4.18 Congruence and Similarity: 1-hour Pack

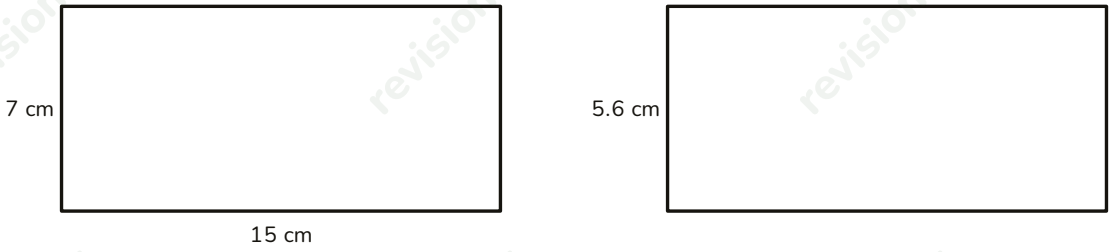
Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A rectangle measures 7 cm by 15 cm. A similar rectangle has its shorter side 5.6 cm. Find the longer side of the similar rectangle. Give your answer to 1 decimal place.

Diagram NOT accurately drawn



(3)

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2 Two similar polygons have perimeters in the ratio 5:8. Find the ratio of their corresponding side lengths and the ratio of their areas.

(3)

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3 Two similar shapes have corresponding lengths in the ratio 1 : 3. The smaller shape has an area of 6 cm². Work out the area of the larger shape.

(3)

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4 Two rectangles are similar. The smaller has sides 7 cm and 11 cm. The larger has a side of 21 cm that matches the 7 cm side. Work out the length of the other side of the larger rectangle.

(3)

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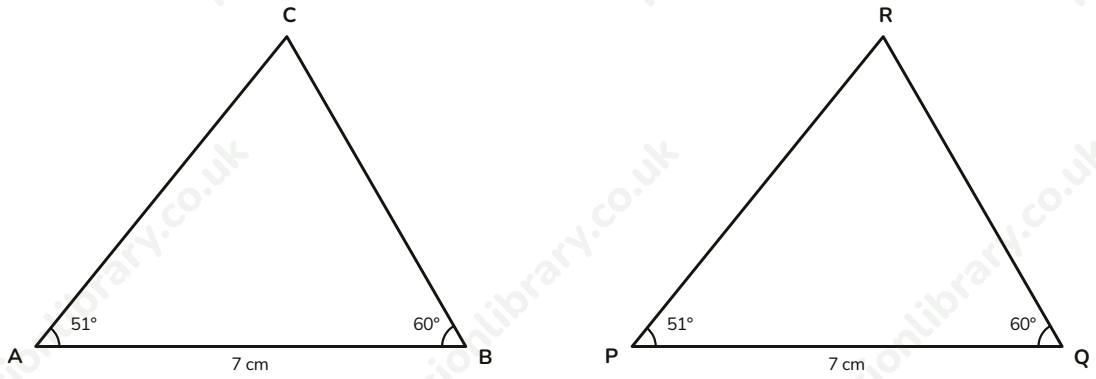
5 Two similar shapes have areas of 17 cm² and 68 cm². The smaller shape has a side of 3 cm. Work out the length of the matching side on the larger shape.

(3)

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6 Triangle ABC has angle A = 51°, angle B = 60° and side AB = 7 cm. Triangle PQR has angle P = 51°, angle Q = 60° and side PQ = 7 cm.
Are the two triangles congruent? Give a reason for your answer.

Diagram NOT accurately drawn



(2)

7 A shape of area 24 cm² is enlarged by scale factor 3. Work out the area of the image.

(2)

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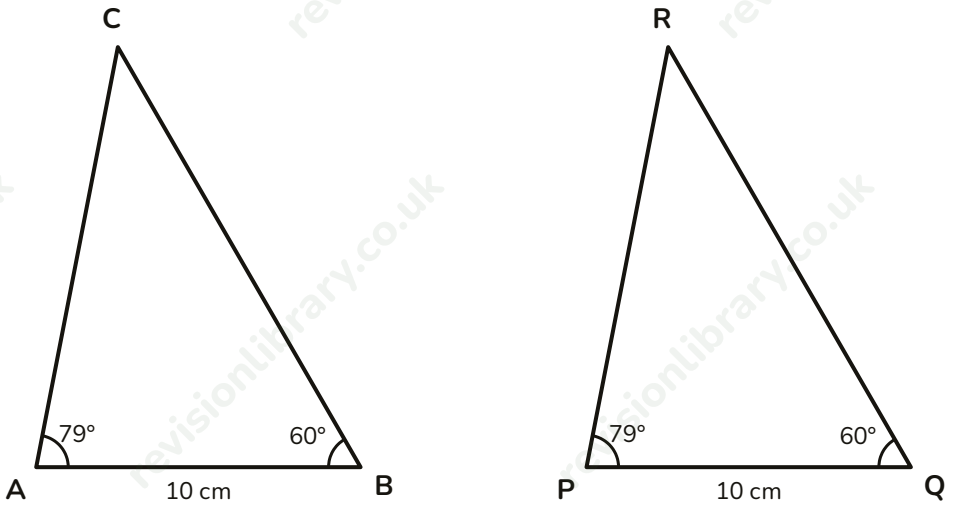
8 Two similar shapes have corresponding lengths in the ratio 1 : 2. The smaller shape has an area of 11 cm². Work out the area of the larger shape.

(3)

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9 Triangle ABC has angle A = 79°, angle B = 60° and side AB = 10 cm. Triangle PQR has angle P = 79°, angle Q = 60° and side PQ = 10 cm.
Are the two triangles congruent? Give a reason for your answer.

Diagram NOT accurately drawn

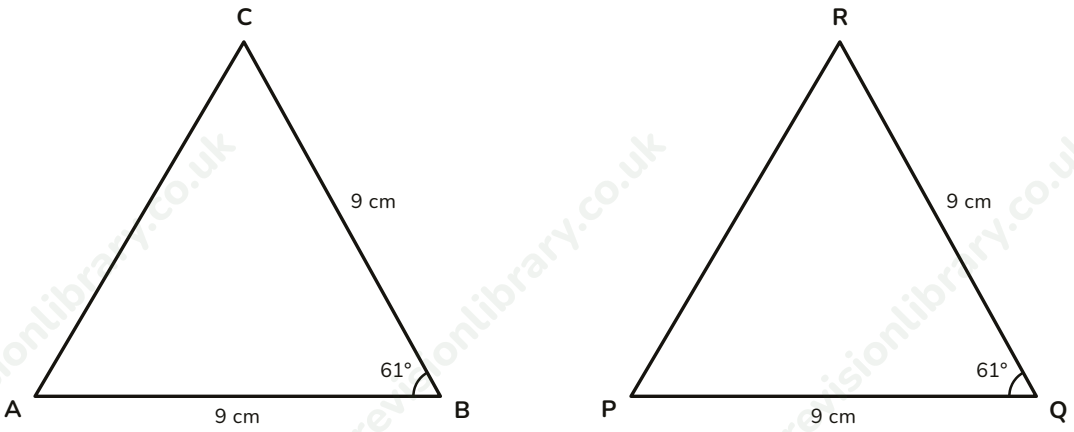


(2)

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10 Triangle ABC has AB = 9 cm, BC = 9 cm and angle ABC = 61°. Triangle PQR has PQ = 9 cm, QR = 9 cm and angle PQR = 61°.
Are the two triangles congruent? Give a reason for your answer.

Diagram NOT accurately drawn



(2)

11 A shape of area 18 cm² is enlarged by scale factor 5. Work out the area of the image.

(2)

12 A photograph is 10 cm wide and 8 cm tall. It is enlarged so that it is 80 cm wide, keeping the same shape. How tall is the enlarged photograph?

(3)

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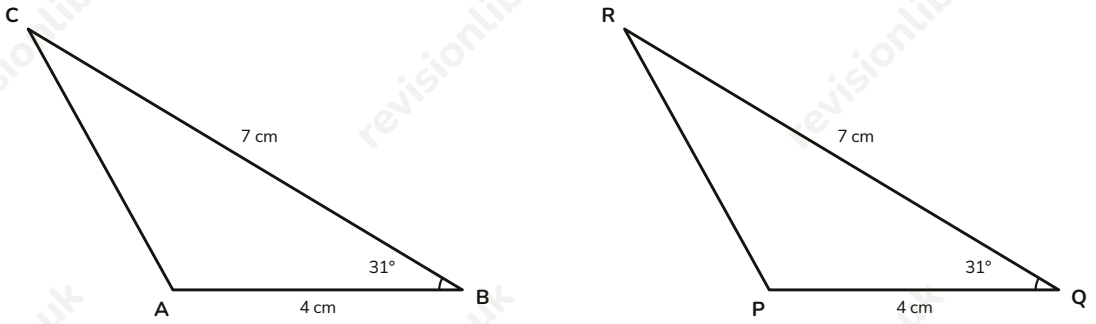
13 A shape of area 24 cm² is enlarged by scale factor 5. Work out the area of the image.

(2)

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14 Triangle ABC has AB = 4 cm, BC = 7 cm and angle ABC = 31°. Triangle PQR has PQ = 4 cm, QR = 7 cm and angle PQR = 31°.
Are the two triangles congruent? Give a reason for your answer.

Diagram NOT accurately drawn

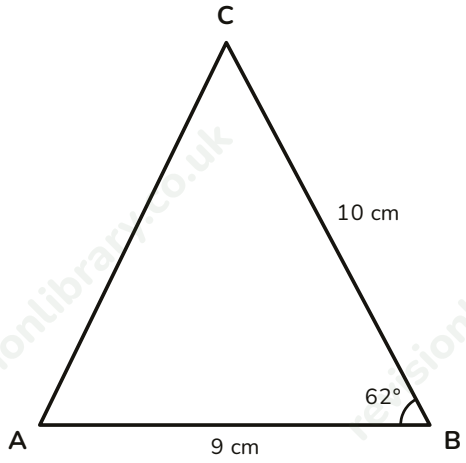


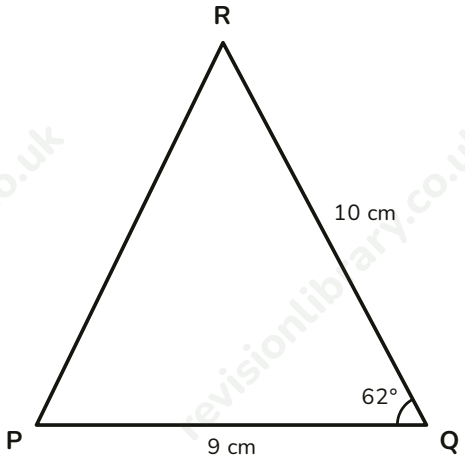
(2)

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15 Triangle ABC has AB = 9 cm, BC = 10 cm and angle ABC = 62°. Triangle PQR has PQ = 9 cm, QR = 10 cm and angle PQR = 62°.
Are the two triangles congruent? Give a reason for your answer.

Diagram NOT accurately drawn

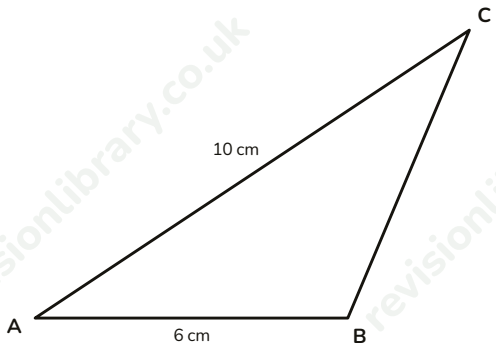


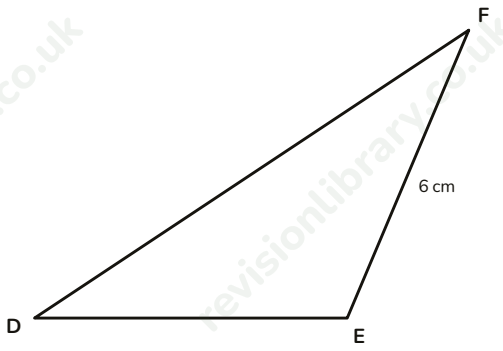


(2)

16 Triangle ABC is congruent to triangle DEF. Point B corresponds to E. If AB = 6 cm and EF = 6 cm, give the length of DE if AC = 10 cm and DF corresponds to AC.

Diagram NOT accurately drawn





(2)

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17 A rectangle measures 4 cm by 10 cm. A second rectangle measures 6 cm by 15 cm. Are the two rectangles similar? Explain briefly, stating the scale factor.

(2)

18 A map uses a scale where 1 cm represents 2.5 km. Two similar triangular fields on the map have corresponding heights 3.6 cm and 5.2 cm. Find the actual difference in height of the fields in metres.

(3)

19 Triangle C and triangle D are shown with angles 65 degrees and 65 degrees, and the side between them equal. Are the triangles congruent? State the reason.

(2)

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Mark scheme · 4.18 Congruence and Similarity: 1-hour Pack

Question 1

Find scale factor: 5.6/7 = 0.8	M1
Multiply 15 by 0.8 to get 12	M1
Answer 12.0 cm or 12.0 cao	A1

Answer: **12.0 cm**

Question 2

Recognise perimeter ratio equals linear scale factor: 5:8	M1
State scale factor 5/8 or 5:8 for lengths	M1
Area ratio = $(5/8)^2$ = 25/64 cao	A1

Answer: **Lengths 5:8; areas 25:64**

Question 3

area scale factor 3^2 = 9	M1
6 x 9	M1
54 cm² cao	A1

Answer: **54 cm^2**

Question 4

scale factor 21 ÷ 7 = 3	M1
11 x 3	M1
33 cm cao	A1

Answer: **33 cm**

Question 5

area ratio 4 : 1	M1
length scale factor $\sqrt{4}$ = 2	M1
6 cm cao	A1

Answer: **6 cm**

Question 6

compares corresponding sides and angles	M1
Yes, ASA (two angles and a corresponding side)	A1

Answer: **Yes, ASA (two angles and a corresponding side)**

Question 7

3^2 = 9	M1
216 cm² cao	A1

Answer: **216 cm^2**

Question 8

area scale factor 2^2 = 4	M1
11 x 4	M1
44 cm² cao	A1

Answer: **44 cm^2**

Question 9

compares corresponding sides and angles	M1
Yes, ASA (two angles and a corresponding side)	A1

Answer: **Yes, ASA (two angles and a corresponding side)**

Question 10

compares corresponding sides and angles	M1
Yes, SAS (two sides and the included angle)	A1

Answer: **Yes, SAS (two sides and the included angle)**

Question 11

5^2 = 25	M1
450 cm² cao	A1

Answer: **450 cm^2**

Question 12

scale factor from the widths	M1
8 x 8	M1
64 cm cao	A1

Answer: **64 cm**

Question 13

5^2 = 25	M1
600 cm² cao	A1

Answer: **600 cm^2**

Question 14

compares corresponding sides and angles	M1
Yes, SAS (two sides and the included angle)	A1

Answer: **Yes, SAS (two sides and the included angle)**

Question 15

compares corresponding sides and angles	M1
Yes, SAS (two sides and the included angle)	A1

Answer: **Yes, SAS (two sides and the included angle)**

Question 16

Use congruence: corresponding sides are equal, so DE corresponds to AB. AC corresponds to DF, not DE.	M1
Correct length: DE = 6 cm cao	A1

Answer: **6 cm**

Question 17

Shows both pairs of sides in the same ratio: 6/4 = 1.5 and 15/10 = 1.5	M1
States similar with scale factor 1.5 cao	A1

Answer: **Yes, similar with scale factor 1.5.**

Question 18

Find map difference: 5.2 - 3.6 = 1.6 cm	M1
Convert to real distance: 1.6 cm -> 1.6 x 2.5 km = 4 km	M1
Convert to metres: 4 km = 4000 m cao	A1

Answer: **4000 m**

Question 19

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.**

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