



Name :

Form :

SEKOLAH BERASRAMA PENUH
 BAHAGIAN PENGURUSAN
 SEKOLAH BERASRAMA PENUH / KLUSTER
 KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2008

MATEMATIK TAMBAHAN
 Kertas 1
 Dua jam

JANGAN BUKA KERTAS SOALAN INI
SEHINGGA DIBERITAHU

1. *This question paper consists of 25 questions.*
2. *Answer all questions.*
3. *Give only one answer for each question.*
4. *Write your answers clearly in the spaces provided in the question paper.*
5. *Show your working. It may help you to get marks.*
6. *If you wish to change your answer, cross out the work that you have done. Then write down the new answer.*
7. *The diagrams in the questions provided are not drawn to scale unless stated.*
8. *The marks allocated for each question and sub-part of a question are shown in brackets.*
9. *A list of formulae is provided on pages 2 to 3.*
10. *A booklet of four-figure mathematical tables is provided.*
11. *You may use a non-programmable scientific calculator.*
12. *This question paper must be handed in at the end of the examination.*

For examiner's use only		
Question	Total Marks	Marks Obtained
1	3	
2	3	
3	3	
4	3	
5	3	
6	3	
7	3	
8	3	
9	3	
10	4	
11	4	
12	4	
13	4	
14	3	
15	2	
16	3	
17	4	
18	3	
19	3	
20	3	
21	3	
22	3	
23	3	
24	4	
25	3	
TOTAL	80	

Kertas soalan ini mengandungi 15 halaman bercetak

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

ALGEBRA

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

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

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

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

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

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

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

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

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

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

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

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

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

CALCULUS

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

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

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

4 Area under a curve

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

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

5 Volume generated

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

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

GEOMETRY

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

2 Midpoint

$$(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$3 \quad |r| = \sqrt{x^2 + y^2}$$

$$4 \quad \hat{r} = \frac{xi + yj}{\sqrt{x^2 + y^2}}$$

5 A point dividing a segment of a line

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

6 Area of triangle =

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

STATISTIC

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

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

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

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

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

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

$$7 \quad \bar{I} = \frac{\sum w_1 I_1}{\sum w_1}$$

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

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

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

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

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

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

$$14 \quad z = \frac{x - \mu}{\sigma}$$

TRIGONOMETRY

$$1 \quad \text{Arc length, } s = r\theta$$

$$2 \quad \text{Area of sector, } L = \frac{1}{2} r^2 \theta$$

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

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

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

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

$$7 \quad \begin{aligned} \cos 2A &= \cos^2 A - \sin^2 A \\ &= 2 \cos^2 A - 1 \\ &= 1 - 2 \sin^2 A \end{aligned}$$

$$8 \quad \tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

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

$$10 \quad \cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$11 \quad \tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

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

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

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

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Answer all questions.

1. 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) Write down the function notation for f .

(b) State the value of m .

(c) State the codomain.

[3 marks]

Answer : (a).....

(b).....

(c).....

1
3

2. Given that function $f : x \rightarrow ax - 3, a < 0$ and $f^2 : x \rightarrow 16x - b$, find the value of a and of b .

[3 marks]

2
3



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

$b = \dots\dots\dots$

3. Given that function $f : x \rightarrow 3 - \frac{k}{x}, x \neq 0$, and $f^{-1} : x \rightarrow \frac{4}{x+h}, x \neq -h$, find the value of h and of k .

[3 markah]

3

3

Answer : $h = \dots\dots\dots$

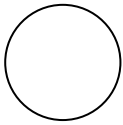
$k = \dots\dots\dots$

4. Given m and -3 are the roots of a quadratic equation $2x^2 - 4x = k - 1$, find the value of m and of k .

[3 marks]

4

3



5. Given that quadratic equation $x(3x - p) = 2x - 3$ has no roots, find the range of values of p .

[3 marks]

Answer : $m = \dots\dots\dots$ For examiner's use only

$k = \dots\dots\dots$

Answer : $\dots\dots\dots$

5
3

6. **Diagram 1** shows the graph of a curve $f(x) = 2(x + p)^2 + q$, where p and q are constants.

$f(x)$

x

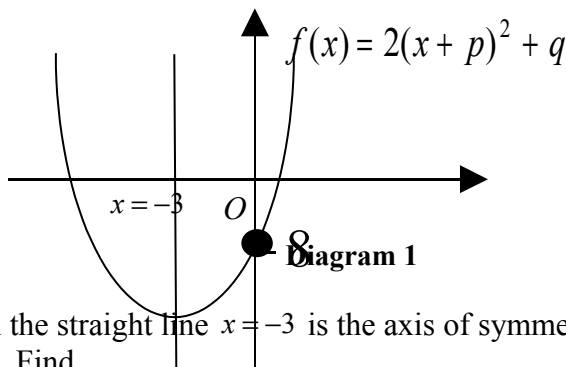


Diagram 1

Given the straight line $x = -3$ is the axis of symmetry of the curve and parallel to the y -axis. Find

- (a) the value of p ,
- (b) the value of q ,
- (c) the turning point of the curve $f(x)$.

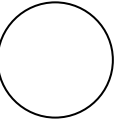
[3 marks]

Answer : (a) $\dots\dots\dots$

6
3

(b)

(c).....



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7. Find the range of the values of x for which $3x(2x - 1) \leq 2(2x + 5)$.

[3 marks]

7
3

Answer :

8. Solve the equation $\sqrt{8^{x+3}} = \frac{1}{2^{x-2}}$.

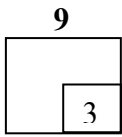
[3 marks]

8
3

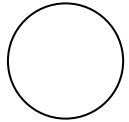
Answer :

9. Solve the equation $\log_5 (5 - 2x) - 1 = \log_5 2x$.

[3 marks]



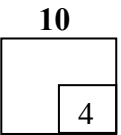
Answer : For examiner's use only



10. Given that $\log_{27} p - 2\log_9 q = 2$, express p in terms of q .

[4 marks]

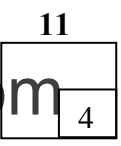
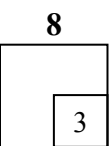
Answer :

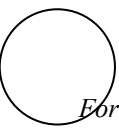


11. An arithmetic progression has 9 terms. The sum of the first four terms is 24 and the sum of all the odd number terms is 55. Find

- a) the first term and the common difference,
- b) the seventh term.

[4 marks]

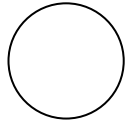




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Answer: (a).....

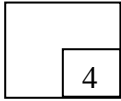
(b).....



12. For a geometric progression, the sum of the first two terms is 30 and the third term exceeds the first term by 15. Find the common ratio and the first term of the geometric progression.

[4 marks]

12



Answer:

13. Diagram 2 shows the graph of xy against x^2 .

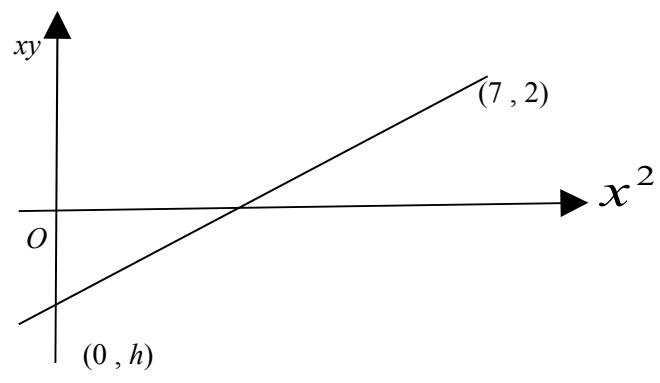
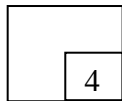


Diagram 2

The variables x and y are related by the equation $2y = x + \frac{k}{x}$, where k is a constant. Find the value of h and of k .

[4 marks]

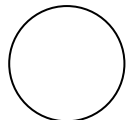
13



Answer : $h = \dots\dots\dots$

$k = \dots\dots\dots$

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14. In **Diagram 3** below, the equation of straight line LM is $\frac{x}{6} - \frac{y}{4} = 1$. The points L and M lie on the x -axis and y -axis respectively.

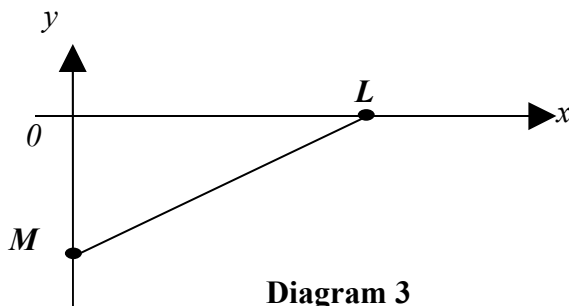


Diagram 3

Find the equation of a straight line which is perpendicular to LM and passes through the point M .

[3 marks]

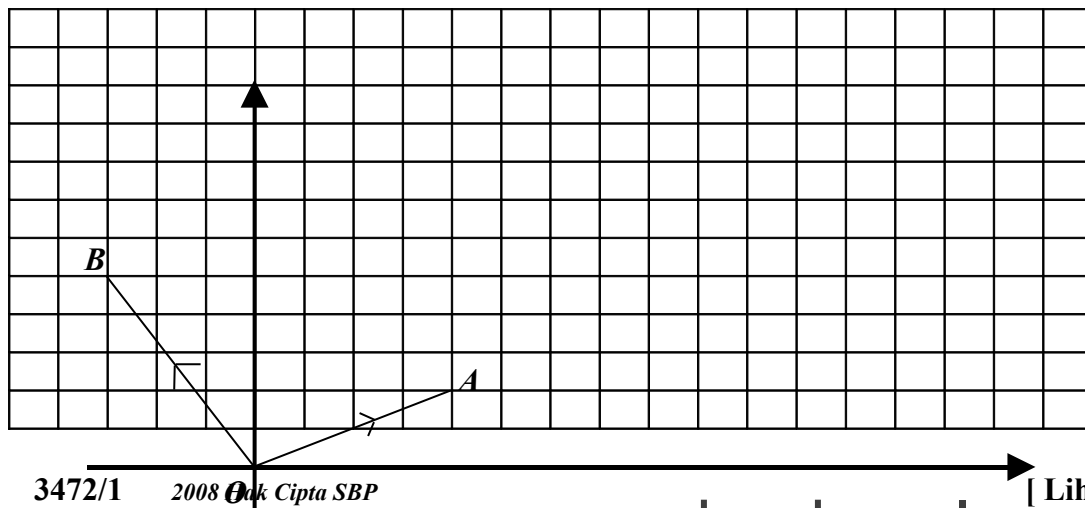
Answer : $\dots\dots\dots$

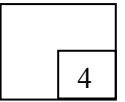
14



15. In **Diagram 4**, $\vec{OA} = \underline{a}$ and $\vec{OB} = \underline{b}$. On the same square grid, draw the line that represents the vector $\vec{OC} = 3\underline{a} + \underline{b}$.

[2 marks]





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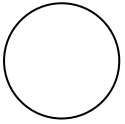
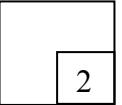
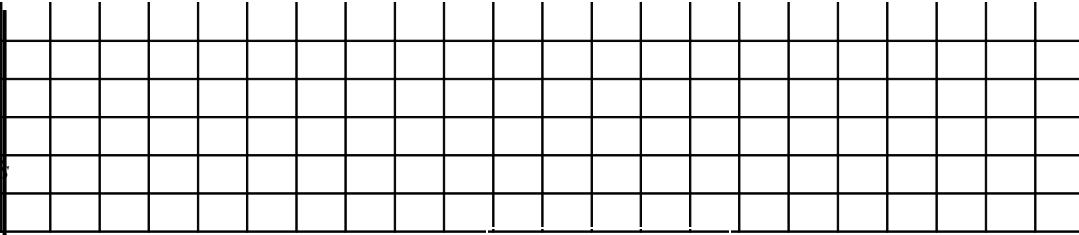
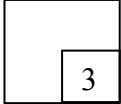


Diagram 4

16. Given $A(2, -5), B(3, 4)$ and $C(p, q)$. Find the values of p and q such that $\vec{AB} - 2\vec{BC} = 9\vec{i} - 5\vec{j}$.

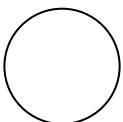
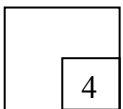
[3 marks]

Answer:



17. Solve the equation $4 \cos 2x + \sin x = -3$ for $0^\circ \leq x \leq 360^\circ$.

[4 marks]



18. **Diagram 5** shows a sector BOC of a circle with centre O .
 B

Answer:

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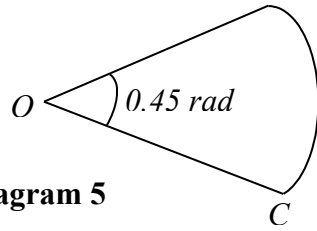


Diagram 5

Given the perimeter of the sector BOC is 24.5 cm , calculate

- (a) the radius of the sector
- (b) the area of the sector.

[3 marks]

Answer: a).....

b)

18

3

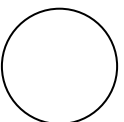
19. Given $f(x) = \frac{2}{(5-3x)^3}$, find the value of $f'(2)$.

[3 marks]

19

3

Answer:.....

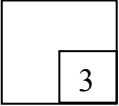


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20. Find the equation of normal to the curve $y = -x^3 + 5x$ at the point when $x = -1$.

[3 marks]

20



Answer:

21. Given that $\int_5^2 f(x)dx = -6$, calculate $\int_2^5 \left[f(x) - \frac{x}{4} \right] dx$.

[3 marks]

21



Answer:

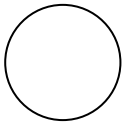
22. It is given that the sum of 5 numbers is $\sqrt{\alpha}$. The mean of the sum of the square is 200 and the variance is $3\beta^2$. Express α in terms of β .

[3 marks]

22



Answer:



23. A pack of present containing three pens are chosen from 4 blue pens and 5 black pens. Find the probability of getting at least one black pen in the pack of present.

[3 marks]

Answer:

23

3

24.

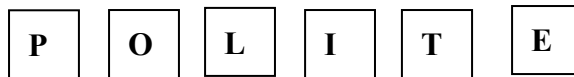


Diagram 6

Diagram 6 shows six cards of different letters.

- (a) Find the number of possible arrangements beginning with P.
- (b) Find the number of these arrangements in which the vowels are separated.

[4 marks]

Answer: (a).....

(b).....

24

4



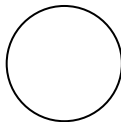
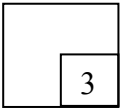
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25. X is a random variable which is normally distributed with mean μ and standard deviation of 6. Find

- (a) the value of μ , if the z -value is 1.5 when $x = 42$,
- (b) $P(X < 47)$.

[3 marks]

25



Answer: (a).....

(b).....

END OF QUESTION PAPER

