



# EXAM PAPERS PRACTICE

GCSE OCR Math J560  
Similarity Length

Answers

*"We will help you to  
achieve A Star "*



**Answer 1**

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

$$y = SF \times MN$$

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

$$= \underline{\underline{8 \text{ cm}}}$$



**Answer 2**

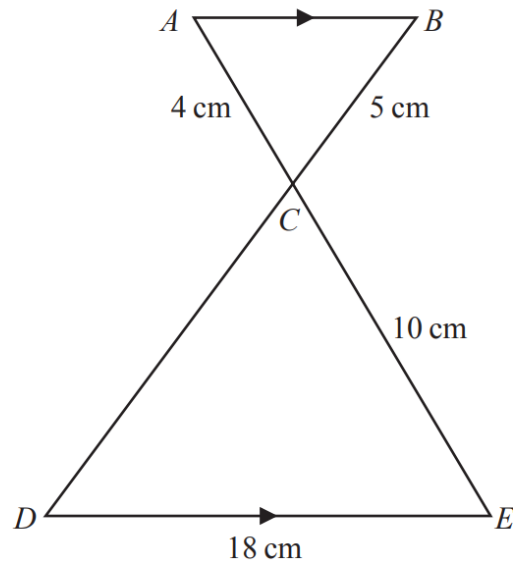


Diagram **NOT** accurately drawn

*ACE* and *BCD* are straight lines.  
*AB* is parallel to *DE*.

(a) Calculate the length of *CD*.

Sf :  $10/4$

$$10/4 \times 5 = 12.5$$

12.5

.....cm



**Answer 3**

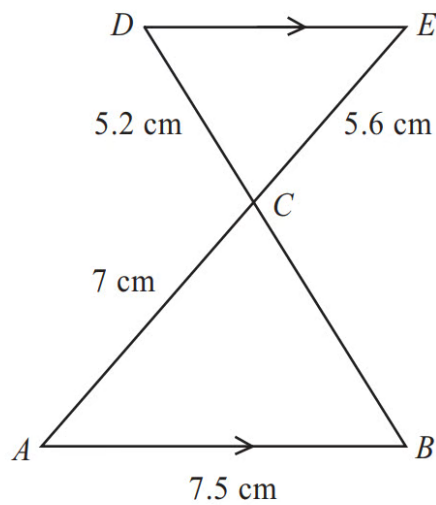


Diagram **NOT**  
accurately drawn

$AB$  is parallel to  $DE$ .  
The lines  $AE$  and  $BD$  intersect at  $C$ .  
 $AB = 7.5$  cm,  $AC = 7$  cm,  $CD = 5.2$  cm,  $CE = 5.6$  cm.

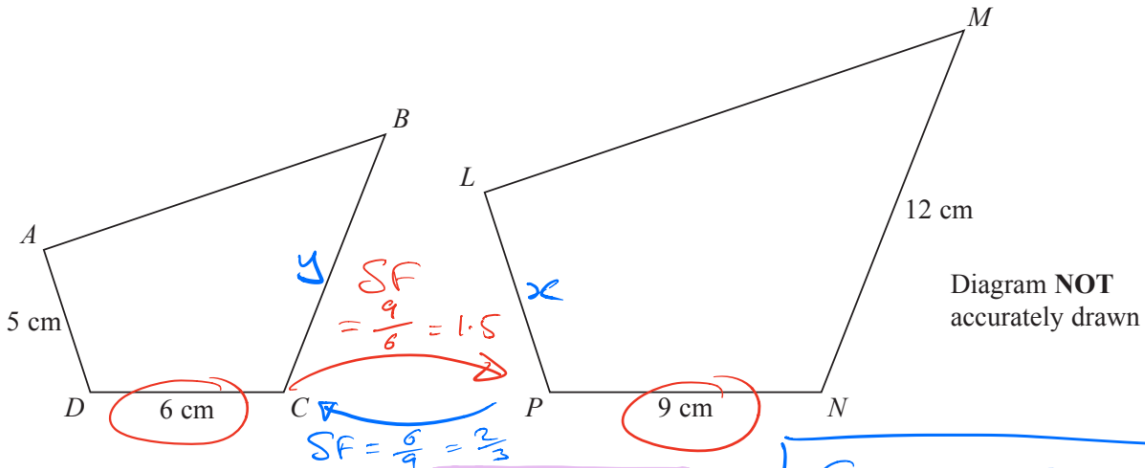
(a) Calculate the length of  $BC$ .

Similar triangles

$$\frac{BC}{5.2} = \frac{7}{5.6} \quad BC = \underline{6.5}$$



**Answer 4**



Quadrilaterals  $ABCD$  and  $LMNP$  are mathematically similar.

- Angle  $A$  = angle  $L$
- Angle  $B$  = angle  $M$
- Angle  $C$  = angle  $N$
- Angle  $D$  = angle  $P$

SIMILAR SHAPES  
FIND SCALE FACTOR

(a) Work out the length of  $LP$ .

$$\begin{aligned} x &= SF \times AD \\ &= 1.5 \times 5 \\ &= \underline{\underline{7.5 \text{ cm}}} \end{aligned}$$



**Answer 5**

The ocean liner Queen Mary 2 is the longest of its type.  
It has a length of 345 metres.

A scale model is made of the Queen Mary 2  
The scale of the model is 1 : 200

Work out the length of the scale model.  
Give your answer in centimetres.



Scale 1:200

actual length = 345m

Scale length = 345m / 200

1.725m

172.5 cm

**Answer 6**

$AC = 6.15$  cm.

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

$$AB = 6.15 - y$$

$$y = 6.15 \times \frac{5.4}{8.1} = \underline{4.1} \text{ cm}$$

$$\begin{aligned} AB &= 6.15 - 4.1 \\ &= \underline{\underline{2.05 \text{ cm}}} \end{aligned}$$



**Answer 7**

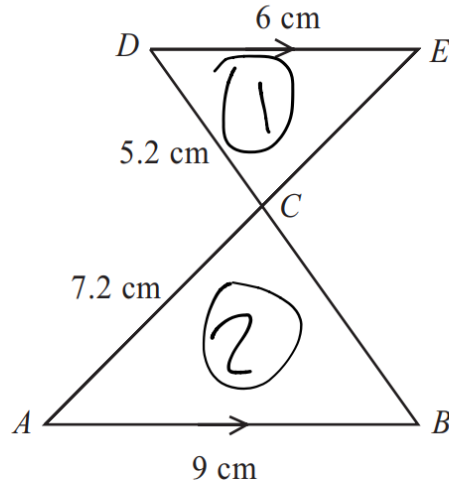


Diagram **NOT** accurately drawn

- $AB$  is parallel to  $DE$ .
- $ACE$  and  $BCD$  are straight lines.
- $AB = 9$  cm.
- $AC = 7.2$  cm.
- $CD = 5.2$  cm.
- $DE = 6$  cm.

(a) Calculate the length of  $BC$ .

Triangles are proportional  
 $\therefore$  length of sides are a ratio

$$AB = k \times DE \quad \frac{9}{6} = k \quad \therefore BC = 5.2 \times \frac{9}{6}$$
$$= 7.8 \text{ cm}$$



**Answer 8**

The diagram shows triangle  $ADC$ .

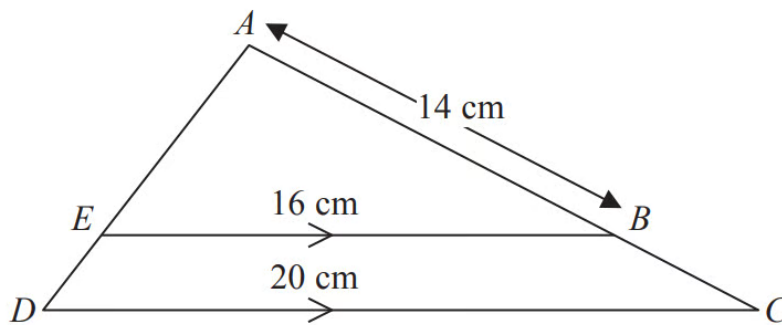


Diagram **NOT**  
accurately drawn

$E$  is a point on  $AD$  and  $B$  is a point on  $AC$  so that  $EB$  is parallel to  $DC$ .

$$AB = 14 \text{ cm.}$$

$$EB = 16 \text{ cm.}$$

$$DC = 20 \text{ cm.}$$

Calculate the length of  $BC$ .

Scale factor = enlarged side / original

$$20/16 = 5/4$$

$$\text{Therefore } AC = 14 \times 5/4 = 17.5$$

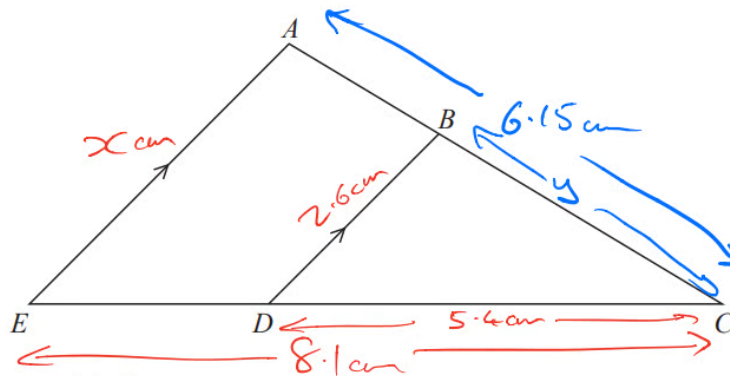
$$BC = AC - AB = 17.5 - 14 = 3.5$$

3.5 cm





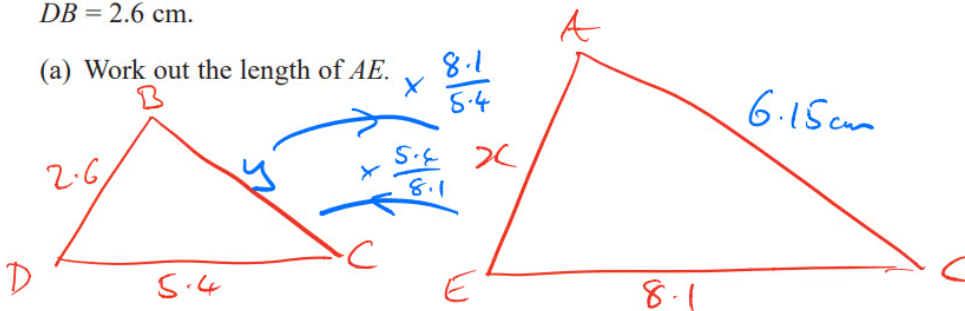
Answer 9



$ABC$  and  $EDC$  are straight lines.  
 $EA$  is parallel to  $DB$ .

$EC = 8.1$  cm.  
 $DC = 5.4$  cm.  
 $DB = 2.6$  cm.

(a) Work out the length of  $AE$ .

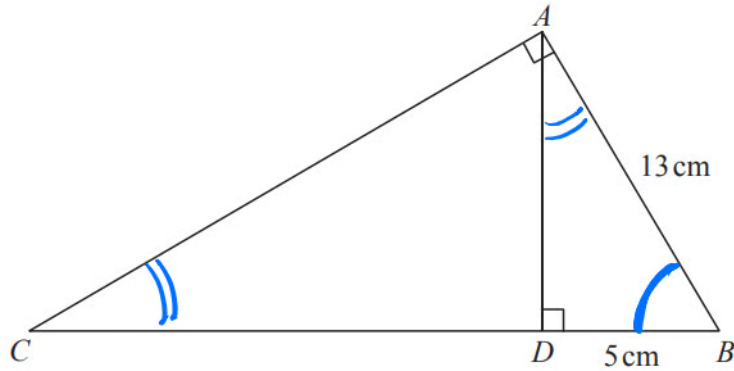


$$x = 2.6 \times \frac{8.1}{5.4} = \underline{\underline{3.9 \text{ cm}}}$$



**Answer 10**

$ABC$  and  $ABD$  are two right-angled triangles.

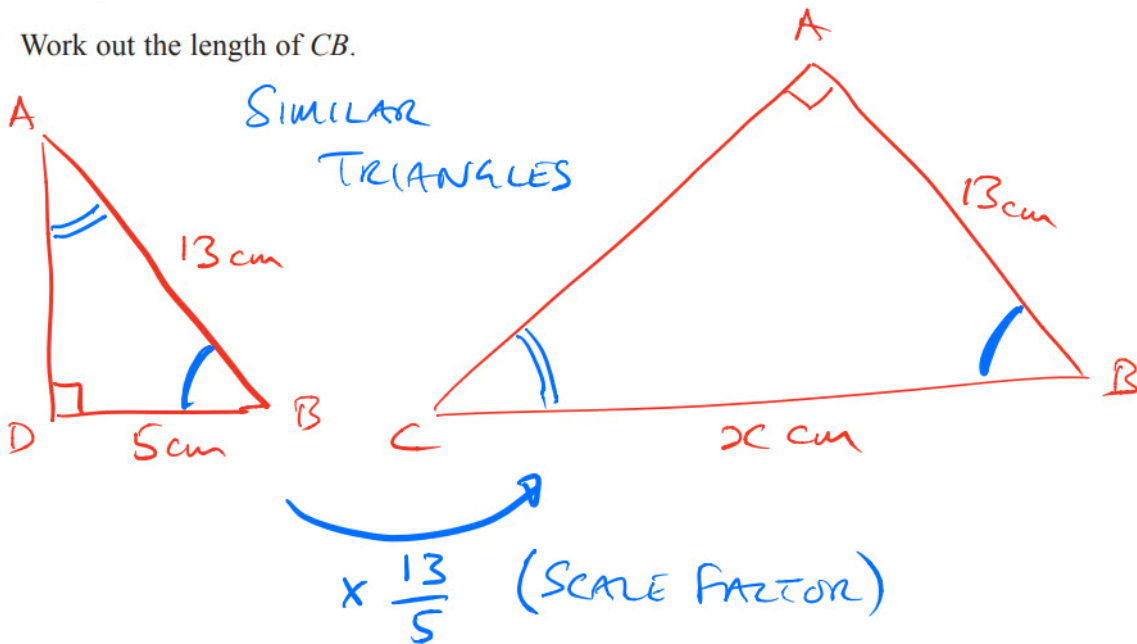


Angle  $BAC = \text{angle } ADB = 90^\circ$

$AB = 13 \text{ cm}$

$DB = 5 \text{ cm}$

Work out the length of  $CB$ .



$$\begin{aligned} \text{So } x &= 13 \times \frac{13}{5} \\ &= \frac{169}{5} = \underline{\underline{33.8 \text{ cm}}} \end{aligned}$$



Answer 11

SIMILAR  
TRIANGLES

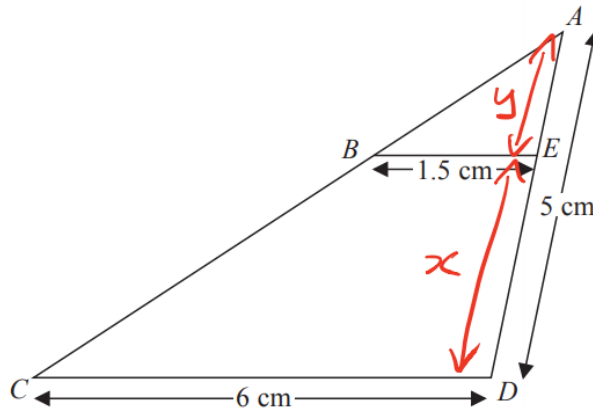
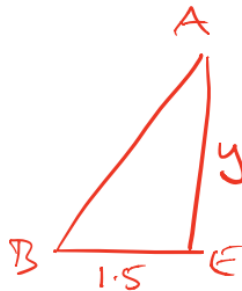
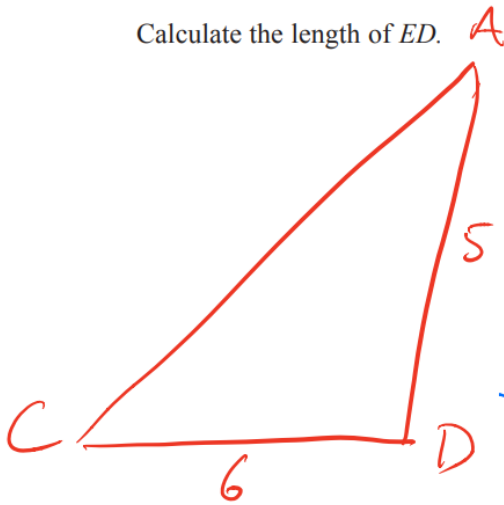


Diagram NOT  
accurately drawn

$$x + y = 5$$
$$x = 5 - y$$

$ABC$  and  $AED$  are straight lines.  
 $BE$  and  $CD$  are parallel.  
 $BE = 1.5$  cm.  
 $CD = 6$  cm.  
 $AD = 5$  cm.

Calculate the length of  $ED$ .



SF  $\rightarrow$

$$x \frac{1.5}{6} = \frac{1}{4}$$

$$\frac{1.5}{6} = \frac{1}{4}$$
$$2 \times 1.5 = 3$$
$$2 \times 3 = 6$$

So

$$4 \times 1.5 = 6$$

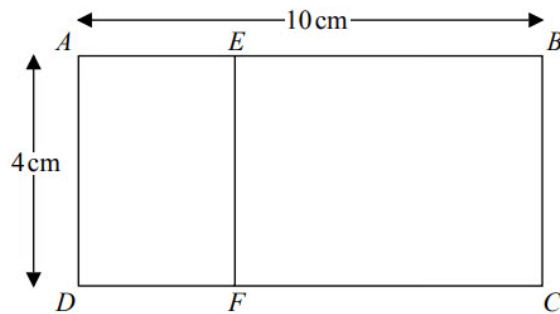
$$y = 5 \times \frac{1}{4} = \frac{5}{4} = 1.25 \text{ cm}$$

$$x = 5 - y$$
$$= 5 - 1.25$$
$$= \underline{\underline{3.75 \text{ cm}}}$$



**Answer 12**

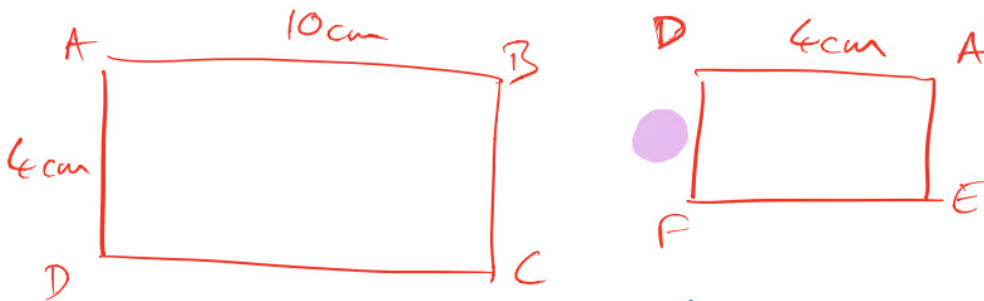
Rectangle  $ABCD$  is mathematically similar to rectangle  $DAEF$ .



$AB = 10$  cm.

$AD = 4$  cm.

Work out the area of rectangle  $DAEF$ .



$$SF = \frac{4}{10}$$

$$\begin{array}{r} 16 \\ 1:16 \\ 2:32 \\ 4:64 \end{array}$$

$$DF = \frac{4}{1} \times \frac{4}{10} = \frac{16}{10} \text{ cm}$$

$$\text{AREA OF DAEF} = \frac{4}{1} \times \frac{16}{10}$$

$$= \frac{64}{10}$$

$$= \underline{\underline{6.4 \text{ cm}^2}}$$



**Answer 13**

(b) Work out the scale of the map in the form  $1:n$

Cont. for part a)

$$1\text{m} = 100\text{ cm}$$

$$250\text{m} = 25000\text{cm}$$

1cm on map = 25000 cm in real life so scale is

$$1:25000$$

1 : 25000 .....

**Answer 14**

(b) Calculate the length of  $DE$ .

$$AE = AD \times sf = 10 \times 2.5 = 25$$

$$AD = AE - AD = 25 - 10 = 15$$

.....15..... cm



**Answer 15**

Steve has a photo and a rectangular piece of card.

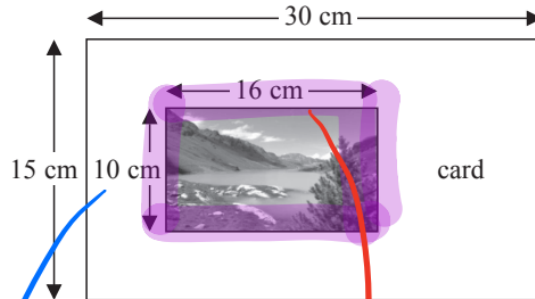


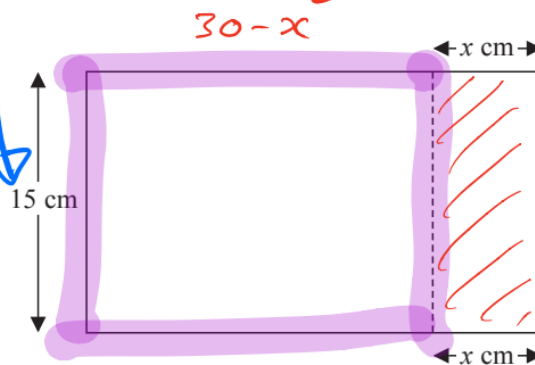
Diagram **NOT** accurately drawn

The photo is 16 cm by 10 cm.  
The card is 30 cm by 15 cm.

Steve cuts the card along the dotted line shown in the diagram below.

SCALE FACTOR

$$\times \frac{15}{10}$$



SIMILAR SHAPES  
FIND (AND USE!)  
SCALE FACTOR

Steve throws away the piece of card that is 15 cm by  $x$  cm.  
The piece of card he has left is mathematically similar to the photo.

Work out the value of  $x$ .

$$30 - x = \frac{15}{10} \times 16$$

$$30 - x = 24$$

$$-x = -6$$

$$\underline{\underline{x = 6}}$$