

3472/1
Matematik
Tambahan
Kertas 1
September
2004
2 jam



MAKTAB RENDAH SAINS MARA

PEPERIKSAAN PERCUBAAN SPM 2004

MATEMATIK TAMBAHAN

Kertas 1

Dua jam

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

- 1. Kertas soalan ini adalah dalam Bahasa Melayu*
- 2. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan dalam Bahasa Melayu atau Bahasa Inggeris*

Kertas solan ini mengandungi 11 halaman bercetak

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Answer **all** question

For
Examiner's
Use

- 1 Given that $h^{-1} : x \rightarrow 2x - 3$, find $h^{-1}h^{-1}(x)$ to its simplest form.

[2 marks]

Answer :

- 2 Given that $f : x \rightarrow \frac{2x-3}{2p}$, $p \neq 0$, and $f^{-1} : x \rightarrow \frac{5x+3}{q}$, $q \neq 0$, where p and q are constants, find the values of p and q .

[4 marks]

Answer : $p =$

$q =$

- 3 The equation $x^2 - 2a(x + 1) = 0$ **does not** have real roots. Find the range of values of a .

[3 marks]

Answer :

- 4 The roots of the equation $ax^2 + bx = 4$ are $\frac{3}{2}$ and $-\frac{4}{3}$. Find the values of a and b . *For*
[3 marks] *Examiner's*
Use

Answer : $a = \dots\dots\dots$

$b = \dots\dots\dots$

-
- 5 Given the function $f(x) = x^2 - 5x$. Calculate the range of values of x such that $f(x) > 14$. [2 marks]

Answer : $\dots\dots\dots$

-
- 6 Find the equation of the straight line which is perpendicular to the line $y = 2x - 4$, and passes through the point $(2, -4)$. [3 marks]

Answer : $\dots\dots\dots$

- 7 It is given that $P(0,4)$, $Q(5,1)$ and $R(2,k)$ are the vertices of a triangle on the Cartesian plane. If the area of triangle PQR is 8 unit^2 , calculate the possible values of k .

[3 marks]

Answer :

- 8 Given that $\log_4 x^2 y = p$ and $\log_2 xy^2 = t$, express $\log_2 (xy)^2$ in terms of p and t .

[4 marks]

Answer :

- 9 Solve the equation $\log_4(\log_x 30x) = 1$. Give the answer to 4 significant figures.

[4 marks]

Answer :

10 Diagram 1 shows a section of the graph for the curve $y = p(x + q)^2 + r$, with B as the maximum point.

- (a) State the value of q .
- (b) State the value of r and the corresponding value for p .

[4 marks]

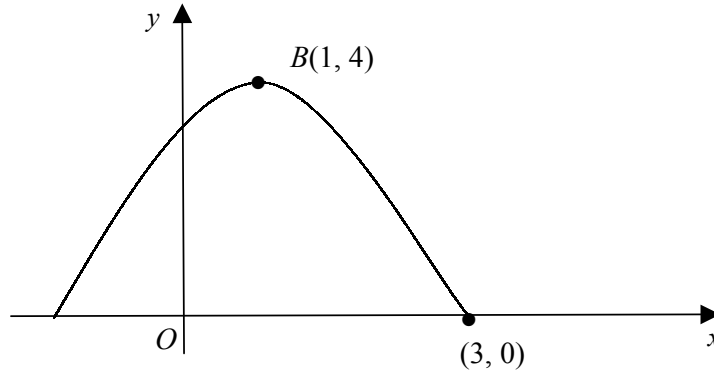


Diagram 1

Answer : (a) :

(b) $r =$

$p =$

11 In Diagram 2, OPQ and ORS are two sectors of circles with centre O . It is given that the area of the shaded region is 18 cm^2 . Calculate the area of sector OPQ if S is the mid point of OQ .

[3 marks]

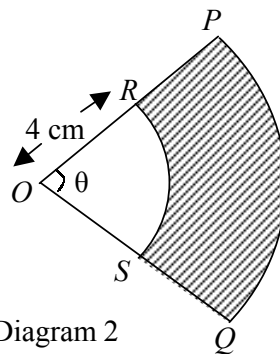


Diagram 2

Answer :

For
Examiner's
Use

- 12 It is given that the median for 6, 4, 7, x , 10 and 9 is 8. If $1 \leq x \leq 10$, state the possible values of x , given x is an integer.

[2 marks]

Answer :

- 13 The tangent to the curve $y = \frac{a}{x^2} + \frac{b}{x}$ at the point $(-1, 5)$ is parallel to the straight line $y = 4x + 3$. Calculate the values of a and b .

[4 marks]

Answer : a =

b =

- 14 The radius of a spherical balloon increases at the rate of 0.08 cm s^{-1} . Find the rate of change of its surface area when the volume of the balloon is $36\pi \text{ cm}^3$.

[3 marks]

[Use $\pi = 3.142$, surface area of a sphere = $4\pi r^2$, volume of sphere = $\frac{4}{3}\pi r^3$].

Answer :

15 It is given that ..., 11, x , 19, ... are 3 consecutive terms of an arithmetic progression.

- (a) Find the value of x and the common difference.
- (b) Hence, if x is the 9th term of the progression, find the first term of this progression.

[4 marks]

Answer : (a) :

(b) :

16 Diagram 3 shows the straight line graph obtained by plotting $\frac{y}{x}$ against x when the equation $y = 5x^2 + 4x$ is transformed into a linear form.

[3 marks]

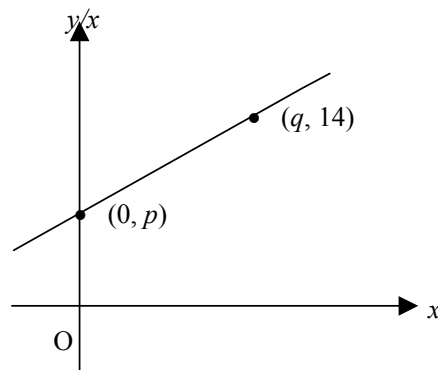


Diagram 3

Find the values of p and q .

Answer : $p =$

$q =$

17 Find $\int_1^t \frac{(2x-1)(2x+1)}{4x^2} dx$ in terms of t .

[3 marks]

Answer :

18 Diagram 4 shows the curve of $y = 3x^2 + 2$ and the rectangle $PQRS$.

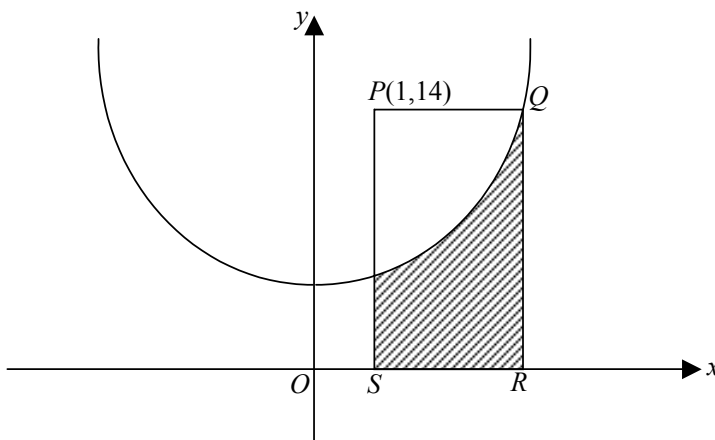


Diagram 4

- (a) Calculate the coordinate of Q .
- (b) Find the area of the shaded region.

[3 marks]

Answer (a) :

(b) :

- 19 Diagram 5 shows the vectors \vec{OP} , \vec{OQ} , \vec{PQ} dan \vec{QS} on a square grid.

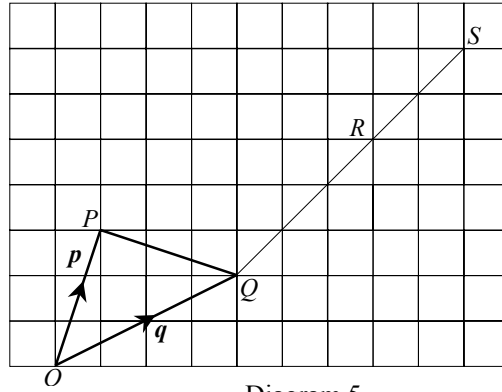


Diagram 5

Given that $\vec{OP} = \mathbf{p}$, and $\vec{OQ} = \mathbf{q}$, express in terms of \mathbf{p} and \mathbf{q} .

- (a) \vec{PQ} .
- (b) \vec{RS}

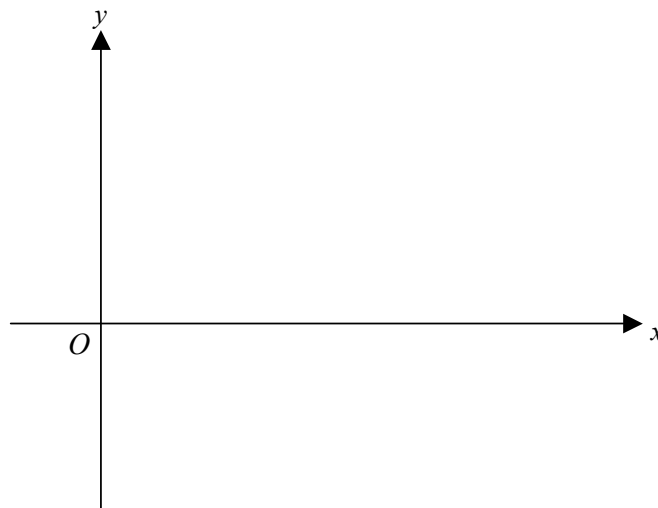
[3 marks]

Answer (a) :

(b) :

- 20 Sketch the graph of $y = |2 \cos 3x|$ for $0 \leq x \leq \pi$ on the answer space provided below.

Answer :



[4 marks]

21 Solve the equation $4 \cot^2 x - \operatorname{cosec}^2 x = 2$, for $0^\circ \leq x \leq 360^\circ$.

[3 marks]

*For
Examiner's
Use*

Answer :

.....

22 A rescue team of 6 is to be chosen from 7 firemen and 5 medical personnel. Find the number of ways of forming the rescue team if

- (a) the number of firemen and medical personnel are the same,
(b) the number of medical personnel is more than the number of firemen.

[3 marks]

Answer (a) :

(b) :

23 Find the number of ways the letters from the word B E N T U K can be arranged if

- (a) the letters are arranged in a row,
(b) the letters are arranged in two rows, that is, three letters per row and all the vocals must be in the first row.

[3 marks]

Answer (a) :

(b) :

*For
Examiner's
Use*

- 24 A box contains x white balls and 6 black balls. Two balls are picked simultaneously at random. Find the value of x if the probability of getting two black balls is $\frac{1}{3}$.
[4 marks]

Answer :

-
- 25 If z is the score for the standard normal distribution and $P(k < z < 0.5) = 0.148$, find the value of k .
[3 marks]

Answer :

End of Question Paper