Measurement & Geometry

Question 1 **(4 marks)**

(a) Calculate the circumference of the garden, in metres. (2 marks)

Solution
$C = \pi d$
$C = 3.14 \times 8$
$C = 25.12$ m

Specific behaviours
✓ correct substitution into $C = \pi d$
✓ correct final answer, 25.12 m

(b) Calculate the area of the garden, in square metres. (2 marks)

Solution
$r = d \div 2 = 4$ m
$A = \pi r^2 = 3.14 \times 4^2$
$A = 3.14 \times 16 = 50.24$ m^2

Specific behaviours
✓ correct substitution into $A = \pi r^2$ using $r = 4$ m
✓ correct final answer, 50.24 m^2

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Question 2 **(6 marks)**

(a) A tent has a triangular cross-section with a base of 6 cm and a height of 4 cm. The tent (prism) is 10 cm long. Calculate the volume of the triangular prism. (2 marks)

Solution

Area of cross-section = $\frac{1}{2} \times$ base × height

$$= \frac{1}{2} \times 6 \times 4 = 12 \text{ cm}^2$$

Volume = cross-sectional area × length

$= 12 \times 10 = 120 \text{ cm}^3$

Specific behaviours

✓ correct area of triangular cross-section, 12 cm^2

✓ correct final volume, 120 cm^3

(b) The following parts are not related to the tent above. Two parallel lines are crossed by a transversal. One of the angles formed measures 115°, and x is the co-interior angle on the same side of the transversal. Find the size of x, giving a geometric reason. (2 marks)

Solution

Co-interior angles on parallel lines sum to 180°

$x = 180° - 115°$

$x = 65°$

Specific behaviours

✓ correct reason stated (co-interior angles sum to 180° on parallel lines)

✓ correct value, x = 65°

(c) Triangle ABC is congruent to triangle DEF, with vertices matching in the order A ↔ D, B ↔ E, C ↔ F. Given that ∠A = 50° and ∠B = 70°, find the size of ∠F, giving a reason. (2 marks)

Solution

∠C = 180° − 50° − 70° = 60° (angle sum of a triangle)

Since $\Delta ABC \cong \Delta DEF$, ∠F corresponds to C

∠F = 60°

Specific behaviours

✓ correct use of angle sum to find ∠C = 60°

✓ correct final answer, ∠F = 60°, with matching angle identified

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Number & Algebra

Question 3 **(4 marks)**

(a) $a^4 \times a^3$ (1 mark)

Solution
$a^4 \times a^3 = a^{4+3} = a^7$
Specific behaviours
✓ correct simplified answer, a^7

(b) $m^8 \div m^5$ (1 mark)

Solution
$m^8 \div m^5 = m^{8-5} = m^3$
Specific behaviours
✓ correct simplified answer, m^3

(c) Expand and simplify $3(x + 4) - 2x$. (2 marks)

Solution
$3(x + 4) - 2x = 3x + 12 - 2x$ $= x + 12$
Specific behaviours
✓ correctly expands to $3x + 12 - 2x$
✓ correct simplified answer, $x + 12$

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Question 4 **(6 marks)**

(a) Solve each equation for the unknown. Solve for x: $2x + 5 = 17$. (2 marks)

Solution
$2x + 5 = 17$
$2x = 12$
$x = 6$

Specific behaviours
✓ correctly isolates the term with x, $2x = 12$
✓ correct final answer, $x = 6$

(b) Solve for y: $y \div 3 - 2 = 4$. (2 marks)

Solution
$y \div 3 - 2 = 4$
$y \div 3 = 6$
$y = 18$

Specific behaviours
✓ correctly isolates $y \div 3 = 6$
✓ correct final answer, $y = 18$

(c) The following part is not related to the equations above. A fruit punch recipe mixes juice and lemonade in the ratio 3 : 5. If 15 L of lemonade is used, how much juice is needed? (2 marks)

Solution
Ratio is 3 : 5, and 5 parts = 15 L
1 part = 15 ÷ 5 = 3 L
Juice needed = 3 parts = 3 × 3 = 9 L

Specific behaviours
✓ correctly finds the value of 1 part, 3 L
✓ correct final answer, 9 L of juice

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Statistics & Probability

Question 5 **(5 marks)**

(a) How many of the 40 students prefer English in total? (1 mark)

Solution
Students who prefer English = 8 + 11 = 19
Specific behaviours
✓ correct final answer, 19 students

(b) One student is chosen at random from all 40 students. Find the probability that the student is in Class B and prefers Maths. (2 marks)

Solution
Students in Class B who prefer Maths = 9
P(Class B and Maths) = $\frac{9}{40}$
Specific behaviours
✓ correctly identifies 9 students in Class B who prefer Maths
✓ correct final probability, 9/40

(c) Find the probability that a randomly selected student does NOT prefer Maths. (2 marks)

Solution
Total who prefer Maths = 12 + 9 = 21
Students who do not prefer Maths = 40 − 21 = 19
P(not Maths) = $\frac{19}{40}$
Specific behaviours
✓ correctly finds the total who prefer Maths, 21 (or directly 19 who prefer English)
✓ correct final probability, 19/40

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Question 6 **(5 marks)**

(a) How many students play sport only (and not a musical instrument)? (1 mark)

Solution
Sport only = 15 − 4 = 11 students
Specific behaviours
✓ correct final answer, 11 students

(b) Draw a Venn diagram to represent this information, then use it to find the probability that a randomly chosen student plays neither a sport nor a musical instrument. (2 marks)

Solution
Instrument only = 10 − 4 = 6 students
Students in at least one group = 11 + 6 + 4 = 21
Students in neither = 25 − 21 = 4
P(neither) = $\frac{4}{25}$
Specific behaviours
✓ correct Venn diagram values found (sport only 11, instrument only 6, both 4)
✓ correct final probability, 4/25

(c) Calculate the range and median of each group's scores, and state which group had more consistent results. (2 marks)

Solution
Group X: range = 10 − 6 = 4; median = 8
Group Y: range = 10 − 4 = 6; median = 8
Group X has the smaller range, so Group X's results were more consistent.
Specific behaviours
✓ correctly calculates both ranges and both medians
✓ correct conclusion with justification (Group X more consistent, smaller range)

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