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0178/03
May/June 2026
2 hours
Marks: 100

Additional Materials: Electronic calculator
Geometrical instruments
Tracing paper (optional)

Do not use staples, paper clips, glue or correction fluid.

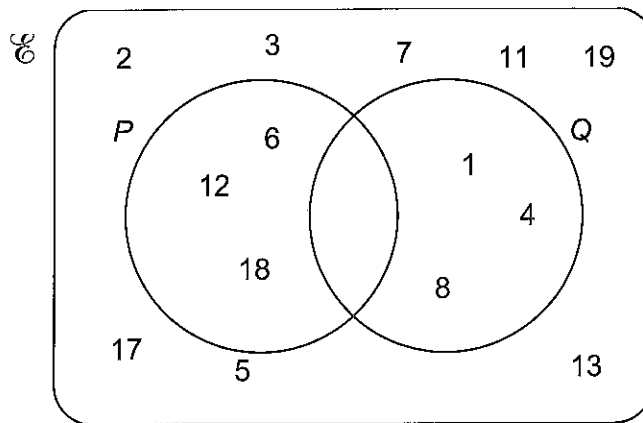
For π , use either your calculator value or 3.142.

The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **14** printed pages and **2** blank pages.



- 1 (a) The Venn diagram shows the elements of set P and Q in the universal set.



- (i) Write the type of numbers given to the elements of $(P \cup Q)'$.

..... [1]

- (ii) Describe $P \cap Q$.

..... [1]

- (iii) Find $n(Q)'$.

..... [1]

- (b) In a class of 102 students,
70 joined Mathematics club,
60 joined Debate club,
15 joined neither of the clubs.

By means of a Venn diagram or otherwise, find the number of students who joined Mathematics club only.

..... [3]

- 2 (a) Given the sequence 2,, 18, 54, 162,, ...
find the 2nd term and the 6th term of the sequence.

2nd term =

6th term = [2]

- (b) Another sequence is given by $-1, -1, 1, 5, 11, \dots$
Find the n th term of the sequence.

..... [3]

- (c) The 1st term and the 5th term of the sequence are 4 and 16 respectively.
The n th term of the sequence is given by $T_n = a + d(n - 1)$.

Find

- (i) the common difference,

..... [3]

- (ii) the n th term.

..... [1]

- 3 (a) Teboho and Sebolelo share M72 000 in the ratio 3 : 5.

Calculate

(i) Teboho's share,

(ii) the percentage of Sebolelo's share.

M..... [2]

.....% [2]

- (b) Lebeha invested part of M10 000 at 2.5% per annum simple interest and the remaining at 1.9% per annum simple interest.
He obtained the total interest of M678 after three years.

Calculate the amount invested at 2.5%.

M [3]

- 4 (a) In a binding company, machine A completes the pile every 25 minutes while machine B completes the same pile every 30 minutes.
The machines start binding at 8.00 a.m.

Find

- (i) the total number of piles completed by both machines when they first release the completed piles at the same time,

..... [3]

- (ii) the time at which both machines first release the completed piles at the same time.

..... [2]

- (b) Mxolisi pays M18 000 for 30 pairs of shoes.
He sells 15 pairs for M750 each, 10 pairs for M700 each and the rest for M650 each pair.

Calculate his percentage profit.

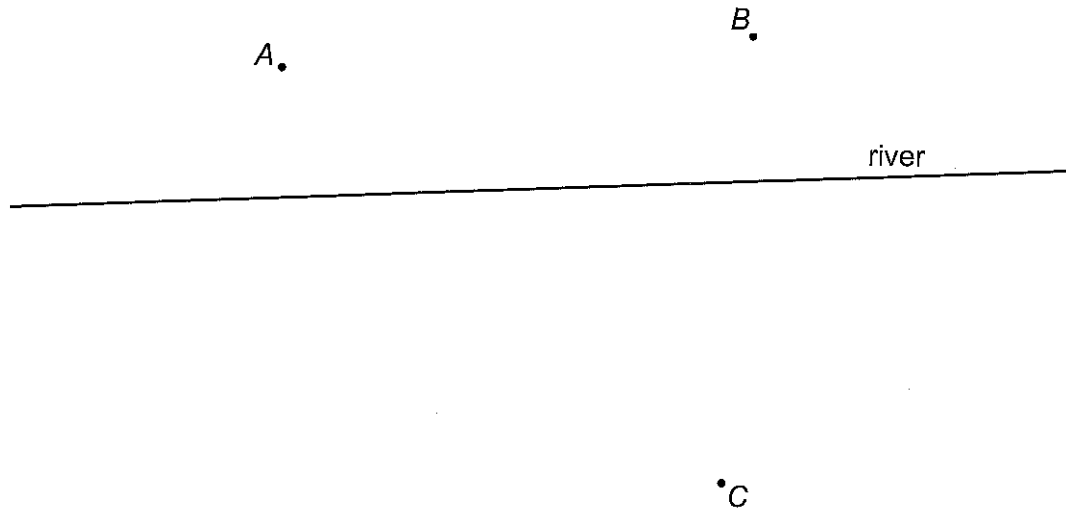
.....% [3]

- (c) Sempe has a flock of 3200 sheep and sells 19.5% of them.

Find the number of the remaining sheep.

.....[2]

- 5 The diagram shows the river and the positions of three villages A , B and C on the map. The map is drawn to scale.



- (a) Measure and write the distance BC .

..... cm [1]

- (b) The actual distance from A to B is 30 km.

Find the scale, in cm to km, that was used to draw the map.

1 cm is to km [3]

- (c) A bridge is to be constructed such that it is equidistant from AB and AC .

Construct and mark with M the position of the bridge.

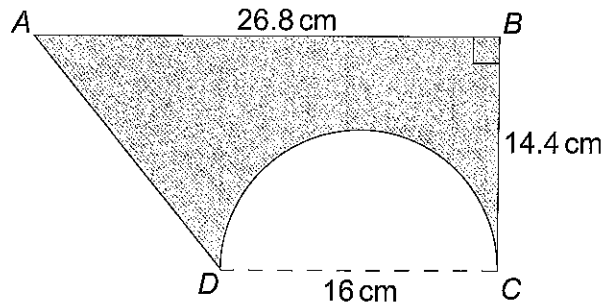
[3]

- (d) A perpendicular bisector of line AC is to be drawn.

Describe the locus of all points represented by the perpendicular bisector.

.....
[1]

- 6 (a) The diagram shows part of the trapezium after the semi-circle was cut.
 $AB = 26.8$ cm, $BC = 14.4$ cm and diameter $DC = 16$ cm.



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SCALE

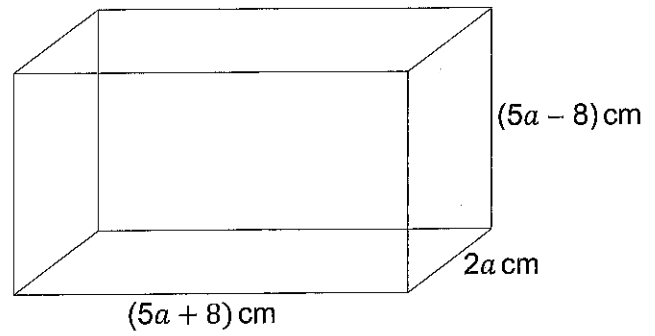
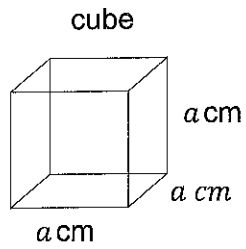
- (i) Show that $AD = 18$ cm.

[3]

- (ii) Calculate the perimeter of the shaded region.

..... cm [3]

- (b) The diagrams show a cube of sides a cm and a cuboid of $(5a + 8)$ cm by $2a$ cm by $(5a - 8)$ cm.
48 cubes fit exactly into the cuboid.



Calculate the length of the cube.

..... cm [4]

- 7 (a) Given $2r - 17 = 2p + 3$,
find the value of $r - p$.

$$r - p = \dots\dots\dots [2]$$

- (b) Factorise fully.

$$(a - t)^2 - 4$$

$$\dots\dots\dots [2]$$

- (c) 360 cubes of 1cm are arranged to make a cuboid.
The largest base area of the cuboid is a perfect square.

Find the smallest possible height of the cuboid.

$$\dots\dots\dots [3]$$

- (d) Given $4k + 3r^2 = 10$, make r^2 the subject of the formula.

$$r^2 = \dots\dots\dots [2]$$

8 (a) $f(x) = \frac{2x-7}{3}$ and $g(x) = x - \frac{2}{3}$

Find

(i) $f\left(\frac{1}{2}\right)$,

$f\left(\frac{1}{2}\right) = \dots\dots\dots [2]$

(ii) x when $f(x) = g(x)$.

$x = \dots\dots\dots [3]$

(b) Solve $x^2 + x = 132$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots [3]$

9 (a) $\overrightarrow{PQ} = \begin{pmatrix} 14 \\ 7 \end{pmatrix}$ $\overrightarrow{PR} = \begin{pmatrix} -6 \\ -3 \end{pmatrix}$ $\overrightarrow{RS} = \begin{pmatrix} 12 \\ -5 \end{pmatrix}$

Find

(i) $\overrightarrow{QR}$,

..... [2]

(ii) $|\overrightarrow{RS}|$.

.....units [2]

- (b) A triangle QRS has a base 22 units and the area of 110 units².

Find, in simplest form, the ratio of the height to the base.

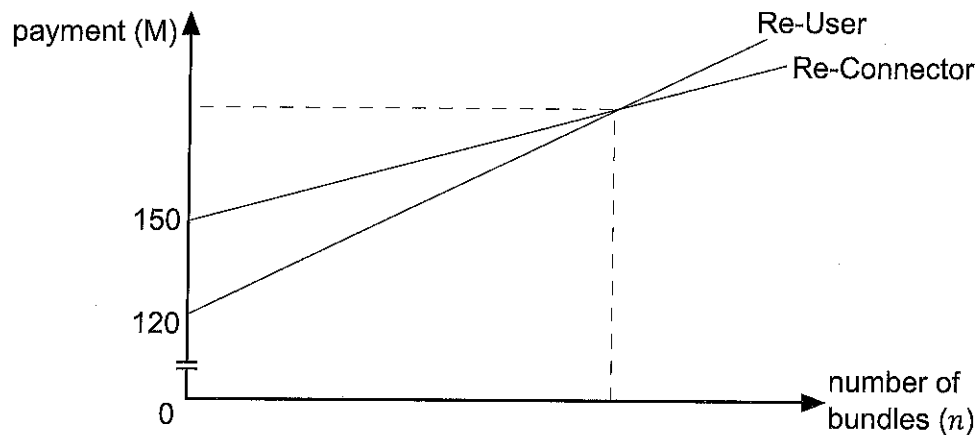
..... [3]

- (c) Work out.

$$\begin{pmatrix} 1.2 & 0 \\ -2.7 & 2.1 \end{pmatrix} - \begin{pmatrix} -3.3 & -0.5 \\ 2.4 & 0 \end{pmatrix}$$

..... [2]

- 10 Two companies Re-Connector and Re-User sell data bundles.
 For Re-Connector, a customer must pay M150 for the service and is charged M5 per data bundle.
 For Re-User, a customer must pay M120 for the service and is charged M5.50 per data bundle.
 The graph represents the payments M and the number of bundles n .



- (a) Considering Re-Connector only, explain what M150 represents.

.....
 [1]

- (b) Write the equations, in terms of M and n , used by the two companies.

Re-Connector company

Re-User company: [4]

- (c) Calculate the amount paid for 45 data bundles from Re-user.

M [2]

- (d) Which company will be cheaper for a customer who wants to buy 66 data bundles.
 Justify.

company

reason

..... [2]

- 11 The table shows the salaries of football players.

salary (M)	8 000	12 000	16 000	20 500	22 500	28 500
number of players	5	4	6	4	2	3

- (a) State the modal salary.

M [1]

- (b) Calculate

- (i) the total number of football players,

..... [1]

- (ii) the mean salary of players.

..... [3]

- (c) A player is chosen at random.

Calculate, in simplest form, the probability that

- (i) the player's salary is M8 000,

.....[1]

- (ii) the player's salary is at least M20 000.

..... [3]

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