Geometry and transformations - Applications test

Name: _____ Date: _____

16 questions | 54 marks | 60 minutes

Use geometric reasoning to evaluate plans, repair procedures and justify constructions in practical situations.

No calculator needed.

1. A triangular sign has two angles of 54° and 61°. Find its third angle. [2 marks]

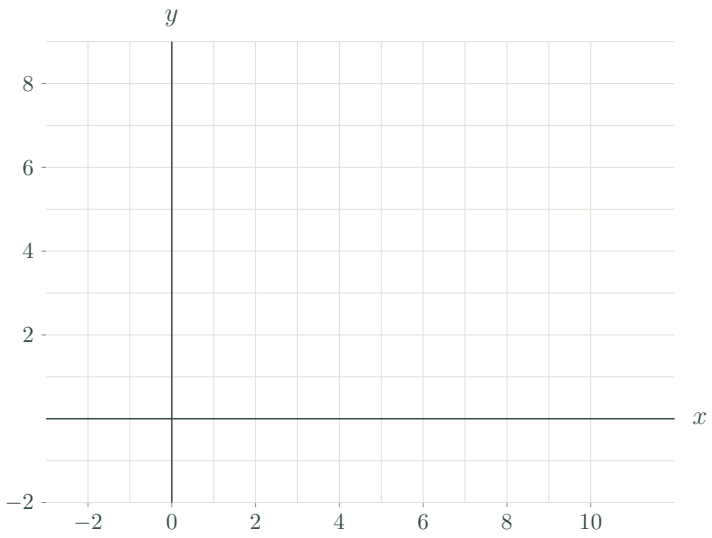
2. A map image is enlarged so that a 4 cm route becomes 10 cm. Find the positive scale factor. [2 marks]

3. A rectangular logo is 5 cm by 4 cm. It is enlarged by factor 1.2. Find its new area. [3 marks]

4. A safety sign is translated to a new position. State whether its perimeter, area and angles change. [2 marks]

5. A design uses centre $C(2, 1)$. Enlarge corner $P(5, 3)$ by factor 2. [3 marks]

6. A logo has $P(1, 1)$, $Q(3, 1)$, $R(1, 3)$. Translate it by $(1, 0)$, then enlarge by factor 2 from the origin. Draw the final triangle on the supplied grid. [4 marks]



Each grid square represents 1 unit.

7. A fountain must be equally far from gates $A(0,0)$ and $B(8,0)$, and lie on path $y=3$. Find its position and explain the construction line used. [4 marks]

8. A 96° entrance angle is to be divided equally by a compass construction. Describe the steps and give each angle. [4 marks]

9. A plotting robot doubles x and triples y. It is claimed to enlarge every figure. Test a 2 cm by 2 cm square and explain the result. [4 marks]

10. A plan tells a worker to construct a bisector of a 10 cm segment using radius 6 cm from A and 7 cm from B. Repair the instruction and explain why. [3 marks]

11. A similar triangular shade has an angle of 68° before enlargement. A designer changes it to 72° in the image. Explain why the revised shade is not a true enlargement. [2 marks]

12. A screen rounds all image coordinates to the nearest whole number after a factor-$\frac{1}{2}$ enlargement from the origin. [5 marks]

(a) Find the exact image of $P(1, 5)$. [2 marks]

(b) Explain why rounding those coordinates can spoil the enlargement, and suggest a repair. [3 marks]

13. A triangular roof brace has two equal sloping sides and a 46° vertex angle. Find its two base angles and justify your method. [3 marks]

14. A pupil checks a transformation rule on $(0, 0)$ only and concludes the rule doubles every coordinate correctly. Why is this weak evidence? Give two better points to test. [4 marks]

15. A garden shape has perimeter 24 m and area 32 m². A similar garden has positive scale factor 1.5. [5 marks]

(a) Find the new perimeter and area. [3 marks]

(b) Paving costs 2 dollars per square metre. Find the extra paving cost for the larger garden. [2 marks]

16. A worker says a compass-made bisector is correct because it looks centred. Give the two geometric conditions to check and a reason the equal-radius construction guarantees them. [4 marks]