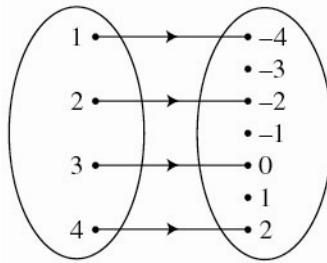


Answer **all** questions.

- 1 Given that $f(x) = 3x - 4$ and $g(x) = 4x + 3$, find the function $fg(x)$.

(2 marks)

2



Based on the relation given, state

- (a) the codomain
(b) the range

(2 marks)

- 3 Solve the following equations using the factorisation method:

(a) $6x^2 - 17x - 14 = 0$

(b) $3x^2 + 13x + 12 = 0$

(2 marks)

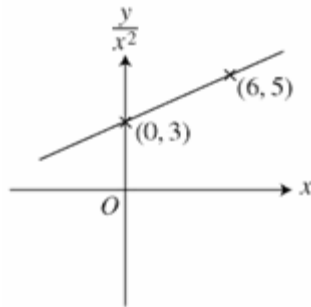
- 4 $2x + 9$, $5x - 14$ and $4x - 1$ are three consecutive terms in an arithmetic progression. Calculate the value of x .

(3 marks)

- 5 The sixth term of an arithmetic progression is 46 and the eighteenth term is 106.
Find the tenth term.

(3 marks)

- 6 The equation $y = kx^3 + hx^2$ is converted to a linear form.
The line of best fit is shown in the diagram below.



Find the values of h and k .

(3 marks)

- 7 Sketch the graph of $y = 9 - (x + 5)^2$ for the domain $-10 \leq x \leq 0$.

(3 marks)

- 8 In each of the following inequalities, determine the range values of x such that

- (a) $(x - 2)(3x + 2) > 0$,
(b) $x(7x - 11) \leq 6(2x - 1)$

(3 marks)

- 9 The gradient function for a curve is $3x^2 - 8x + 8$. If the curve passes through the point (2, 3), find the equation of the curve.

(3 marks)

10

Given that $\int_1^5 m(x) dx = 7$, find

(a) $\int_5^1 [m(x) + 2x] dx$,

(b) $\int_1^5 4[m(x) - 3x] dx$.

(3 marks)

11

Simplify $\frac{1 + \sin x}{\cos x} + \frac{\cos x}{1 + \sin x}$.

(3 marks)

- 12 In how many ways can 9 question papers be arranged in an examination time table so that all the three Mathematics papers are to be separated?

(3 marks)

13

In a class of 40 students, 16 students pass Mathematics test and 18 students pass Science test. If the proportion of students passing both subjects is $\frac{1}{8}$, find the probability of a student passing only one subject.

(3 marks)

- 14** The diameters of ball bearings are normally distributed with mean 0.397 cm and standard deviation 0.005 cm. Find the percentage of the ball bearings having a diameter of 0.4 cm or more.

(3 marks)

- 15** If $P(|Z| > z) = 0.3$, find the value of z .

(3 marks)

- 16** Find the equation of the tangent to the curve $y = 2x^3 - 5x^2 + 2$ at the point (1, -1).

(3 marks)

17

Given that $y = \frac{2}{3}x^3 + \frac{7}{2}x^2 - 4x + 9$, find the range of values of x for which $\frac{dy}{dx} > 0$.

(3 marks)

18

It is given that $\underline{a} = 3\underline{i} - 4\underline{j}$, $\underline{b} = 5\underline{i} - \underline{j}$ and $\underline{c} = -\underline{i} + 5\underline{j}$. Find the magnitude of the resultant of the three vectors $2\underline{a}$, \underline{b} and $3\underline{c}$.

(4 marks)

19

$ABCD$ is a rhombus such that $\overline{AB} = \begin{pmatrix} 5 \\ 12 \end{pmatrix}$ and $\overline{BC} = \underline{a} + \underline{b}$, where $\underline{a} = \begin{pmatrix} 6 \\ 3 \end{pmatrix}$, $\underline{b} = \begin{pmatrix} -11 \\ m \end{pmatrix}$. Find the possible values of m .

(4 marks)

20

It is given that $\log_{10} 5 = 0.70$ and $\log_{10} 9 = 0.95$. Calculate the value of

(a) $\log_9 25$,

(b) $\log_{10} 13\frac{8}{9}$.

(4 marks)

21 Solve the following equation for x giving your answer correct to 4 significant figures.

$$\log_5 x + \log_5 (3x - 2) = 2$$

(4 marks)

- 22 Given the points $P(1, -4)$ and $Q(3, -1)$, find the equation of a moving point R such that $RP = 3RQ$.
(4 marks)

- 23 Find the area of the quadrilateral with vertices $(1, 5)$, $(-3, 2)$, $(2, -3)$ and $(5, 1)$.
(4 marks)

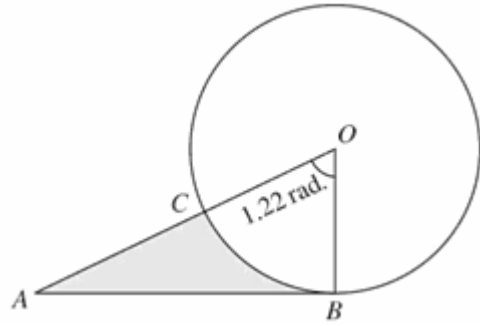
- 24 The frequency table below shows the time taken to complete a task by 20 students.

Time (minutes)	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29
Frequency	2	3	7	4	4

Determine the standard deviation of the distribution.

(4 marks)

- 25 The diagram below shows a circle with centre O .



AB is a tangent to the circle at B . The length of the minor arc BC is 4.88 cm. Find

- the length of the radius of the circle,
- the area of the shaded region.

(4 marks)