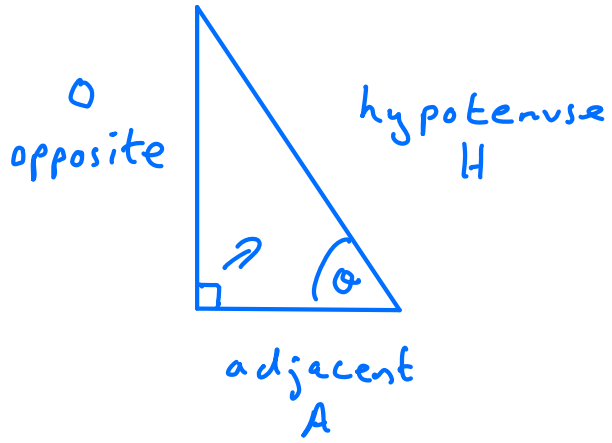
Basic Trigonometry



hypotenuse which is opposite the right angle is always the longest side

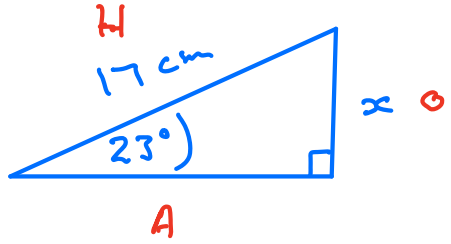
$$\sin = \frac{O}{H} \qquad \cos = \frac{A}{H} \qquad \tan = \frac{O}{A}$$

SOHCAHTOA

These ratios can be used to find a side given another side and an angle

They can be used to find an angle given two sides

Ex1



Find x

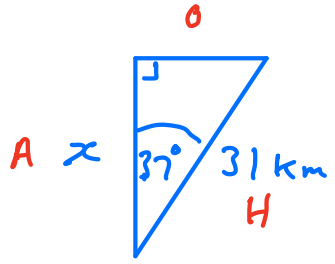
$\sin = \frac{O}{H}$

$\sin 23° = \frac{x}{17}$

$17 \sin 23° = x$

$x = 6.64$ cm

Ex2



Find x

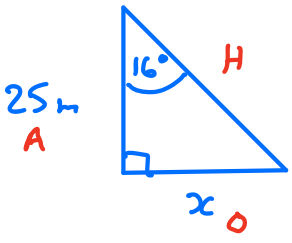
$\cos = \frac{A}{H}$

$\cos 37° = \frac{x}{31}$

$31 \cos 37 = x$

$x = 24.76$ km

Ex3



$\tan = \frac{O}{A}$

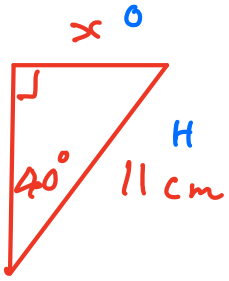
$\tan 16° = \frac{x}{25}$

$25 \tan 16° = x$

$x = 7.17$ m

Exercise Find x

1)



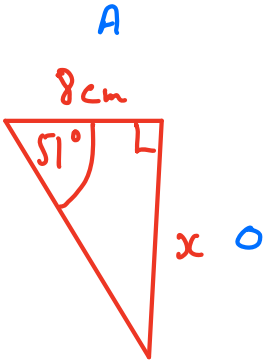
$\sin = \frac{O}{H}$

$\sin 40° = \frac{x}{11}$

$11 \sin 40° = x$

$x = 7.07$ cm

2)



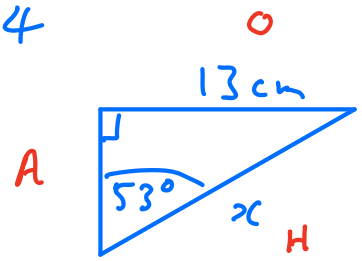
$\tan = \frac{O}{A}$

$\tan 51° = \frac{x}{8}$

$8 \tan 51° = x$

$x = 9.88$ cm

Ex 4



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

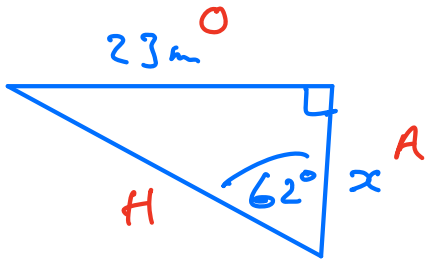
$\sin 53^\circ = \frac{13}{x}$

$x \sin 53^\circ = 13$

$x = \frac{13}{\sin 53^\circ}$

$x = 16.3 \text{ cm}$

Ex 5



$\tan = \frac{O}{A}$

$\tan 62^\circ = \frac{23}{x}$

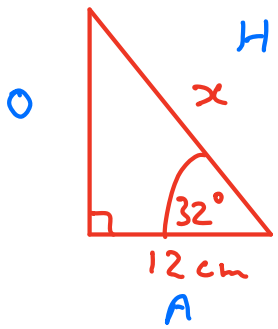
$x \tan 62^\circ = 23$

$x = \frac{23}{\tan 62^\circ}$

$x = 12.23 \text{ m}$

Exercise

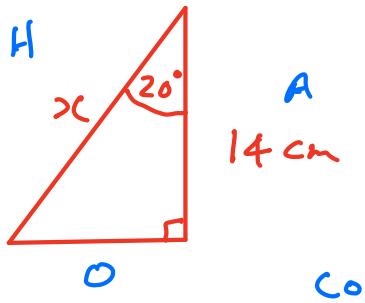
1)



$\cos = \frac{A}{H}$

$\cos 32 = \frac{12}{x}$

2)



$\cos = \frac{A}{H}$

$\cos 20^\circ = \frac{14}{x}$

$x = \frac{14}{}$

$x \cos 32 = 12$

$x = \dfrac{12}{\cos 32^\circ}$

$x = 14.15 \text{ cm}$

$\cos 20$

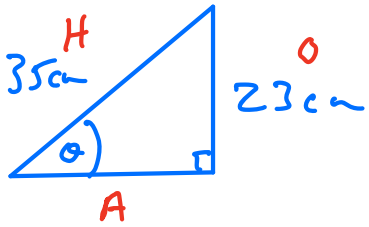
$x \cos 20 = 14$

$x = \dfrac{14}{\cos 20}$

$x = 14.90 \text{ cm}$

Finding Angles

Ex 7



Find θ

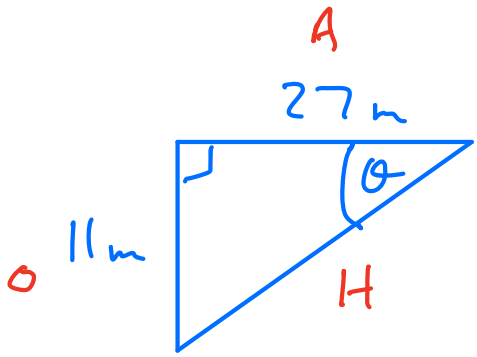
$\sin = \dfrac{O}{H}$

$\sin\theta = \dfrac{23}{35}$

$\theta = \sin^{-1}\left(\dfrac{23}{35}\right)$

$\theta = 41.1^\circ$

Ex 8



Find θ

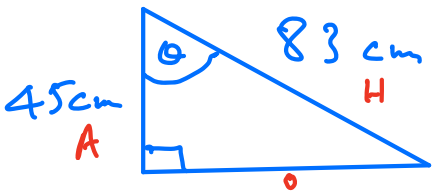
$\tan = \dfrac{O}{A}$

$\tan\theta = \dfrac{11}{27}$

$\theta = \tan^{-1}\left(\dfrac{11}{27}\right)$

$\theta = 22.2^\circ$

Exercise Find θ



$\cos = \dfrac{A}{H}$

$\cos\theta = \dfrac{45}{83}$

$\theta = \cos^{-1}\left(\dfrac{45}{83}\right)$

$\theta = 57.2^\circ$