^{-1}(1)$.

[4*marks*]
[4*markah*]

Answer / *Jawapan:*

(*a*)

(*b*)

2

4

---

3. Given the function $f : x \to 3 - x$ and $fg : x \to 2x^2 - 1$, find
Diberi fungsi $f : x \to 3 - x$ dan $fg : x \to 2x^2 - 1$, cari

(a) $g(x)$

(b) the value of *x* if $fg(x) = x$.
nilai-nilai x jika $fg(x) = x$

[3 *marks*]
[3 *markah*]

Answer / *Jawapan:*

(*a*)

(*b*)

3

3

4. Given that the quadratic equation $x^2 + k(2x+4) = 3$ where *k* is a constant, has two equal roots, find the possible values of *k*.
Diberi persamaan kuadratik $x^2 + k(2x+4) = 3$ *mempunyai dua punca nyata yang sama, cari nilai-nilai k yang mungkin*.

[3 *marks*]
[3 *markah*]

Answer / *Jawapan :*

4
3

---

5. Diagram 5 shows the graph of the function $f(x) = m(x-h)^2 + 5$. A is a minimum point.
Rajah 5 menunjukkan graf bagi fungsi $f(x) = m(x-h)^2 + 5$. *A ialah titik minimum*.

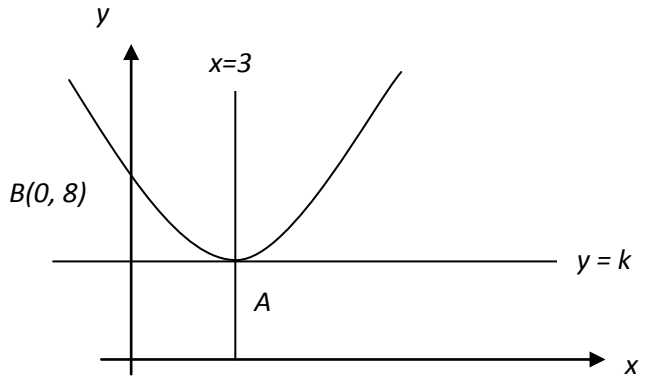

Diagram 5
Rajah5

Find the value of
Carinilai

(a) *h*
(b) *k*
(c) *m,*

[4*marks*]
[*4markah*]

Answer / *Jawapan:*

5
3

(a)

(b)

(c)

6. Solve the inequality $(4x+1)^2 \leq 9$

Selesaikan ketaksamaan $(4x+1)^2 \leq 9$

[3 marks]
[*3 markah*]

Answer / *Jawapan:*

6

3

---

7. Solve the equation $4^{3x+1} = 0.25$

Selesaikan persamaan $4^{3x+1} = 0.25$

[3 marks]
[*3 markah]*

Answer / *Jawapan:*

7

3

---

8. Solve the equation $\log_3(8x-1) - \log_3(x-7) = 2$

Selesaikan persamaan $\log_3(8x-1) - \log_3(x-7) = 2$

[3 marks]
[*3 markah]*

Answer / *Jawapan*

8

3

9. Given that $...y, y-3, y-6, ...$ are three consecutive terms of an arithmetic progression.
Diberi $...y, y-3, y-6, ...$ *adalah tiga sebutan yang berturutan bagi satu janjang aritmetik*

(a) Find the common difference
Cari nilai beza sepunya

(b) Hence, if y is the 8^{th} term of the progression, find the sum of first 10 terms in terms of y
Seterusnya, jika y *adalah sebutan ke-8, cari hasil tambah10 sebutan yang pertama dalam sebutan* y .

[3 marks]
[*3 markah*]

Answer / *Jawapan:*

(a)

(b)

9

3

10. The first term and sum to infinityof a geometri progression are 32 and 64 respectively. Find the common ratio of the progression.
Sebutan pertama dan hasil tambah ketakterhinggan bagi suatu janjang geometri masing-masing ialah 32 dan 64.Cari nisbah sepunya bagi janjang ini.

[3 marks]
[*3 markah*]

Answer / *Jawapan:*

10

3

11. Given $A(k,3), B(-3,5), C(4,7)$ and $D(x,y)$. *ABCD* is a rhombus, find
Diberi $A(k,3), B(-3,5), C(4,7)$ *dan* $D(x,y)$. *ABCD ialah sebuah rombus, cari*

(a) the value of *k* if *AB* is perpendicular to the straight line $3x+6y=1$
nilai k jika AB berserenjang dengan garis lurus $3x+6y=1$

(b) midpoint *AC*
titik tengah AC

[3 marks]
[*3 markah*]

Answer / *Jawapan:*

(a)

(b)

11 | 3

12. Find the equation of the locus of a moving point *P* such that its distance from *A(1, -6)* is twice its distance from point *B(4, 3)*
Cari persamaan lokus bagi titik P supaya jaraknya dari titik A(1, -6) merupakan dua kali dari titik B(4, 3)

[3 marks]
[*3 markah*]

Answer / *Jawapan:*

12 | 3

13. Given $2\boldsymbol{u} = 7i + 2j$ and $3\boldsymbol{v} = -i + 6j$, find the magnitude of $2\boldsymbol{u} + 3\boldsymbol{v}$
Diberi $2\boldsymbol{u} = 7i + 2j$ *dan* $3\boldsymbol{v} = -i + 6j$ *, cari magnitud bagi* $2\boldsymbol{u} + 3\boldsymbol{v}$

[2 marks]
[*2 markah*]

Answer / *Jawapan:*

13 | 2

14. Given that $\overrightarrow{PQ} = (k+1)i - 4j, \overrightarrow{RS} = 3i + (k-7)j, \overrightarrow{PQ} = \mu\overrightarrow{RS}$ and μ is an integer. Find
Diberi bahawa $\overrightarrow{PQ} = (k+1)i - 4j, \overrightarrow{RS} = 3i + (k-7)j, \overrightarrow{PQ} = \mu\overrightarrow{RS}$ dan μ ialah satu integer. Cari

(a) the values of *k*
nilai-nilai k

(b) $PQ : RS$

[4 marks]
[*4 markah*]

Answer / *Jawapan:*

(a)

(b)

14

4

15. The marks of a group of students in a test are as follows:
Markah ujian bagi satu kumpulan murid adalah seperti berikut:

40, 68, 72, 78, 84, 90

(a) Determine the interquartile range of the marks
Tentukan julat antara kuartil bagi markah-markah itu

(b) When another student's mark is added, the mean decrease by 2, find the student's mark
Apabila markah seorang murid lain ditambahkan, min berkurang sebanyak 2, cari markah murid itu

[4 marks]
[*4markah*]

Answer / *Jawapan:*

(a)

15

4

(b)

16. Diagram 16 shows part of straight line graph drawn to represent linear form of the equation $y = 3x^k$.
Rajah 16 menunjukkan sebahagian daripada graf garis lurus yang dilukis untuk mewakili bentuk linear bagi persamaan $y = 3x^k$

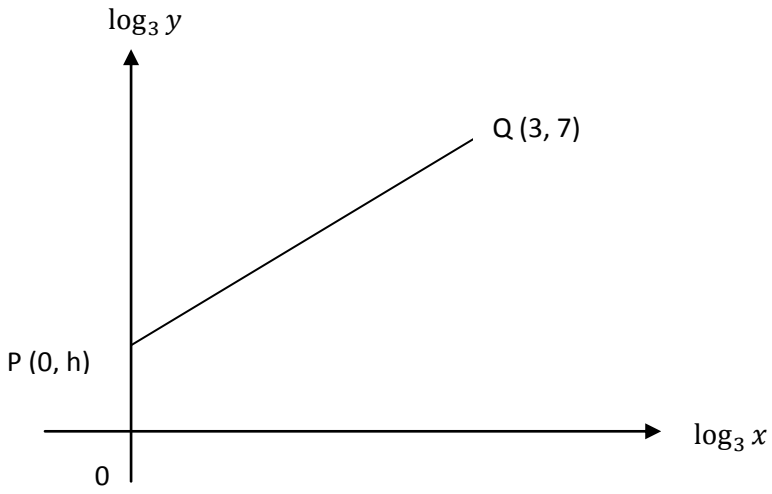

Diagram 16
Rajah 16

Find the values of *h* and *k.*
Cari nilai bagi h dan k.

[3 marks]
[*3markah*]

Answer / *Jawapan:*

16

3

17. The gradient function of the curve $f(x) = (px + 1)^4$ is $16\left(\frac{x}{q} + 1\right)^3$, where *p* and *q* are positive constant. Find the values of *p* and *q*

Fungsi kecerunan bagi lengkung $f(x) = (px + 1)^4$ *ialah* $16\left(\frac{x}{q} + 1\right)^3$*, di mana p dan q adalah pemalar positif.Cari nilai bagi p dan q*

[3 marks]
[*3 markah*]

Answer / *Jawapan:*

17

3

---

18. Given that $\int_1^2 f(x)dx = 5$ and $\int_2^5 f(x)dx = 8$, find the value of

Diberi bahawa $\int_1^2 f(x)dx = 5$ *and* $\int_2^5 f(x)dx = 8$*, cari nilai bagi*

(a) *k* if $\int_1^2 kf(x)dx = 15$
k jika $\int_1^2 kf(x)dx = 15$

(b) $\int_2^5 [4x - f(x)]dx$

[3 marks]
[*3 markah*]

Answer / *Jawapan:*

(a)

(b)

18

3

19. Find the equation of the curve that has a gradient function $\frac{x^2+3x}{x}$ and passes through the point (1, 2)

Cari persamaan lengkung yang mempunyai fungsi kecerunan $\frac{x^2+3x}{x}$ *dan melalui titik(1, 2).*

[3 marks]
[*3 markah*]

Answer / *Jawapan:*

19
3

---

20. Given that $\sin 40° = h$, express in term of *h.*
Diberi bahawa $\sin 40° = h$*, ungkapkan dalam sebutan h.*

(a) $cosec\ 40°$,
$kosek\ 40°$,

(b) $\sin 80°$,
$\sin 80°$,

[3 marks]
[*3 marks*]

Answer / *Jawapan:*

(a)

(b)

20
3

---

21. Solve the equation $4 \sin x cos x = -\sqrt{3}$ for $0° \leq x \leq 360°$.
Selesaikan persamaan $4 \sin x cos x = -\sqrt{3}$ *bagi* $0° \leq x \leq 360°$

[4 marks]
[*4 markah*]

Answer / *Jawapan:*

21
4

22. Diagram 22 shows the sector *OAB* of a circle with centre*O. ABCD* is a rectangle.
Rajah 22 menunjukkan sektor OAB bagi sebuah bulatan berpusat di O. ABCD ialah sebuah segiempat tepat.

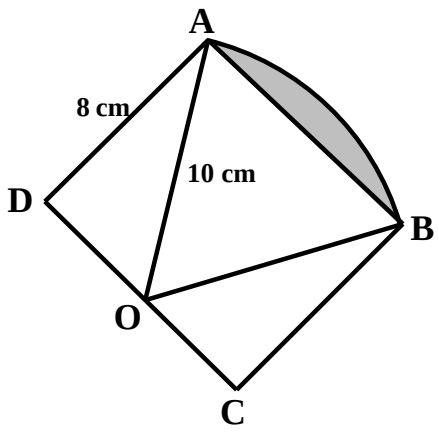

Diagram 22
Rajah 22

Given*OA=10 cm* and *AD=8 cm,* find
Diberi OA=10 cm dan AD=8 cm, cari

(a) $\angle AOB$ in radian,
$\angle AOB$ dalam radian,

(b) area of the shaded region
luas rantau berlorek

[4 marks]
[*4 markah*]

Answer / *Jawapan:*

(a)

(b)

22

4

23. A teacher wants to choose 7 players consisting of 4 boys and 3 girls to form a school badminton team. These 7 players are to be chosen from 8 boys and 5 girls.
Seorang guru ingin memilih 7 orang pemain yang terdiri daripada 4 orang lelaki dan 3 orang perempuan untuk membentuk satu pasukan badminton sekolah.7 orang pemain itu dipilih daripada 8 orang lelaki dan 5 orang perempuan.

(a) find the number of ways the team can be formed,
cari bilangan cara pasukan itu dapat dibentuk,

(b) if 2 boys and a girl from the group are injured during the training and can't be selected, find the number of ways the new team can be formed
jika 2 orang murid lelaki dan seorang murid perempuan mengalami kecederaan semasa latihan dan tidak boleh dipilih, cari bilangan cara pasukan baru yang boleh dibentuk

[4 marks]
[*4 markah*]

Answer / *Jawapan:*

(a)

(b)

23

4

24. A box cantains 4 red balls and 6 white balls. Two balls are taken at random from the box, one after the other, without replacement. Calculate the probability that one red ball and one white ball are taken.
Sebuah kotak mengandungi 4 biji bola merah dan 6 biji bola putih.Dua biji bola dipilih secara rawak dari kotak itu, satu demi satu tanpa penggantian. Hitung kebarangkalian satu bola merah dan satu bola putih dipilih.

[3 marks]
[*3 markah*]

Answer / *Jawapan:*

24

3

25. In a certain school, 6 out of 10 students have a computer at home. If a sample of 5 students is randomly selected, find the probability that more than 2 students have computer at home.
Di sebuah sekolah, 6 orang daripada 10 orang murid mempunyai sebuah komputer di rumah.Jika satu sampel bagi 5 orang murid dipilih secara rawak, cari kebarangkalian bahawa lebih daripada 2 orang murid mempunyai sebuah komputer di rumah.

[3 marks]
[*3 markah*]

Answer / *Jawapan:*

25

3

END OF QUESTIONS
SOALAN TAMAT