4.18 Congruence and Similarity: 30-minute Pack

Calculators not allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Two triangles are similar. The ratio of areas is 9:16. Find the scale factor between lengths of the triangles.

(2)

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2 Stretch question. A garden planter is an enlargement of a smaller template by a scale factor of 7/4. The template has area 32 cm². Find the area of the planter. Then, if the planter has a side that measures 17.5 cm, find the matching side length on the template. Show your working.

(6)

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3 A photograph is 8 cm wide and 4 cm tall. It is enlarged so that it is 32 cm wide, keeping the same shape. How tall is the enlarged photograph?

(3)

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4 Give the congruence condition name for the following: two triangles with two angles equal and the included side equal.

(1)

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5 Two similar shapes have areas of 16 cm² and 256 cm². The smaller shape has a side of 6 cm. Work out the length of the matching side on the larger shape.

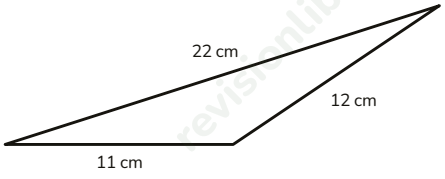
(3)

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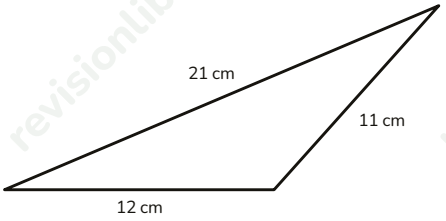
6 Triangle ABC has sides 11 cm, 12 cm and 22 cm. Triangle PQR has sides 12 cm, 11 cm and 21 cm.
Are the two triangles congruent? Give a reason for your answer.

Diagram NOT accurately drawn

Triangle ABC



Triangle PQR



(2)

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7 A shape is enlarged by scale factor 4. A side of length 4 cm on the original shape is enlarged. What length is the matching side on the image?

(1)

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8 Triangle A and triangle B are shown with angles 50 degrees and 50 degrees, and a side between them equal. Are the triangles congruent? State the reason.

(2)

9 Write down whether the pair of shapes are similar or not: two rectangles, one 3 cm by 6 cm and the other 6 cm by 12 cm.

(1)

10 A small model of a bridge is similar to the real bridge with scale 1:150. On the model the arch height is 4 cm. Find the actual arch height in metres.

(3)

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Mark scheme · 4.18 Congruence and Similarity: 30-minute Pack

Question 1

Recognise that the area ratio is the square of the length ratio: $\sqrt{9}:\sqrt{16} = 3:4$, or use $\sqrt{9/16} = 3/4$ or $\sqrt{16/9} = 4/3$.	**M1**
State length ratio 3:4, or scale factor 4/3 from smaller to larger or 3/4 from larger to smaller. Accept either factor since the direction is unspecified.	**A1**

Answer: **Corresponding lengths have ratio 3:4. The scale factor is 4/3 from smaller to larger or 3/4 from larger to smaller.**

Question 2

Compute area scale factor = $(7/4)^2 = 49/16$	**M1**
Multiply template area 32 by 49/16 to get planter area: 32 x 49/16 = 2 x 49 = 98	**M1**
State planter area 98 cm² cao	**A1**
For linear matching side, use inverse scale factor: template length = planter length x (4/7) or show method	**M1**
Compute template length: 17.5 x 4/7 = 17.5 x 4 / 7 = 10	**M1**
State template side 10 cm cao	**A1**

Answer: **Planter area: 98 cm^2; template side: 10 cm**

Question 3

scale factor from the widths	**M1**
4 x 4	**M1**
16 cm cao	**A1**

Answer: **16 cm**

Question 4

Correct name: ASA cao	**B1**

Answer: **ASA**

Question 5

area ratio 16 : 1	**M1**
length scale factor $\sqrt{16} = 4$	**M1**
24 cm cao	**A1**

Answer: **24 cm**

Question 6

compares corresponding sides and angles	**M1**
No, the matching sides are not equal	**A1**

Answer: **No, the matching sides are not equal**

Question 7

16 cm cao	**B1**

Answer: **16 cm**

Question 8

Identify that two angles and the included side are equal or equivalent reasoning	**M1**
Conclusion: triangles are congruent by ASA cao	**A1**

Answer: **Yes, congruent by ASA.**

Question 9

Correct statement: similar, sides are in proportion 1:2 cao	**B1**

Answer: **Similar (scale factor 2).**

Question 10

Method: multiply 4 cm by 150 to get real height in cm or state 4 x 150 = 600 cm	**M1**
Correct conversion to metres: 6 m cao	**A1**
Units stated: metres cao	**B1**

Answer: **6 m**

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