Bishops Online Tutoring

Education Consultancy

Edexcel GCSE Mathematics

SIMILAR SHAPES

Materials Required:

- Pen
- HB Pencil
- Ruler (in centimetres and millimetres)
- Protractor
- Compass

Instructions:

- Use a black ink pen to answer all questions
- Fill your name in the section below
- Answer the questions in the spaces provided
- Show your working out for all answers

Information:

- The marks allocated for each question are displayed within brackets – utilise this information to gauge the appropriate amount of time to dedicate to each question
- Questions marked with an asterisk (*) will assess your written communication; be careful of spelling, punctuation and grammar with these questions

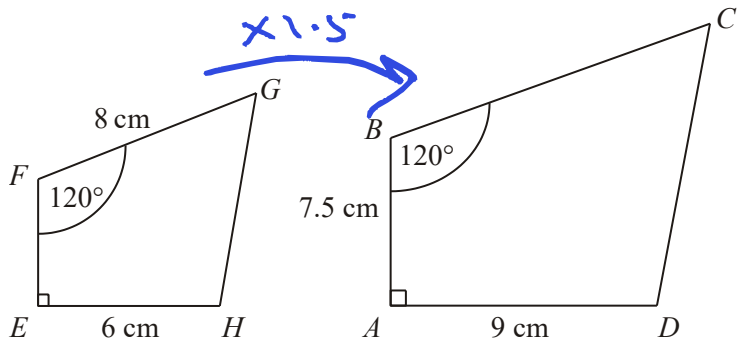
Advice:

- Carefully read the question before attempting to answer it
- Be vary of time and try to answer every question
- If you have enough time in the end, go back and check your answers. A good way to check your answers is to retry the question with the hope of getting the same answer as before without looking at your working out from before

CALCULATOR ALLOWED

NAME:	

1. Shapes *ABCD* and *EFGH* are mathematically similar.



Diagrams **NOT** accurately drawn

(a) Calculate the length of *BC*.

Scale factor = Big / small
= 9 / 6
= 1.5

BC = FG × 1.5
BC = 8 × 1.5
= 12

.....12..... cm

(2)

(b) Calculate the length of *EF*.

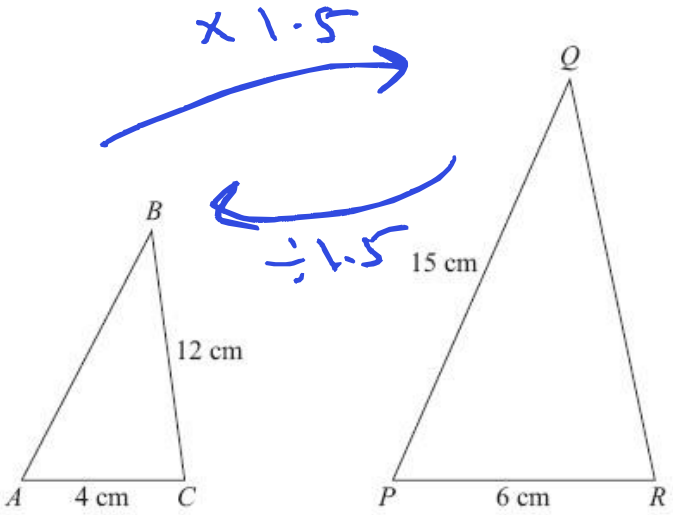
EF = AB ÷ 1.5
= 7.5 ÷ 1.5
= 5 cm

.....5..... cm

(2)

(Total 4marks)

2.



Diagrams **NOT** accurately drawn

Triangles *ABC* and *PQR* are mathematically similar.

Angle *A* = angle *P*.
Angle *B* = angle *Q*.
Angle *C* = angle *R*.
AC = 4 cm.
BC = 12 cm.
PR = 6 cm.
PQ = 15 cm.

Scale factor = Big / small
= 6 / 4
= 1·5

(a) Work out the length of *QR*.

QR = BC x 1·5
= 12 x 1·5
= 18

18 .....cm
(2)

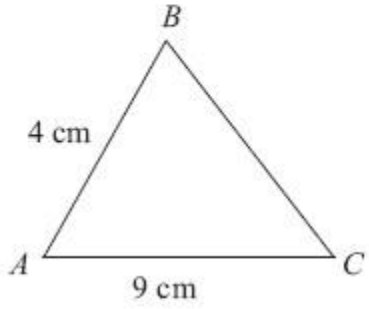
(b) Work out the length of *AB*.

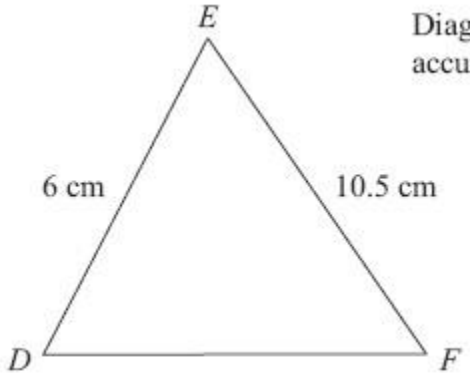
AB = PQ ÷ 1·5
= 15 ÷ 1·5
= 10

10 .....cm
(2)

(Total 4marks)

3.





Diagrams **NOT** accurately drawn

Triangles *ABC* and *DEF* are similar.

AB = 4 cm.
AC = 9 cm.
DE = 6 cm.
EF = 10.5 cm.

Scale factor = Big / small
= 6 / 4
= 1.5

(a) Work out the length of *DF*.

DF = AC × 1.5
= 9 × 1.5
= 13.5

13.5 ..... cm
(2)

(b) Work out the length of *BC*.

BC = EF ÷ 1.5
= 10.5 ÷ 1.5
= 7

7 ..... cm
(2)
(Total 4marks)

4. The diagram shows two similar triangles.

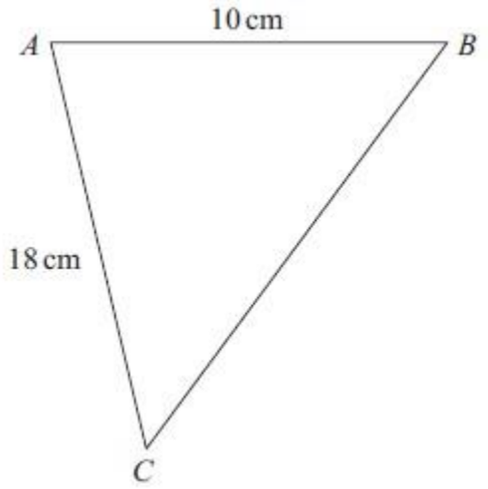
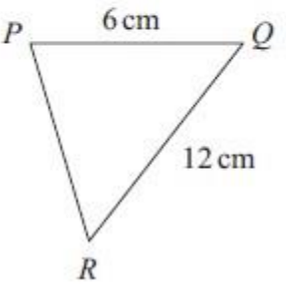


Diagram **NOT** accurately drawn



In triangle ABC, $AB = 10$ cm and $AC = 18$ cm.
In triangle PQR, $PQ = 6$ cm and $QR = 12$ cm.

Angle ABC = angle PQR.
Angle CAB = angle RPQ.

(a) Calculate the length of BC.

Scale factor = $\frac{\text{Big}}{\text{small}}$

$= \frac{10}{6}$

$= 5/3$

$BC = QR \times \frac{5}{3}$

$= 12 \times \frac{5}{3}$

$= 20$

20 ..... cm

(2)

(b) Calculate the length of PR.

$PR = AC \div \frac{5}{3}$

$= 18 \div \frac{5}{3}$

$= 10.8$

10.8 ..... cm

(2)

(Total 4marks)

5.

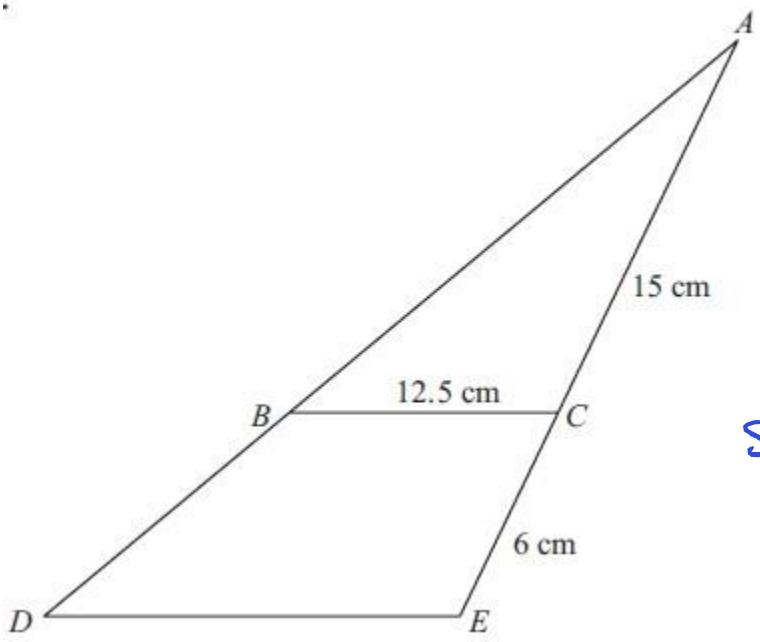


Diagram NOT accurately drawn

Triangle *ABC* is similar to triangle *ADE*.
AC = 15 cm.
CE = 6 cm.
BC = 12.5 cm.

Work out the length of *DE*.

Scale factor = Big / small

$= \frac{21}{15}$

$= 1.4$

$DE = BC \times 1.4$

$= 12.5 \times 1.4$

$= 17.5$

17.5 ..... cm

(Total 3marks)

***6.**

Pictures **NOT** accurately drawn

A 20 Euro note is a rectangle 133 mm long and 72 mm wide.

A 500 Euro Note is a rectangle 165 mm long and 82 mm wide.

Show that the two rectangles are not mathematically similar.

Length

SF = big / small

= 165 / 133

= 1.240601504...

Width

SF = big / small

= 82 / 72

= 1.138888...

Scale factor is not equal therefore they are not similar.

(Total 3marks)

7. The diagram shows two similar solids, A and B.

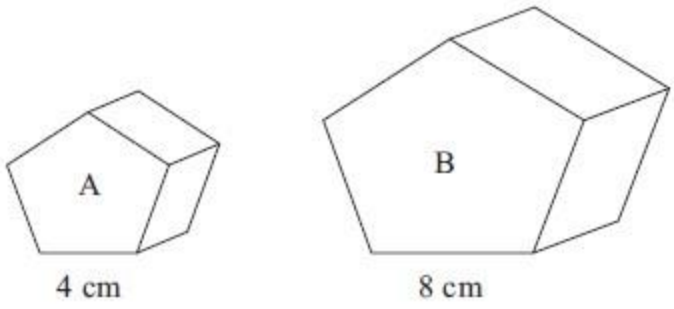


Diagram **NOT** accurately drawn

SF = 8/4

SF = 2

Solid A has a volume of 80 cm^3.

(a) Work out the volume of solid B.

Volume SF = (Length SF)^3

$= 2^3$

$= 8$

B's Volume = 80 × 8

$= 640$

640 ..... cm^3

(2)

Solid B has a total surface area of 160 cm^2.

(b) Work out the total surface area of solid A.

Area SF = (Length SF)^2

$= 2^2$

$= 4$

A's Area = 160 ÷ 4

$= 40$

40 ..... cm^2

(2)

(Total 4 marks)