

# FluidMaths

GCSE Mathematics (Grade 9-1)

Problem Solving

Angles Set 1

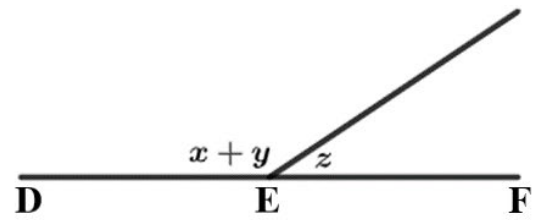
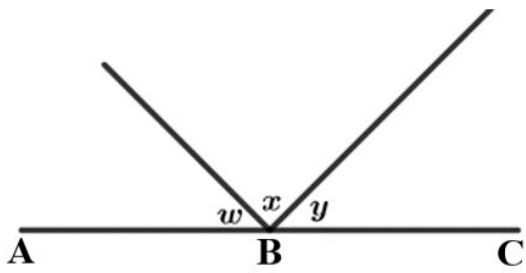
Straight lines and Parallel lines

Solutions

**The marks shown are for guidance purposes only**

**The questions are repeated here for your convenience**

1 The diagrams below show two straight lines AC and DF



Given that  $w : x : y = 2 : 5 : 3$ ,  
calculate the size of angle  $z$ .

**Solution**

Angles at a point on a straight line add up to  $180^\circ$

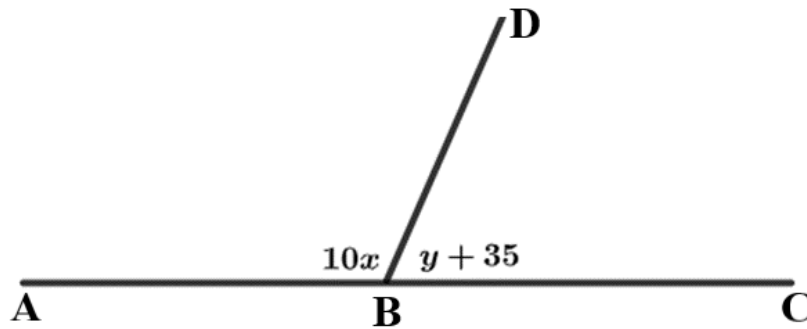
Therefore,  $x = \frac{5}{10} \times 180 = 90$  and  $y = \frac{3}{10} \times 180 = 54$

**[2marks]**

Therefore,  $x + y = 90 + 54 = 144$  **[1mark]**

Hence,  $z = 180 - 144 = 36^\circ$  **[1mark]**

2 The diagram shows a straight-line AC



$$\text{Angle ABD} = 10x$$

$$\text{Angle CBD} = y + 35$$

$$\text{The ratio of } x:y = 2:9$$

Find the size of the larger angle.

**Solution**

From the given ratio  $x:y = 2:9$

$$\frac{x}{y} = \frac{2}{9}$$

$$y = \frac{9}{2}x$$

$$y = 4.5x \quad \text{[1mark]}$$

$$\text{From the diagram, } 10x + y + 35 = 180 \quad \text{[1mark]}$$

$$\text{Substitute } y = 4.5x \text{ into } 10x + y + 35 = 180$$

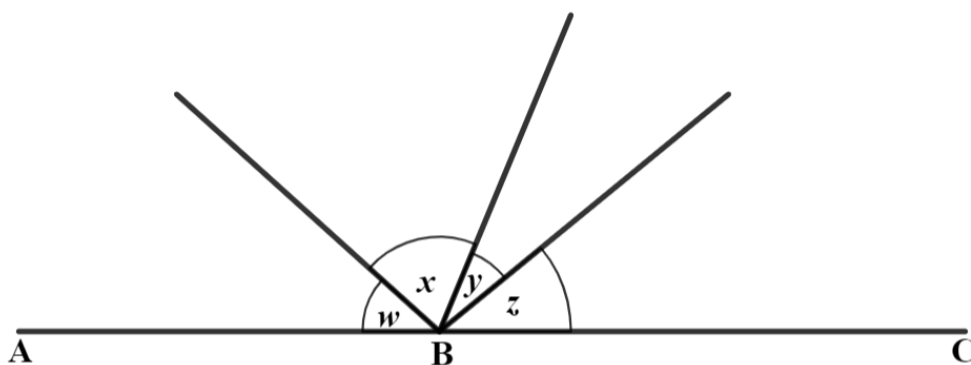
$$10x + 4.5x + 35 = 180$$

$$14.5x = 145$$

$$x = 10 \quad \text{[1mark]}$$

$$\text{Therefore, the larger angle will be } 10 \times 10 = 100^\circ \quad \text{[1mark]}$$

3 In the diagram below, ABC is a straight line



Given that  $w + x + y = 140$  and  $x + y + z = 130$ ,  
What is the value of  $x + y$ ?

### Solution

$$w + x + y + z = 180$$

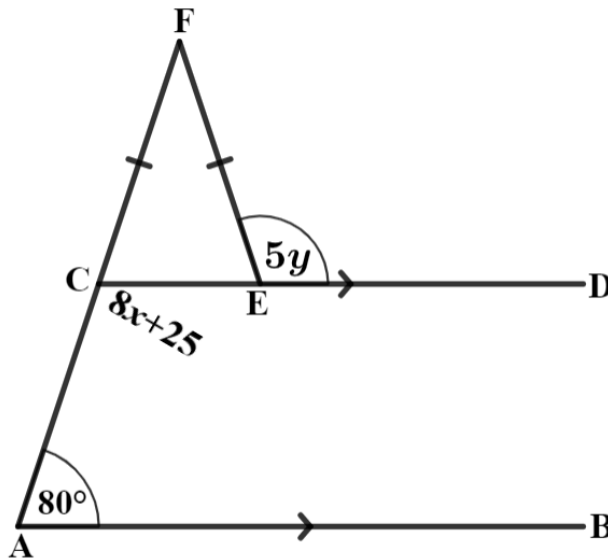
$$\text{But } w + x + y = 140$$

$$\text{Therefore, } z = 40 \quad \text{[1mark]}$$

$$\text{Hence, } x + y = 130 - 40$$

$$x + y = 90 \quad \text{[1mark]}$$

- 4 CEF is an isosceles triangle  
 $CF = EF$   
 AB is parallel to CD



$$\text{Angle BAC} = 80$$

$$\text{Angle ACD} = 8x + 25$$

$$\text{Angle DEF} = 5y$$

Find the values of  $x$  and  $y$

### Solution

$$8x + 25 + 80 = 180 \text{ \{Co-interior angles\}}$$

$$8x = 75$$

$$x = 9.375$$

[2marks]

$$\text{Angle ECF} = 80^\circ \text{ \{Corresponding to angle BAC\}}$$

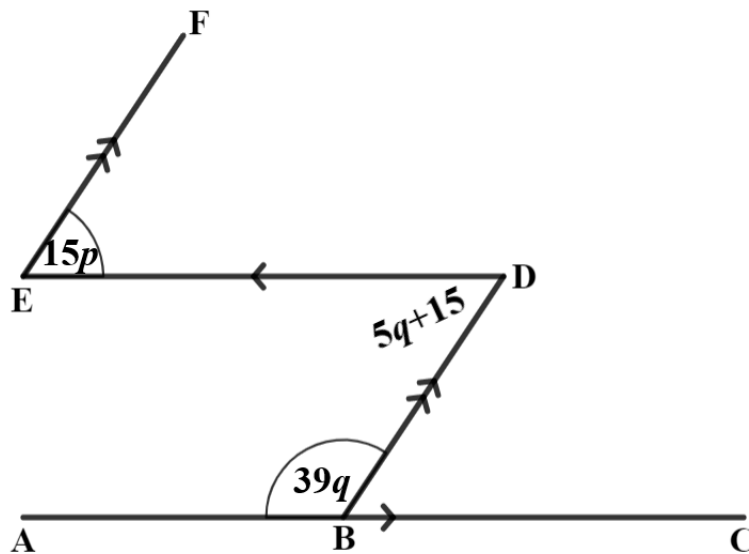
$$\text{Therefore, angle CEF} = 80^\circ \text{ \{Angles in isosceles triangle\}}$$

$$\text{Therefore, } 5y = 120$$

$$y = 24$$

[2marks]

- 5 In the diagram below,  
AC is parallel to DE  
BD is parallel to EF



$$\text{Angle ABD} = 39q$$

$$\text{Angle BDE} = 5q + 15$$

$$\text{Angle DEF} = 15p$$

Calculate the ratio of  $p:q$  in its simplest form

### Solution

$$5q + 15 + 39q = 180$$

$$44q = 165$$

$$q = 3.75 \quad [2\text{marks}]$$

$$\text{Therefore, angle BDE} = 5 \times 3.75 + 15 = 33.75$$

$$\text{Therefore, } 15p = 33.75 \text{ \{Alternate angles\}}$$

$$p = 2.25 \quad [2\text{marks}]$$

$$\text{Therefore, } p:q = 2.25:3.75 = 3:5 \quad [1\text{mark}]$$