3D shapes and transformations topic test

12 questions | 22 marks | 30 minutes

A handwritten review with shape diagrams, transformation reasoning and tessellation design.

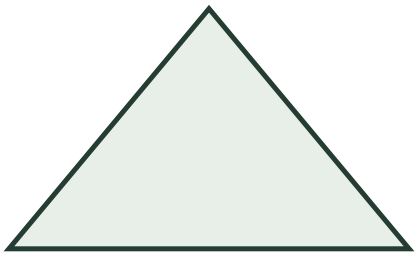
Equivalent correct methods earn the corresponding marks.

1. What two features of the ends help identify a prism? [1 mark]

Prisms have matching, parallel polygon end faces.

Answer: They are matching polygons in parallel planes.

2. A triangular prism is cut parallel to its ends. Name the section. [1 mark]



triangle

The section matches an end face.

Answer: Triangle

3. A rectangular prism has an end 4 cm by 2 cm. Find the area of a section parallel to the end. [2 marks]

$4 \times 2 = 8\,\text{cm}^2$.

Answer: $8\,\text{cm}^2$

4. Translate $(4, 2)$ by 2 right and 3 up. Give its image. [1 mark]

$4 + 2 = 6;\ 2 + 3 = 5$.

Answer: $(6, 5)$

5. Reflect $(1, 3)$ in the line $x = 4$. Find its image. [2 marks]

The point is 3 units left of the mirror.

Its image is 3 units right of $x = 4$.

Answer: $(7, 3)$

6. Point $(2, 2)$ is translated 3 right and 1 down, then reflected in $x = 4$. Find its final position. [2 marks]

The translation gives $(5, 1)$.

The point is 1 unit right of $x = 4$, so its reflection is 1 unit left at $(3, 1)$.

Answer: $(3, 1)$

7. An equilateral triangle corner is 60°. How many such corners fill a point? [1 mark]

$360 \div 60 = 6$.

Answer: 6

8. Explain why square tiles can meet four at a point. [2 marks]

There is no angular gap or overlap at that point.

Answer: $4 \times 90^\circ = 360^\circ$, so their corners fill a full turn.

9. A regular hexagon has 120° corners. Show how many corners fill one turn. [2 marks]

$3 \times 120^\circ = 360^\circ$.

Answer: 3 corners

10. Three regular pentagons with 108° corners are put together at a point. How large is the gap? [2 marks]

$3 \times 108 = 324.$

$360 - 324 = 36.$

Answer: 36°

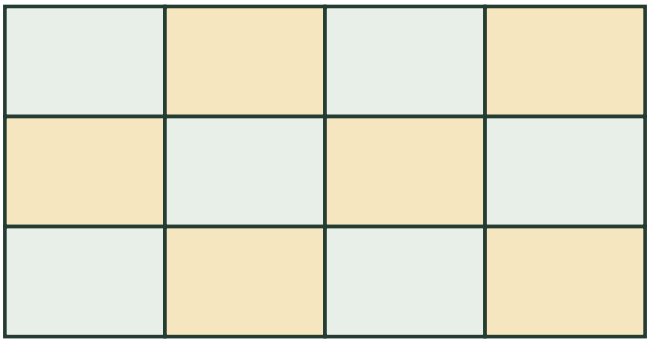
11. Does reflecting a rectangle then translating it change its side lengths? Explain. [2 marks]

Reflections and translations preserve lengths.

The rectangle may finish in a new position or orientation.

Answer: No.

12. Design a rectangle tessellation in the space, with at least two rows and three columns. Mark one repeat unit and explain why the pattern is valid. [4 marks]



No gaps and no overlaps

Repeat rectangles edge to edge.

Matching rows continue the covering.

A valid drawing has no gaps or overlaps.

Answer: Any clear rectangular grid meeting the stated size, with one rectangle marked and a no-gaps/no-overlaps explanation.