Name: _____

GCSE (1 – 9)

Similar Shapes

Instructions

- Use **black** ink or ball-point pen.
- Answer all Questions.
- Answer the Questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
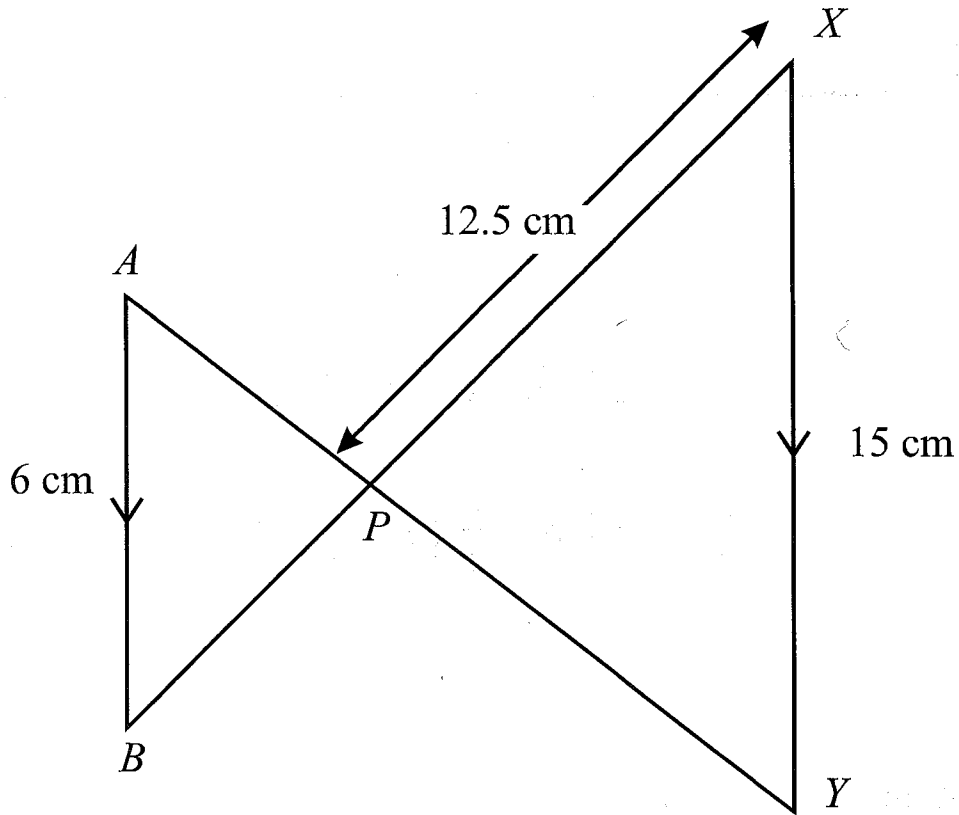- You must **show all your working out.**

Information

- The marks for each Question are shown in brackets
– *use this as a guide as to how much time to spend on each Question.*

Advice

- Read each Question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every Question.
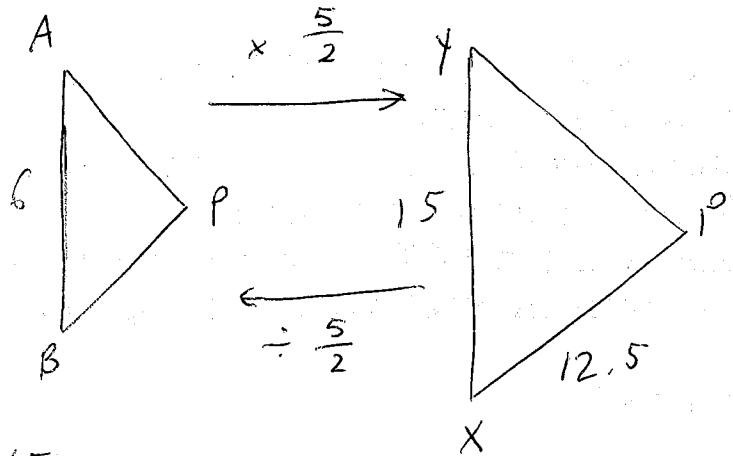- Check your answers if you have time at the end

1

X

12.5 cm

A

6 cm

P

15 cm

B

Y

AB is parallel to XY.
The lines AY and BX intersect at P.
AB = 6 cm.
XP = 12.5 cm.
XY = 15 cm.

Work out the length of BP.

A

6

B

P

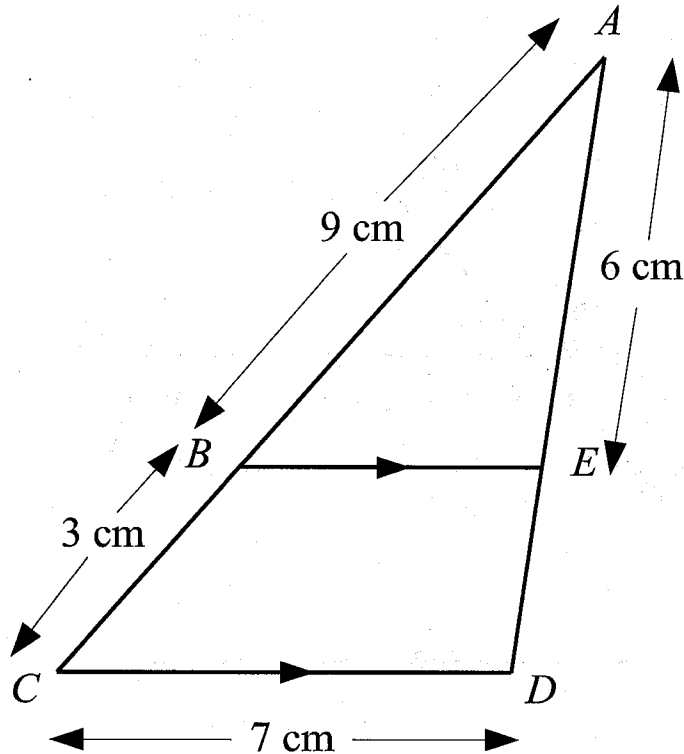$\times \frac{5}{2}$

Y

15

$\div \frac{5}{2}$

X

P

12.5

$Scale\ factor = \frac{15}{6} = \frac{5}{2}$

$12.5 \div \frac{5}{2} = \underline{\underline{5}}$

$\underline{\hspace{4cm} 5 \hspace{4cm}}$ cm

(Total for Question 1 is 3 marks)

2

A

9 cm

6 cm

B

E

3 cm

C

7 cm

D

BE is parallel to *CD*.
$AB = 9$ cm, $BC = 3$ cm, $CD = 7$ cm, $AE = 6$ cm.

(a)   Calculate the length of *ED*.

$$\text{scale factor} = \frac{12}{9} = \frac{4}{3}$$

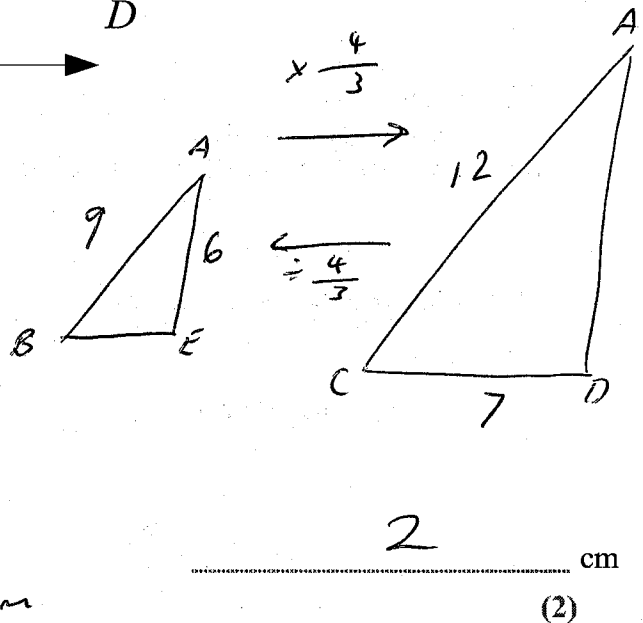$$AD = 6 \times \frac{4}{3} = 8 \text{ cm}$$

$$ED = 8 - 6 = 2 \text{ cm}$$

_____ 2 _____ cm

(2)

(b)   Calculate the length of *BE*.

$$7 \div \frac{4}{3}$$
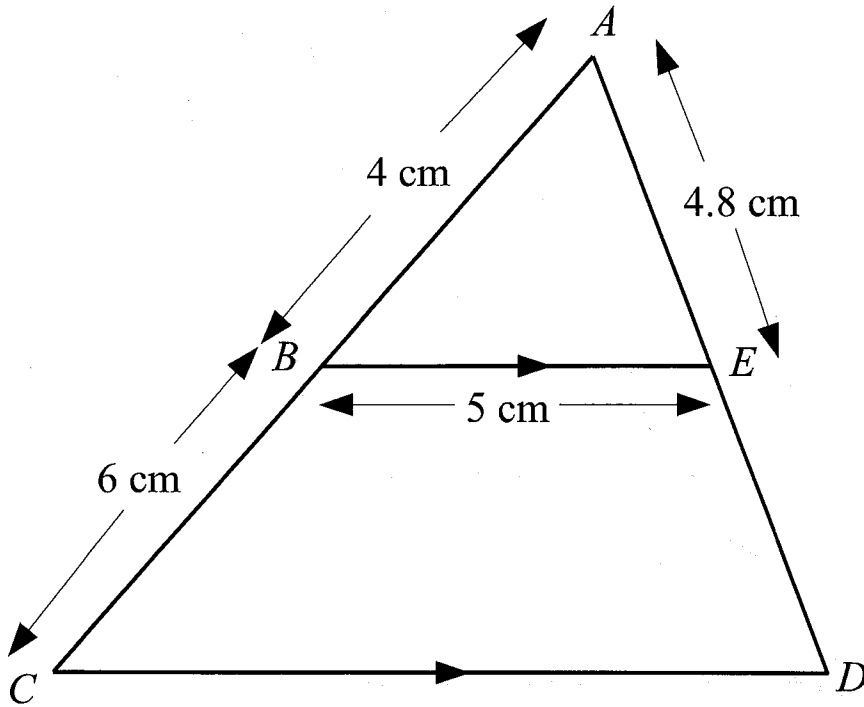
$$7 \times \frac{3}{4} = \frac{21}{4} \text{ or } 5.25$$

_____ $\frac{21}{4}$ _____ cm

(2)

(Total for Question 2 is 4 marks)

Handwritten diagram annotations:

$x \frac{4}{3}$

$\div \frac{4}{3}$

A

9

6

B

E

A

12

C

7

D

3

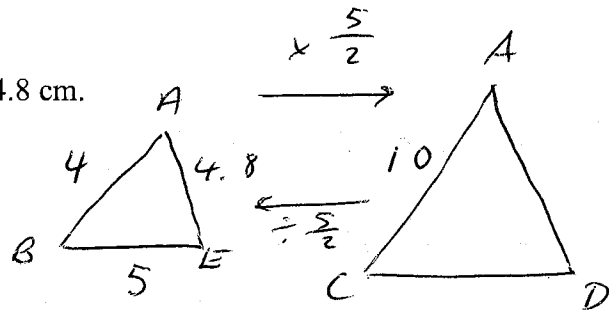

BE is parallel to CD.
ABC and AED are straight lines.
AB = 4 cm, BC = 6 cm, BE = 5 cm, AE = 4.8 cm.

(a)   Calculate the length of CD.

$$Scale \ factor = \frac{10}{4} = \frac{5}{2}$$

$$5 \times \frac{5}{2} = \frac{25}{2} \ or \ 12.5$$

..................$\frac{25}{2}$.............. cm

(2)

(b)   Calculate the length of ED.

$$AD = 4.8 \times \frac{5}{2} = 12 \ cm$$

$$12 - 4.8 = 7.2 \ cm$$

...............7.2............... cm

(2)

(Total for Question 3 is 4 marks)

4

C

26 cm

A   8 cm   B

$\times \dfrac{3}{2}$

$\div \dfrac{3}{2}$

R
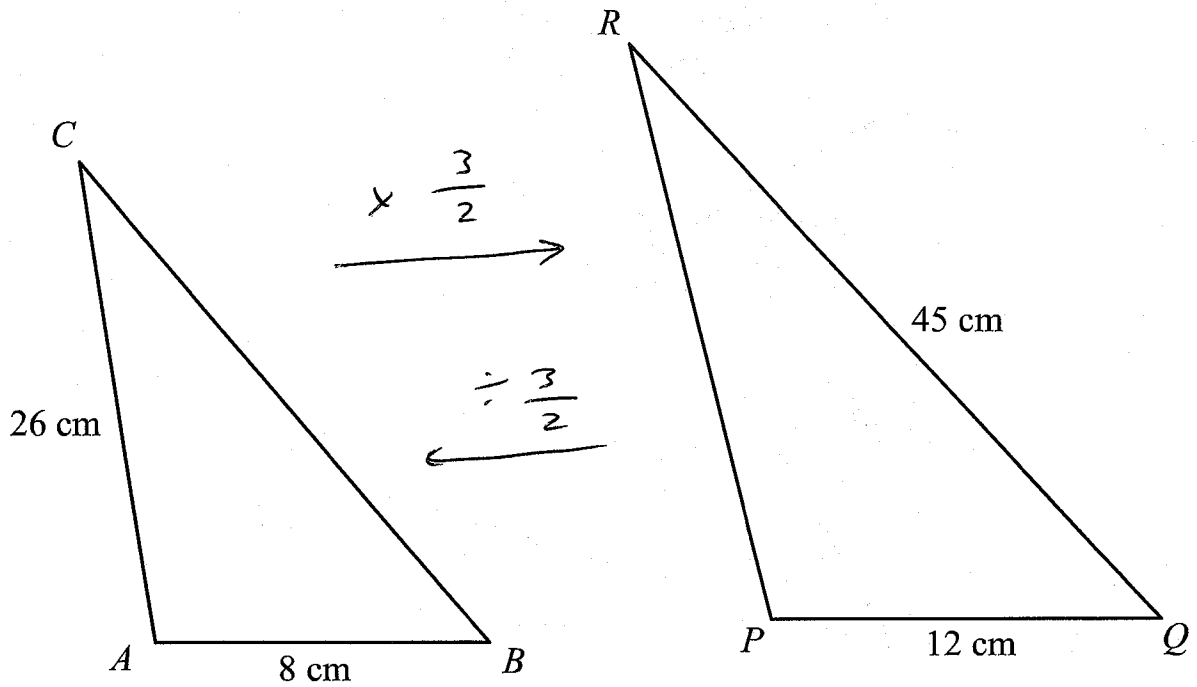
45 cm

P   12 cm   Q

The two triangles ABC and PQR are mathematically similar.
Angle A = angle P.
Angle B = angle Q.
AB = 8 cm.
AC = 26 cm.
PQ = 12 cm.
QR = 45 cm.

scale factor = $\dfrac{12}{8} = \dfrac{3}{2}$

(a)   Calculate the length of *PR*.
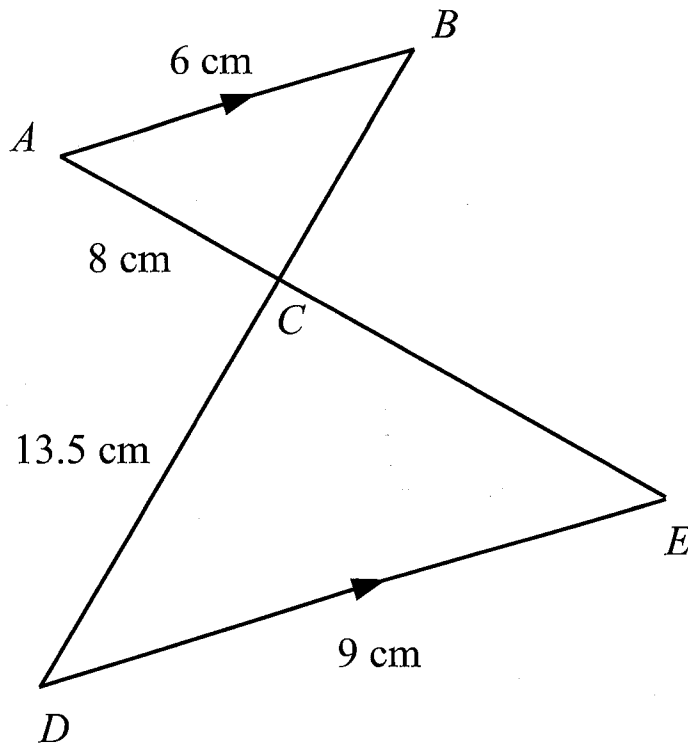
$26 \times \dfrac{3}{2} = \underline{\underline{39}}$

_____ **39** _____ cm

(2)

(b)   Calculate the length of *BC*.

$45 \div \dfrac{3}{2}$

$45 \times \dfrac{2}{3} = \underline{\underline{30}}$

_____ **30** _____ cm

(2)

(Total for Question 4 is 4 marks)

5

B

6 cm

A

8 cm

C

13.5 cm

E

9 cm

D

AB is parallel to DE.
ACE and BCD are straight lines.
AB = 6 cm,
AC = 8 cm,
CD = 13.5 cm,
DE = 9 cm.

(a)   Calculate the length of CE.

$$\text{Scale factor} = \frac{9}{6} = \frac{3}{2}$$

$$8 \times \frac{3}{2} = 12$$

.... 12 .... cm

(2)

(b)   Calculate the length of BC.

$$13.5 \div \frac{3}{2}$$

$$13.5 \times \frac{2}{3} = 9$$

.... 9 .... cm

(2)

(Total for Question 5 is 4 marks)

6

$AC = 5 \times 3$

$AC = 15 \, cm$

$\times 3$

15

AB: AC = 1:3

(a)   Calculate the length of *CD*.

5 4

Scale factor $= \dfrac{15}{5} = 3$

$\div 3$

$4 \times 3 = \underline{\underline{12}}$

_____12_____ cm

(2)
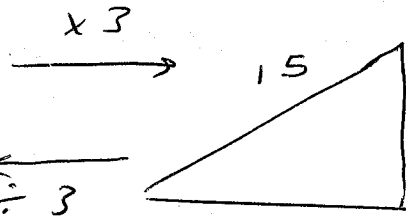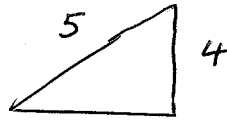
(b)   Calculate the length of *BC*.

$15 - 5 = \underline{\underline{10}}$

_____10_____ cm

(2)

(Total for Question 6 is 4 marks)

7
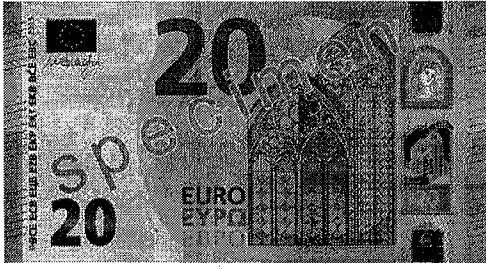
A 20 Euro note is a rectangle 133 mm long and 72 mm wide.
A 500 Euro Note is a rectangle 160 mm long and 82 mm wide.

Show that the two rectangles are not mathematically similar.

Scale factor for length = $\dfrac{160}{133}$

Scale factor for width = $\dfrac{82}{72}$ = $\dfrac{41}{36}$

The scale factor for length is __not__
equal to the scale factor for
width ∴ they are not similar.

(Total for Question 7 is 3 marks)