FluidMaths

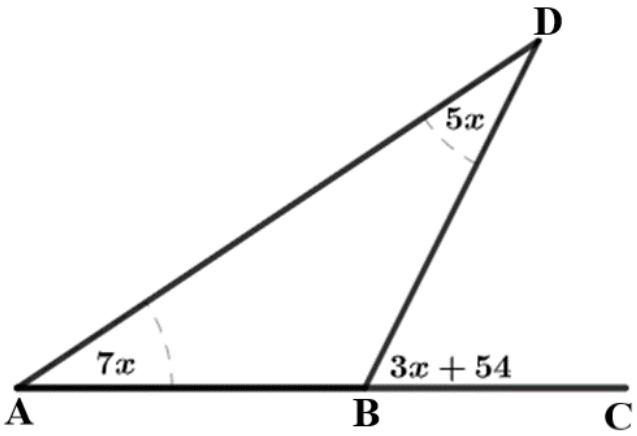
GCSE Mathematics (Grade 9-1)

Problem Solving
Angles Set 2
Triangles and Quadrilaterals
Solutions

The marks shown are for guidance purposes only

The questions are repeated here for your convenience

1 Triangle ABD is shown below.



Angle CBD $= 3x + 54$
Angle BDA $= 5x$
Angle BAD $= 7x$
Calculate the value of x

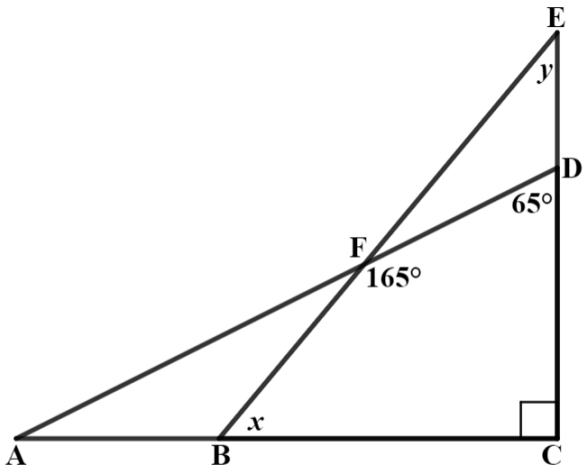
Solution

An exterior angle is equal to the sum of the two opposite interior angles

Therefore, $7x + 5x = 3x + 54$ **[1mark]**

$12x = 3x + 54$ **[1mark]**
$9x = 54$
$x = 6$ **[1mark]**

2 The diagram shows triangles ACD and BCE



Angle CDF = 165°

Angle BDC = 65°

Calculate the ratio of x: y in its simplest form.

Solution

Consider quadrilateral ABDF

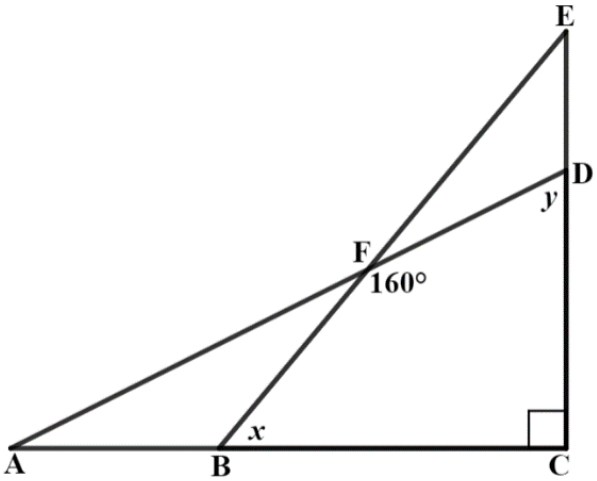
$x = 360 - 165 - 90 - 65 = 40$ **[1mark]**

From triangle BCE

$y = 180 - 90 - 40 = 50$ **[1mark]**

Therefore, $x: y = 40: 50 = 4: 5$ **[1mark]**

3 Two right-angled triangles ACD and CDE are shown below.



Angle FBC $= x$
Angle CDF $= y$
Angle BFD $= 160°$
If the ratio of $x : y = 3 : 2$, calculate the values of x and y.

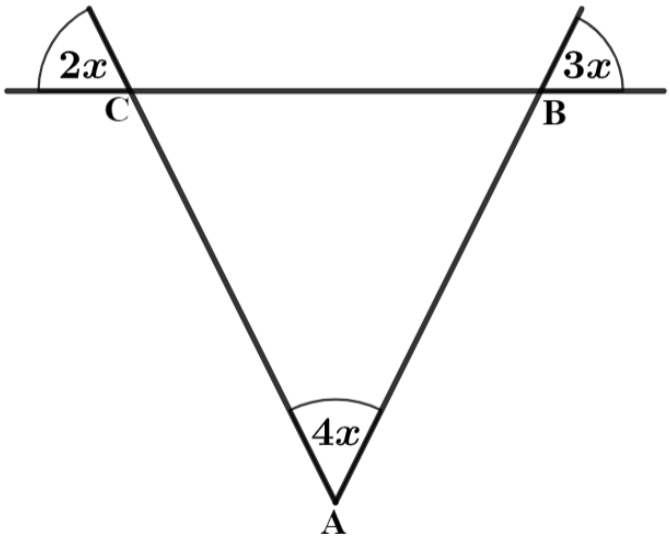
Solution

Therefore, in quadrilateral BCDF
$360 - 90 - 160 = 110$ **[1mark]**
Therefore, share 110 in the ratio 3:2

Angle $x = \frac{3}{5} \times 110 = 66°$ **[1mark]**

Angle $y = \frac{2}{5} \times 110 = 44°$ **[1mark]**

4 ABC is a triangle



Calculate the value of x

Solution

Angle ACB $= 2x$

Angle ABC $= 3x$

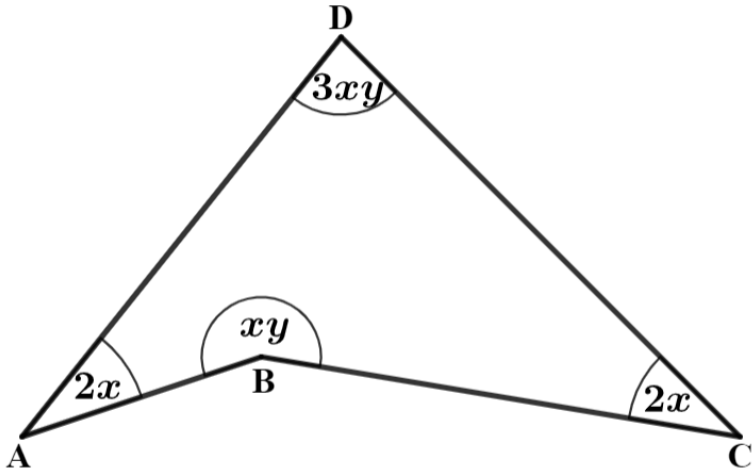
Vertically opposite angles

Therefore, $4x + 3x + 2x = 180$ **[1mark]**

$9x = 180$

$x = 20$ **[1mark]**

5 ABCD is a quadrilateral

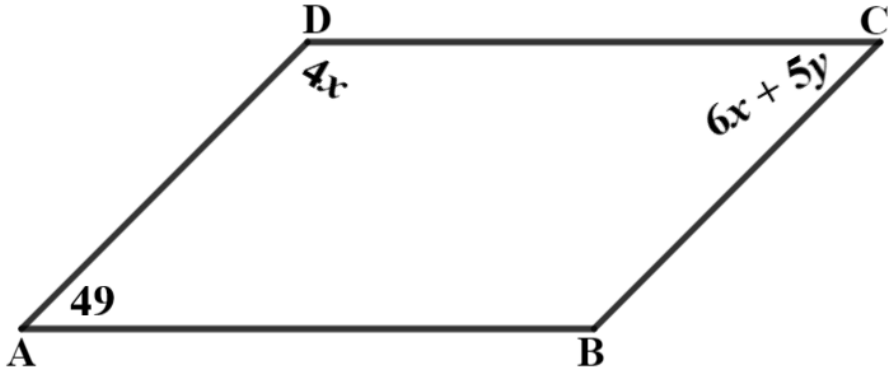


Find an expression for y in terms of x
Give your answer as simplified as possible

Solution

$3xy + xy + 2x + 2x = 360$ **[1mark]**
$4xy + 4x = 360$ {Divide both sides by 4}
$xy + x = 90$ **[1mark]**
$xy = 90 - x$
$y = \frac{90-x}{x}$ **[1mark]**

6 ABCD is a parallelogram



Angle BAD $= 49°$
Angle BCD $= 6x + 5y$
Angle ADC $= 4x$
Calculate the values of x and y

Solution

AB is parallel to DC
Therefore, $4x + 49 = 180$ {Co-interior angles} **[1mark]**
$4x = 131$
$x = 32.75$ **[1mark]**
$6x - 5y = 49$ {Opposite angles in a parallelogram} **[1mark]**
$6 \times 32.75 - 5y = 49$ **[1mark]**
$196.5 - 5y = 49$
$5y = 147.5$
$y = 29.5$ **[1mark]**