# 4.12 Surface Area: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

**Answer ALL questions. Show all your working.**

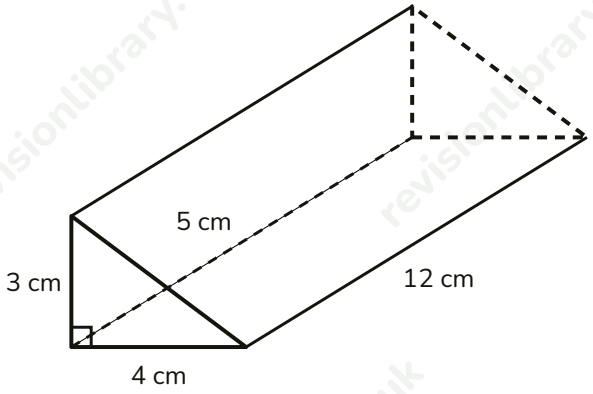
**1** A rectangular block measures 1.2 m by 0.8 m by 0.5 m. Calculate its surface area in square metres. Give your answer to 2 decimal places.

**(Total for Question 1 is 2 marks)**

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**2** A triangular prism has triangular cross-section with sides 3 cm, 4 cm and 5 cm and length 12 cm. Calculate the total surface area of the prism.

Diagram NOT accurately drawn

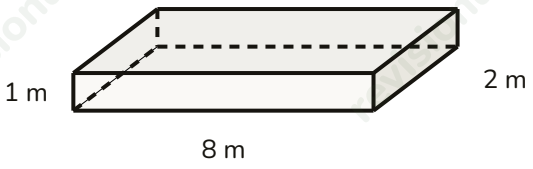



**(Total for Question 2 is 3 marks)**


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**3** A cuboid has dimensions 8 m by 2 m by 1 m. Work out the total surface area of the cuboid.

Diagram NOT accurately drawn

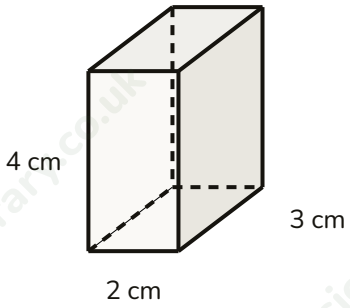



**(Total for Question 3 is 2 marks)**

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**4** A box measures 2 cm by 3 cm by 4 cm. It is scaled up by a linear factor of 2 (all dimensions are multiplied by 2). Work out the total surface area of the larger box.

Diagram NOT accurately drawn

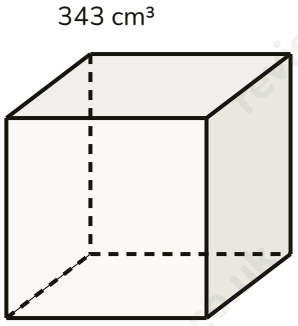



**(Total for Question 4 is 2 marks)**


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**5** A cube has volume 343 cm³. Work out the total surface area of the cube.

Diagram NOT accurately drawn

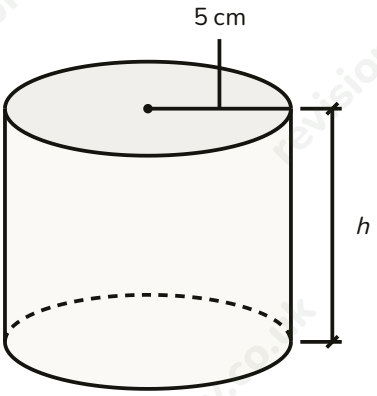



**(Total for Question 5 is 3 marks)**

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**6** A closed cylinder has radius 5 cm. The total surface area of the cylinder is 534 cm², correct to 3 significant figures. Work out the height of the cylinder.

Diagram NOT accurately drawn

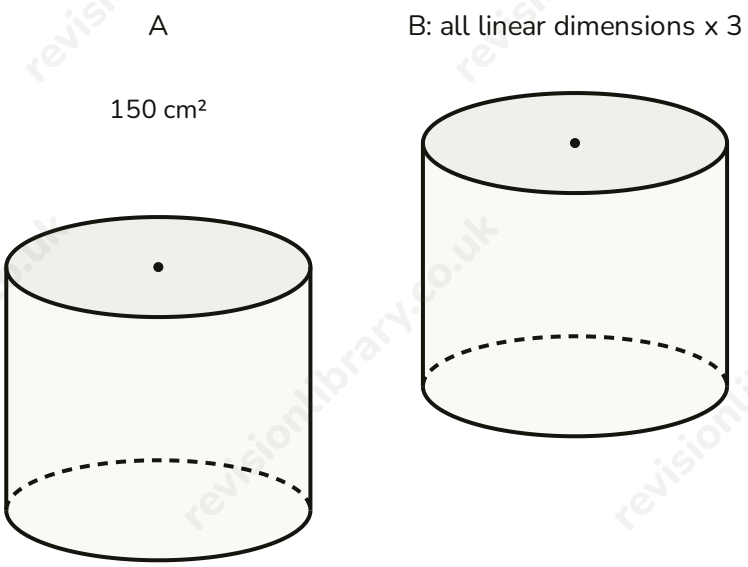



**(Total for Question 6 is 4 marks)**


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**7** Cylinder A has total surface area 150 cm². Cylinder B is mathematically similar to Cylinder A, with all linear dimensions 3 times as large. Work out the total surface area of Cylinder B.

Diagram NOT accurately drawn

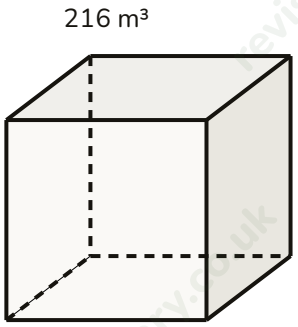



**(Total for Question 7 is 4 marks)**


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**8** A cube has a volume of 216 m³.
Work out the total surface area of the cube.

Diagram NOT accurately drawn

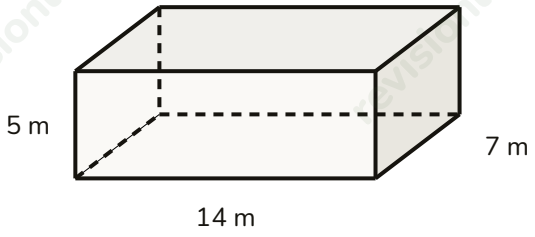



**(Total for Question 8 is 3 marks)**

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**9** A cuboid has length 14 m, width 7 m and height 5 m.
Work out the total surface area of the cuboid.

Diagram NOT accurately drawn

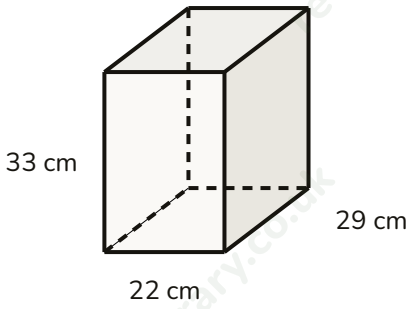



**(Total for Question 9 is 3 marks)**


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**10** A closed wooden box is a cuboid 22 cm by 29 cm by 33 cm. All of the outside is painted. One tin of paint covers 1000 cm$^2$.
Work out the least number of tins of paint needed to paint the box.

Diagram NOT accurately drawn




**(Total for Question 10 is 4 marks)**


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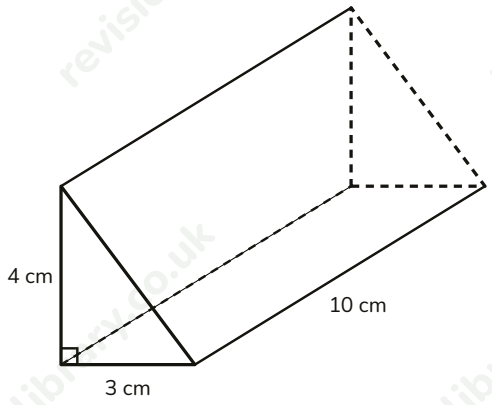
**11** An open box has no lid. The base is 17 cm by 9 cm and the box is 4 cm high.
Work out the total outside surface area of the box (including the base).

**(Total for Question 11 is 3 marks)**

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**12** A triangular prism has a right-angled triangular cross section with base 3 cm and height 4 cm. The prism is 10 cm long. Calculate the total surface area of the prism (include both triangular ends and the three rectangular faces).

Diagram NOT accurately drawn

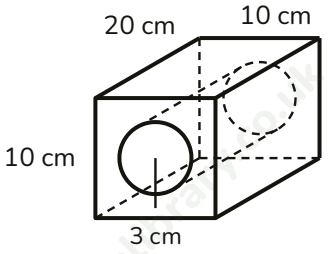



**(Total for Question 12 is 4 marks)**


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**13** A cuboid measures 20 cm by 10 cm by 10 cm. A cylindrical hole of radius 3 cm is drilled completely through the cuboid, from the centre of one 10 cm by 10 cm face to the centre of the opposite 10 cm by 10 cm face. Work out the total surface area of the resulting solid. Give your answer correct to 3 significant figures.

Diagram NOT accurately drawn

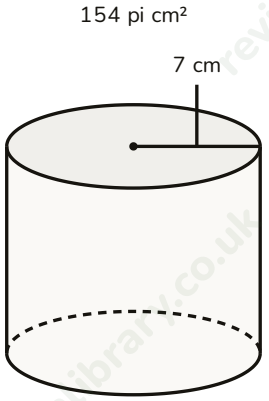



**(Total for Question 13 is 5 marks)**


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**14** A closed cylinder has total surface area $154\ \pi\ cm^2$ and radius 7 cm. Find its height. Give your answer in cm, correct to 1 decimal place if necessary.

Diagram NOT accurately drawn




**(Total for Question 14 is 4 marks)**


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# Mark scheme · 4.12 Surface Area: 1-hour Pack

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

## Question 1

| | |
|---|---|
| convert and apply SA = 2(lw + lh + wh) with l=1.2, w=0.8, h=0.5 | **M1** |
| 3.92 m² awrt 2 dp | **A1** |

**Answer: 3.92 $m^2$**

## Question 2

| | |
|---|---|
| area of triangle = 1/2 * 3 * 4 = 6 cm² and 2*area = 12 cm² | **M1** |
| lateral area = perimeter 12 * length 12 = 144 cm² | **M1** |
| total surface area = 12 + 144 = 156 cm² cao | **A1** |

**Answer: 156 $cm^2$**

## Question 3

| | |
|---|---|
| use 2(lw + lh + wh) = 2(8*2 + 8*1 + 2*1) or equivalent | **M1** |
| 52 m² cao | **A1** |

**Answer: 52 $m^2$**

## Question 4

| | |
|---|---|
| use scale factor squared: original SA = 52 cm², new SA = 4 * 52 or show calculation on new dimensions 4x6x8 | **M1** |
| 208 cm² cao | **A1** |

**Answer: 208 $cm^2$**

## Question 5

| | |
|---|---|
| cube root of 343 (= 7 cm), or $7^3$ = 343 seen | **M1** |
| 6 x $7^2$ (= 6 x 49) | **M1** |
| 294 cm² cao | **A1** |

**Answer: 294 $cm^2$**

## Question 6

| | |
|---|---|
| 2 x π x $5^2$ (= 50pi or 157.08) seen | **M1** |
| 534 - 157.08 (= 376.92) oe | **M1** |
| 376.92 / (2 x π x 5) oe | **M1** |
| awrt 12 cm | **A1** |

**Answer: awrt 12 cm**

## Question 7

| | |
|---|---|
| identifies linear scale factor = 3 | **M1** |
| area scale factor = $3^2$ (= 9) | **M1** |
| 150 x 9 | **M1** |
| 1350 cm² cao | **A1** |

**Answer: 1350 $cm^2$**

## Question 8

| | |
|---|---|
| side length = cube root of 216 = 6 | **M1** |
| 6 x $6^2$ | **M1** |
| 216 m² | **A1** |

**Answer: 216 $m^2$**

## Question 9

| | |
|---|---|
| areas of faces: 98, 70, 35 | **M1** |
| doubles the sum of the three different faces | **M1** |
| 406 m² | **A1** |

**Answer: 406 $m^2$**

## Question 10

| | |
|---|---|
| 22 x 29, 22 x 33, 29 x 33 found | **M1** |
| total surface area 4642 cm² | **M1** |
| 4642 / 1000 = 4.64 | **M1** |
| 5 tins | **A1** |

**Answer: 5 tins**

## Question 11

| | |
|---|---|
| base 17 x 9 = 153 | **M1** |
| four sides 2 x 4 x (17 + 9) | **M1** |
| 361 cm² | **A1** |

**Answer: 361 $cm^2$**

## Question 12

| | |
|---|---|
| area of one triangle: 1/2 * 3 * 4 = 6 cm² or equivalent | **M1** |
| rectangular faces areas: 3*10, 4*10 and hypotenuse*10 with hypotenuse 5 (3-4-5 triangle) giving 30, 40 and 50 | **M1** |
| add two triangular ends: 2 * 6 = 12 or include both ends in total | **M1** |
| 132 cm² cao | **A1** |

**Answer: 132 $cm^2$**

## Question 13

| | |
|---|---|
| total surface area of the cuboid without the hole, 2(20x10)+2(20x10)+2(10x10) (= 1000) | **M1** |
| area of the two circles removed, 2 x π x $3^2$ (= 56.5) | **M1** |
| curved surface area of the hole, 2 x π x 3 x 20 (= 377.0) | **M1** |
| complete method, 1000 - 56.5 + 377.0 | **M1** |
| awrt 1320 cm² | **A1** |

**Answer: 1320 $cm^2$ (3 s.f.)**

## Question 14

| | |
|---|---|
| use formula 2 π $r^2$ + 2 π r h = total surface area and substitute r=7 | **M1** |
| substitute 2 π *$7^2$ + 2 π *7 * h = 154 π, cancel π and compute 98 + 14 h = 154 | **M1** |
| solve 14 h = 56 so h = 4 | **M1** |
| h = 4 cm cao | **A1** |

**Answer: 4 cm**


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