2.96 Nets and 3D Shape Reasoning: 10-minute Pack

GL ASSESSMENT GL-11PLUS-MATHS · Calculators not allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Which of the following nets will fold to make a triangular prism?

- ☐ A) Two triangles separated by a gap, and three rectangles attached end-to-end in a row not touching the triangles
- ☐ B) Two equal triangles attached to opposite ends of a straight strip of three rectangles so each triangle meets one rectangle along a full side
- ☐ C) Two equal triangles joined along one edge with three rectangles attached around the other sides of the joined triangles
- ☐ D) One triangle and four rectangles arranged in a cross so that only one rectangle touches the triangle
- ☐ E) Three triangles in a row with three rectangles attached to the middle triangle only

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2 Which of these nets cannot fold to make a cube?

- ☐ A) A row of four squares with one square attached above the second square and one square attached below the second square
- ☐ B) A cross shape: one central square with a square attached to each of its four sides, and one more square attached to the outer end of one of those four squares
- ☐ C) Two separate groups of three squares not connected to each other
- ☐ D) A column of four squares with one square attached to the left of the second square and one square attached to the right of the second square
- ☐ E) A row of four squares with one square attached above the third square and one square attached below the third square

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3 A net shows six rectangles where opposite rectangles are different sizes (two small, two medium, two large). Which solid could this net make?

- ☐ A) Cube
- ☐ B) Cuboid (rectangular prism)
- ☐ C) Square-based pyramid
- ☐ D) Triangular prism
- ☐ E) Tetrahedron

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4 How many edges does a triangular prism have?

- ☐ A) 6
- ☐ B) 7
- ☐ C) 8
- ☐ D) 9
- ☐ E) 10

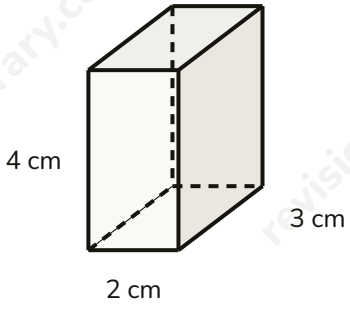
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5 A regular tetrahedron (triangular pyramid with all equal faces) has how many vertices?

- ☐ A) 3
- ☐ B) 4
- ☐ C) 5
- ☐ D) 6
- ☐ E) 8

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6 A cuboid has dimensions 2 cm by 3 cm by 4 cm. Work out its total surface area in square centimetres.



(3)

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7 Which net will fold to make a cube if the faces are labelled so that face 1 is opposite face 6? (Descriptions only.)

- ☐ A) Six squares in a straight row labelled 1 to 6
- ☐ B) A cross with central square 3, squares 1 and 5 attached opposite sides and 2 attached above and 4 below central square, 6 attached to the right of square 5
- ☐ C) A 2x3 rectangle of squares labelled 1 to 6 left-to-right top row then bottom row
- ☐ D) A row of four squares labelled 2, 1, 4, 6 from left to right, with a square labelled 3 attached above the second square (labelled 1) and a square labelled 5 attached below the second square (labelled 1)
- ☐ E) Two L-shaped groups of three squares joined at one corner

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8 Consider this net: six equal squares in a straight row labelled 1 to 6. Can this net fold to make a cube? Give your answer and a brief reason.

(2)

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Mark scheme · 2.96 Nets and 3D Shape Reasoning: 10-minute Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

correct option B cao **B1**

Answer: B) Two equal triangles attached to opposite ends of a straight strip of three rectangles so each triangle meets one rectangle along a full side (correct net for a triangular prism).

Question 2

correct option C cao **B1**

Answer: C) Two separate groups of three squares not connected to each other (cannot fold to form a single cube - a valid net must be six squares joined edge-to-edge in one connected piece; every other option is six squares that do fold to a cube).

Question 3

correct option B cao **B1**

Answer: B) Cuboid (rectangular prism).

Question 4

correct option D (9 edges) cao **B1**

Answer: D) 9 edges

Question 5

correct option B (4 vertices) cao **B1**

Answer: B) 4 vertices

Question 6

Areas of opposite faces shown: 2x3, 3x4 and 2x4 seen or equivalent method **M1**

Sum inside brackets 6 + 12 + 8 = 26 seen **M1**

Total surface area 2 x 26 = 52 cm² cao **A1**

Answer: 52 cm^2

Question 7

correct option D cao **B1**

Answer: D) Folding the row so square 1 is the base: square 6 (attached beyond square 4) becomes the top, directly opposite square 1. (Squares 2 and 4 become the other pair of opposite side faces, and squares 3 and 5 become the last pair.)

Question 8

Correct decision stated: 'No' (cannot fold to a cube) oe **M1**

Reason given that three squares in a straight row would place faces opposite each other incorrectly so opposite faces would be adjacent or separated incorrectly cao **A1**

Answer: No. A straight row of six squares cannot fold to a cube because opposite faces on a cube would not be correctly positioned; the row forces faces that should be opposite to be adjacent when folded.

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