SMJK PEREMPUAN PERAK, IPOH, PERAK.
PEPERIKSAAN PERCUBAAN SPM 2021
ADDITIONAL MATHEMATICS
KERTAS 1 (3472/1)

(Masa: 2 jam)

Nama murid: _____ ( ) Kelas: 5 _____

Disediakan oleh: KALAIVANI A/P KARUPPIAH Markah : _____

Disemak oleh: _____ Disahkan oleh: _____
(YAU BEED WAH) (WONG SOOK KUIN)
Guru Kanan Sains & Matematik Pengetua

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Kertas peperiksaan ini mengandungi 9 halaman bercetak.

Section A [64 marks]
Answer **all** questions.

1 (a) Write down all the possible outcomes for the following event in set notation.
Determine whether the event is a discrete random variable or a continuous variable.
Give a reason.

A fair dice is thrown five times, given X is a random variable which represents the number of times to get the number 6.

[3 marks]

Answer:

(b) The marks of a mathematics test taken by pupils of SMK Mutiara are normally disributed with a mean of 50 marks and standard deviation of 10 marks. Diagram 1 shows the normal distribution graph of their mathematics test marks.

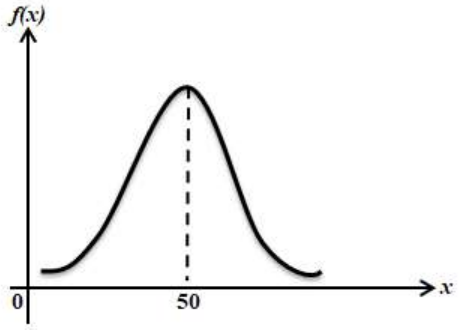

Diagram 1

The marks of the same test taken by pupils of SMK Intan are normally disributed with a mean of 60 marks and standard deviation of 15 marks. Sketch the normal distribution graph of their mathematics test marks on Diagram 1. [3 marks]

2 Diagram 2 shows a seven-letter word.

F A S H I O N

Diagram 2

Determine the number of different ways 4 letters chosen from the word can be arranged in a circle. [3 marks]

Answer:

3 (a) Sketch the graph of quadratic function $f(x) = 2x^2 - 4x - 16$ where $a = 2$, $b = -4$ and $c = -16$. [3 marks]

(b) Hence, sketch the graph of $f(x)$ that is formed when the value of b changes to 4. Describe the changes in the shape of the graph obtained. [4 marks]

Answer:

(a)

(b)

4 The area of a circle is given as $A = \pi r^2$ and its radius expands at a rate of 2.5 cm s^{-1}.

(a) Find $\frac{dA}{dr}$ by using the first principle. [4 marks]

(b) Hence, find the rate of change of its area, in π cm^2 s^{-1}, when the radius is 6 cm. [3 marks]

Answer:

(a)

(b)

5 Verify that the function $f(x) = 2x - 5$ has an inverse function $g(x) = \frac{x+5}{2}$. [3 marks]

Answer:

6 Solve the equation $4\cos 2x + \sin x = -3$ for $0° \leq x \leq 360°$. [4 marks]

Answer:

7 (a) Rationalise the denominator and simplify the following expression:

$$\frac{6}{2\sqrt{5} - \sqrt{2}}$$

[3 marks]

(b) Solve the following simultaneous equations.

$$(9^x)(3^y) = 1$$

$$\frac{8^x}{4^y} = 4$$

[4 marks]

Answer:

(a)

(b)

8 (a) An arithmetic progression has 14 terms. The sum of all the odd terms is 161 and the sum of all even terms is 182. Find the last term of the progression. [3 marks]

(b) Jay works as a supervisor in a factory. Every subsequent year, his monthly salary is increased by 10%. Given the total salary paid to him in the first 5 years is RM256,414.20 What is his initial salary? [4 marks]

Answer:

(a)

(b)

9 The variables x and y are related by an equation $y = \frac{1}{px^2+q}$ where p and q are constants. Diagram 3 shows a straight line graph obtained by plotting $\frac{1}{y}$ against x^2.

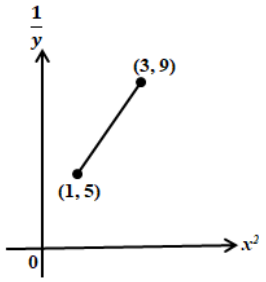

Diagram 3

Find the values of p and q . [4 marks]

Answer:

10 Given three points, O(0, 0), A(2, 5) and B(– 3, 6) are on a Cartesian plane. Find the following in the form $\begin{pmatrix} x \\ y \end{pmatrix}$:

(a) $\overrightarrow{AB}$ [3 marks]

(b) The unit vector in the direction of $\overrightarrow{AB}$. [3 marks]

Answer:

(a)

(b)

11 Diagram 4 shows sector *OMN* with centre *O*.

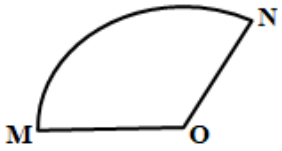

Diagram 4

Given the perimeter of sector *OMN* is 40 cm and the area of sector *OMN* is 100 cm^2. Find $\angle MON$ in radians. [4 marks]

Answer:

12 Solve the following linear equations system.

$$4p - 2q + 3r = 7$$
$$p + 5q - 6r = -7$$
$$6q - 4p + 7r = 9$$

[6 marks]

Answer:

Section B [16 marks]

Answer any **two** questions from this section.

13 (a) Diagram 5 shows line segment *AB* where the coordinates of points *A* and *B* are (x_1, y_1) and (x_2, y_2) respectively. $P(x, y)$ is a point which divides line segment *AB* in the ratio m : n.

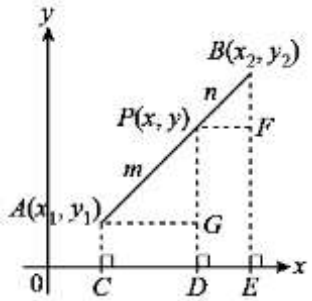

Diagram 5

Show that $(x, y) = \left(\frac{nx_1+mx_2}{m+n}, \frac{ny_1+my_2}{m+n}\right)$. [4 marks]

(b)

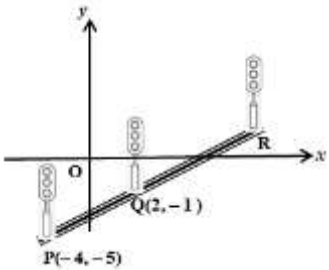

Diagram 6

Diagram 6 shows three traffic lights P, Q and R along a straight road. It is given that the distance from Q to R is $\frac{3}{5}$ times the distance from P to R. Find the coordinates of traffic light R. [4 marks]

Answer:

(a)

(b)

14 A curve has a gradient function $3x^2 - 12x + 9$ and passes through point A(4,5).

(a) Find the equation of the curve. [3 marks]

(b) Hence, find the coordinates of the maximum point of the curve. [5 marks]

Answer:

(a)

(b)

15 It is given that $g: x \to 3x + 4$ and $fg: x \to 6x + 1$, find

(a) $f(x)$, [3 marks]

(b) $gf(x)$, [2 marks]

(c) the value of x such that $3fg(x - 2) = gf(x)$. [3 marks]

Answer:

(a)

(b)

(c)

End of Question Paper