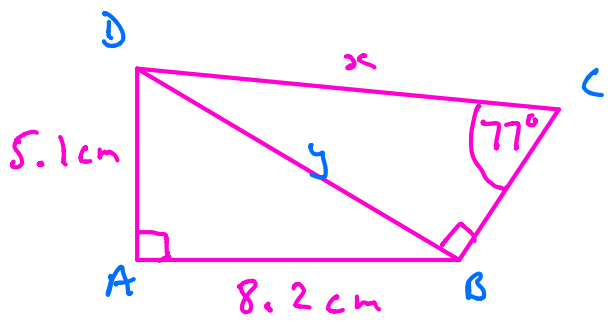
Problem Solving in Trigonometry

Ex 1

Find x



Let $BD = y$

In $\triangle ABD$ By Pythagoras

$$5.1^2 + 8.2^2 = y^2$$
$$93.25 = y^2$$
$$\sqrt{93.25} = y$$
$$y = 9.6566 \text{ cm}$$

In $\triangle BCD$ $\sin = \frac{O}{H}$

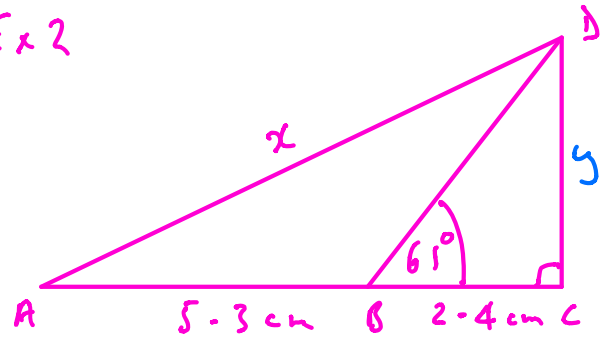
$$\sin 77^\circ = \frac{y}{x} = \frac{9.6566}{x}$$

$$x \sin 77^\circ = 9.6566$$

$$x = \frac{9.6566}{\sin 77^\circ} = 9.91 \text{ cm}$$

$$\underline{x = 9.9 \text{ cm}}$$

Ex 2



Find x

In $\triangle BCD$ $\quad \tan = \frac{O}{A}$

$$\tan 61^\circ = \frac{y}{2.4}$$

$$2.4 \tan 61^\circ = y$$

$$y = 4.3297$$

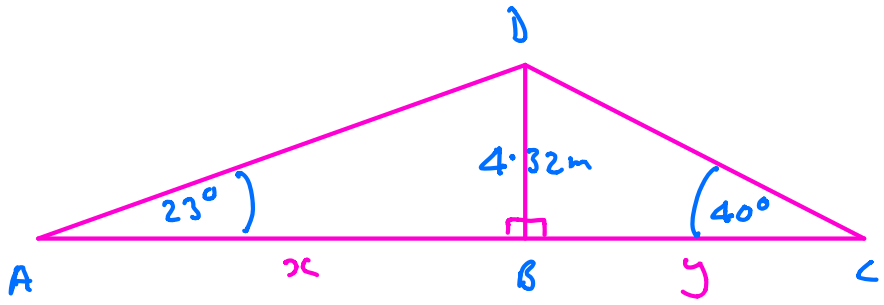
In $\triangle ACD$

By Pythagoras $\quad 7.7^2 + 4.3297^2 = x^2$

$$78.0363 = x^2$$

$$\underline{x = 8.83 \text{ cm}}$$

Ex 3



Find AC

In $\triangle ABD$

$$\tan 23^\circ = \frac{4.32}{x}$$

$$x \tan 23^\circ = 4.32$$

$$x = \frac{4.32}{\tan 23^\circ}$$

$$x = 10.18 \text{ m}$$

In $\triangle BCD$

$$\tan 40^\circ = \frac{4.32}{y}$$

$$y \tan 40^\circ = 4.32$$

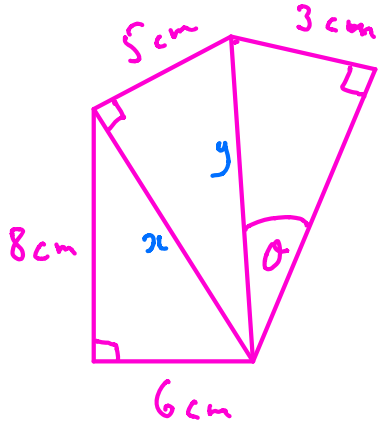
$$y = \frac{4.32}{\tan 40^\circ}$$

$$y = 5.15 \text{ m}$$

$$AC = x + y = 10.18 + 5.15 = 15.33 \text{ m}$$

$$\underline{AC = 15.3 \text{ m}}$$

Ex 4



Find θ

$6^2 + 8^2 = x^2$ Pythagoras

$100 = x^2$

$\sqrt{100} = x$

$x = 10\text{cm}$

$10^2 + 5^2 = y^2$

$125 = y^2$

$y = \sqrt{125}$

$y = 11.18\text{cm}$

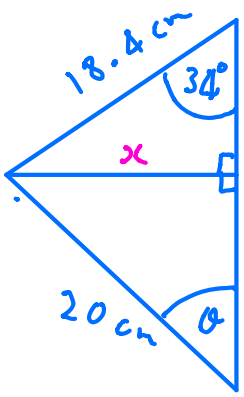
$\sin = \frac{O}{H}$

$\sin\theta = \frac{3}{11.18}$

$\theta = \sin^{-1}\left(\frac{3}{11.18}\right)$

$\theta = 15.6^\circ$

Ex 5



Find θ

$\sin = \frac{O}{H}$

$\sin 34^\circ = \frac{x}{18.4}$

$18.4 \sin 34^\circ = x$

$x = 10.289\text{ cm}$

$\sin = \frac{O}{H}$

$\sin\theta = \frac{10.289}{20}$

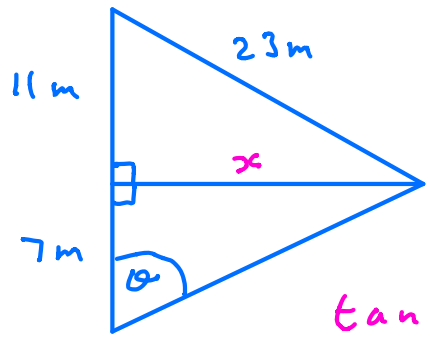
$\theta = \sin^{-1}\left(\frac{10.289}{20}\right)$

$\theta = 30.96^\circ$

$\theta = 31.0^\circ$

Homework

1)



Find θ

Pythagoras

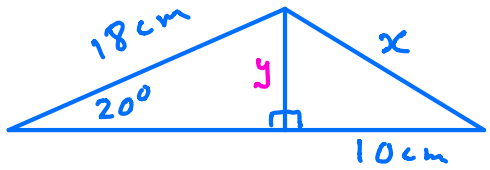
$$x^2 + 11^2 = 23^2$$
$$x^2 = 23^2 - 11^2$$
$$x^2 = 408$$
$$x = \sqrt{408} = 20.20$$

$$\tan\theta = \frac{20.20}{7}$$

$$\theta = \tan^{-1}\left(\frac{20.20}{7}\right)$$

$$\underline{\theta = 70.9^\circ}$$

2)



Find x

$$\sin 20^\circ = \frac{y}{18}$$

$$18\sin 20^\circ = y$$

$$y = 6.156$$

Pythagoras

$$6.156^2 + 10^2 = x^2$$
$$137.896 = x^2$$
$$x = \sqrt{137.896}$$

$$\underline{x = 11.7\text{ cm}}$$