

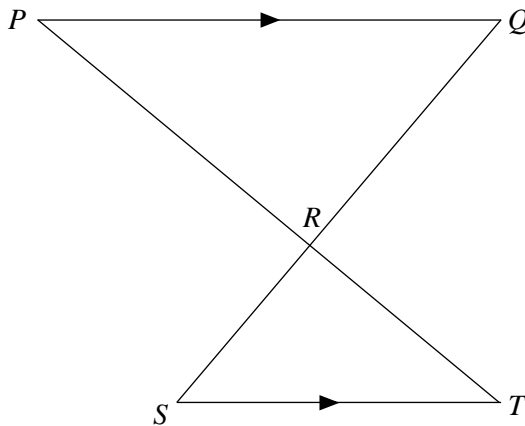


# Similar Triangles



REVISE THIS TOPIC

- 1  $PQR$  and  $RST$  are similar triangles.  
 $PQ$  is parallel to  $ST$ .



$PQ = 9$  cm     $RQ = 6$  cm     $RT = 5$  cm     $ST = 6$  cm

- (a) Work out the length of  $PR$ .

$$\frac{PR}{5} = \frac{9}{6}$$

$$PR = \frac{9 \times 5}{6}$$

..... **7.5** ..... cm  
 (2)

- (b) Work out the length of  $RS$ .

$$\frac{RS}{6} = \frac{6}{9}$$

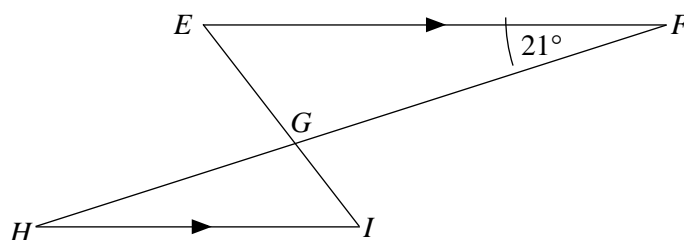
$$RS = \frac{6 \times 6}{9}$$

..... **4** ..... cm  
 (2)

(Total for Question 1 is 4 marks)



2  $EFG$  and  $GHI$  are similar triangles.  
 $EF$  is parallel to  $HI$ .



$EG = 8.1 \text{ cm}$     $GF = 18 \text{ cm}$     $GH = 10 \text{ cm}$     $HI = 12 \text{ cm}$   
 Angle  $EFG = 21^\circ$

(a) Work out the size of angle  $GHI$ .

Angle  $GHI = \text{Angle } EFG$

$21$   
 .....  
 (1)

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

$\frac{EF}{12} = \frac{18}{10}$        $EF = \frac{18 \times 12}{10}$

$21.6$   
 .....cm  
 (2)

(c) Work out the length of  $GI$ .

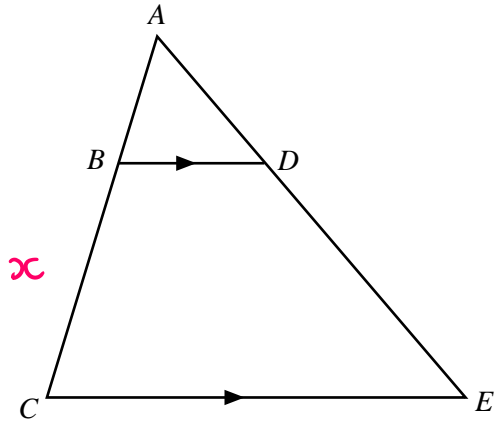
$\frac{GI}{8.1} = \frac{10}{18}$        $GI = \frac{10 \times 8.1}{18}$

$4.5$   
 .....cm  
 (2)

(Total for Question 2 is 5 marks)



3  $ABC$  and  $ADE$  are straight lines.  
 $BD$  is parallel to  $CE$ .



$AB = 4 \text{ cm}$      $AD = 5 \text{ cm}$      $DE = 15 \text{ cm}$      $BD = 3.5 \text{ cm}$

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

$$\frac{CE}{3.5} = \frac{20}{5} \qquad CE = \frac{20 \times 3.5}{5}$$

.....14.....cm  
 (2)

(b) Work out the length of  $BC$ .  $\leftarrow x$

$$\frac{x+4}{4} = \frac{20}{5} \qquad \left| \qquad \begin{aligned} x+4 &= 16 \\ x &= 12 \end{aligned}$$

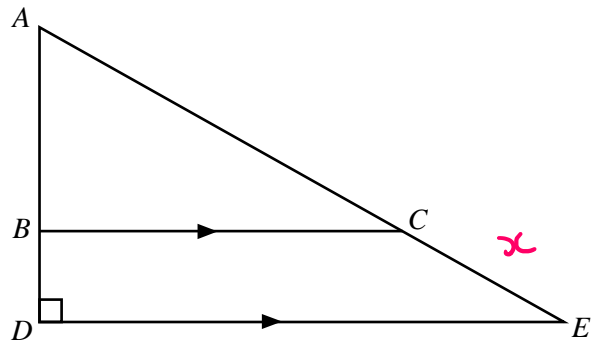
$$x+4 = \frac{20 \times 4}{5}$$

.....12.....cm  
 (2)

(Total for Question 3 is 4 marks)



- 4  $ADE$  is a right-angled triangle.  
 $BC$  is parallel to  $DE$ .



$AB = 6$  cm     $AC = 10$  cm     $BC = 8$  cm     $BD = 1.5$  cm

- (a) Work out the length of  $DE$ .

$$\frac{DE}{8} = \frac{7.5}{6} \qquad DE = \frac{7.5 \times 8}{6}$$

..... 10 ..... cm  
 (2)

- (b) Work out the length of  $CE$ .

$$\frac{x+10}{10} = \frac{7.5}{6} \qquad x+10 = 12.5$$

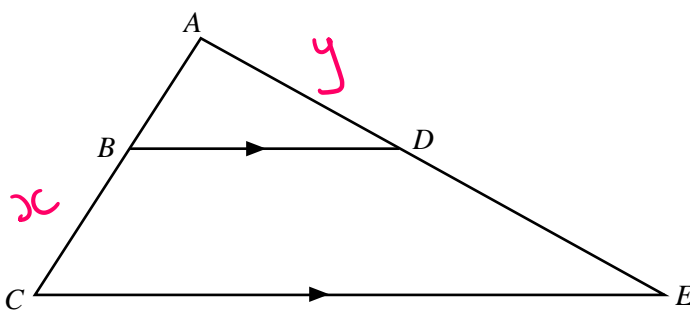
$$x+10 = \frac{7.5 \times 10}{6} \qquad x = 2.5$$

..... 2.5 ..... cm  
 (2)

(Total for Question 4 is 4 marks)



5  $ABC$  and  $ADE$  are straight lines.  
 $BD$  is parallel to  $CE$ .



$AB = 6$  cm     $BD = 12$  cm     $CE = 28$  cm     $DE = 10$  cm

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

$$\frac{x+6}{6} = \frac{28}{12}$$

$$x+6 = \frac{28 \times 6}{12}$$

$$x+6 = 14$$

$$x = 8$$

8

..... cm  
(3)

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

$$\frac{y+10}{y} = \frac{28}{12}$$

$$12(y+10) = 28y$$

$$12y + 120 = 28y$$

$$120 = 16y$$

$$y = 7.5$$

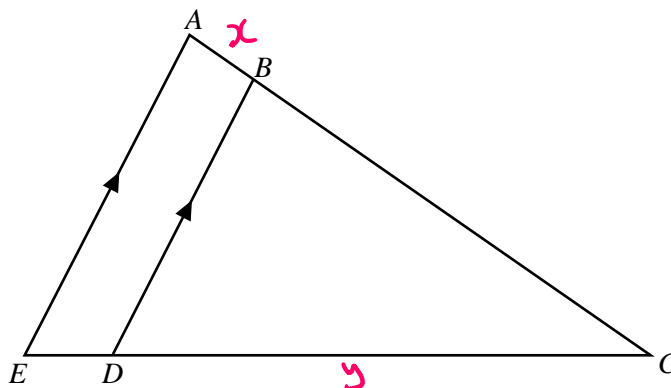
7.5

..... cm  
(3)

(Total for Question 5 is 6 marks)



6  $ABC$  and  $EDC$  are straight lines.  
 $AE$  is parallel to  $BD$ .



$BC = 15 \text{ cm}$      $BD = 9 \text{ cm}$      $AE = 10.5 \text{ cm}$      $EC = 21 \text{ cm}$

(a) Work out the length of  $AB$ .  $\leftarrow x$

$$\frac{x + 15}{15} = \frac{10.5}{9}$$

$$x + 15 = \frac{10.5 \times 15}{9}$$

$$x + 15 = 17.5$$

$$x = 2.5$$

.....  $2.5$  ..... cm  
 (2)

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

Find  $DC$  first

$$\frac{y}{21} = \frac{9}{10.5}$$

$$y = 18$$

$$y = \frac{9 \times 21}{10.5}$$

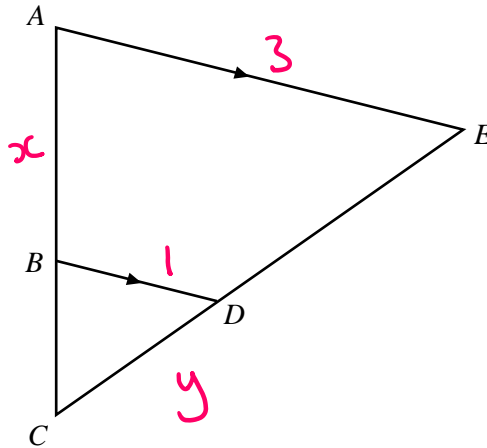
$$ED = 21 - 18$$

.....  $3$  ..... cm  
 (3)

(Total for Question 6 is 5 marks)



7  $ABC$  and  $CDE$  are straight lines.  
 $AE$  is parallel to  $BD$ .



$BC = 2.8 \text{ cm}$      $DE = 6.4 \text{ cm}$

$BD : AE = 1 : 3$

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

$$\frac{x + 2.8}{2.8} = \frac{3}{1}$$

$$x + 2.8 = \frac{3 \times 2.8}{1}$$

$$x + 2.8 = 8.4$$

$$x = 5.6$$

..... 5.6 ..... cm  
 (2)

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

$$\frac{y}{y + 6.4} = \frac{1}{3}$$

$$3y = y + 6.4$$

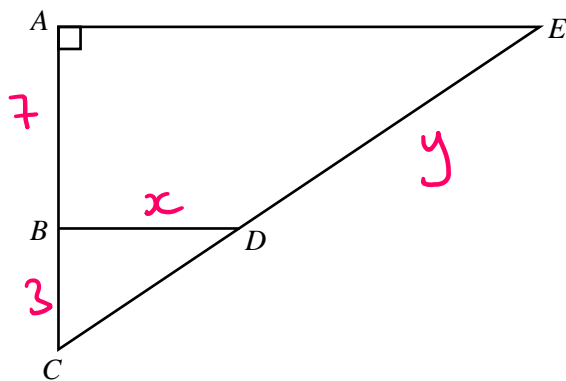
$$2y = 6.4$$

..... 3.2 ..... cm  
 (3)

(Total for Question 7 is 5 marks)



8  $ACE$  is a right-angled triangle.  
 $AE$  is parallel to  $BD$ .



$AE = 40$  cm     $CD = 18$  cm

$AB : BC = 7 : 3$

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

$$\frac{x}{40} = \frac{3}{10}$$

$$x = \frac{3 \times 40}{10}$$

..... 12 ..... cm  
 (3)

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

$$\frac{y + 18}{18} = \frac{10}{3}$$

$$3(y + 18) = 180$$

$$3y + 54 = 180$$

$$3y = 126$$

$$y = 42$$

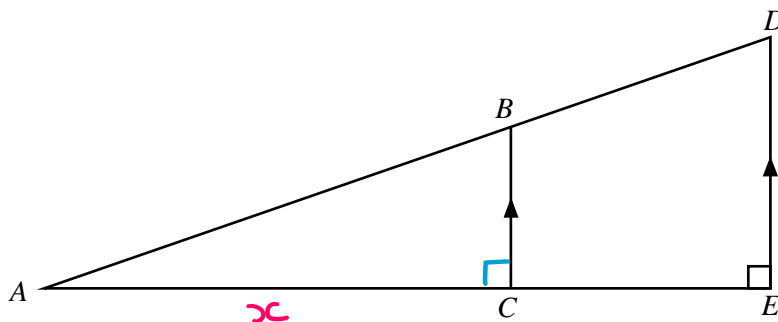
..... 42 ..... cm  
 (3)

(Total for Question 8 is 6 marks)





- 9  $ADE$  is a right-angled triangle.  
 $BC$  is parallel to  $DE$ .



$BC = 10 \text{ cm}$      $DE = 15 \text{ cm}$      $CE = 12 \text{ cm}$

Work out the length of  $AB$ .

Find  $AC$  first

$$\frac{x+12}{x} = \frac{15}{10}$$

$$10(x+12) = 15x$$

$$10x + 120 = 15x$$

$$120 = 5x$$

$$x = 24$$

$$AB^2 = AC^2 + CB^2$$

$$AB^2 = 24^2 + 10^2$$

$$AB^2 = 676$$

$$AB = \sqrt{676}$$

$$AB = 26$$

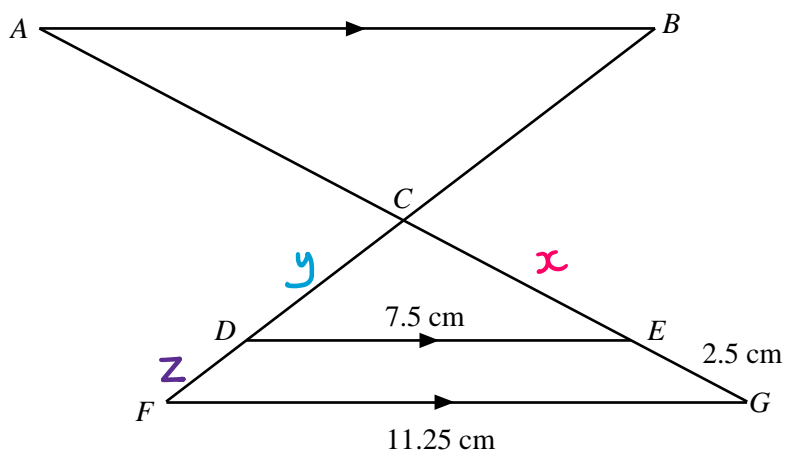
26

..... cm

(Total for Question 9 is 5 marks)



10 ACEG and BCDF are straight lines.  
 AB, DE and FG are parallel lines.



$AC = 8 \text{ cm}$      $BC = 6.4 \text{ cm}$      $DE = 7.5 \text{ cm}$      $FG = 11.25 \text{ cm}$      $EG = 2.5 \text{ cm}$

Work out the length of DF.

$$\frac{x + 2.5}{x} = \frac{11.25}{7.5}$$

$$\frac{y}{6.4} = \frac{5}{8}$$

$$7.5(x + 2.5) = 11.25x$$

$$y = \frac{5 \times 6.4}{8}$$

$$7.5x + 18.75 = 11.25x$$

$$y = 4$$

$$18.75 = 3.75x$$

$$x = 5$$

$$\frac{z + 4}{4} = \frac{11.25}{7.5}$$

$$z + 4 = 6$$

$$z = 2$$

$$z + 4 = \frac{11.25 \times 4}{7.5}$$

2

..... cm

(Total for Question 10 is 5 marks)

