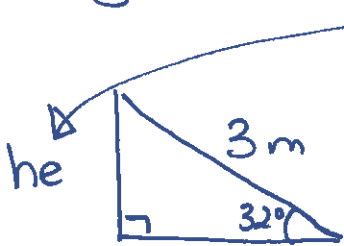


Using Trig to Solve Problems.

Teachers resource to go with student's notes example (supporting evidence from exercise books.)

eg Ladder problem.



$$\sin A = \frac{o}{h}$$

$$3 \times \sin 32 = \frac{he}{3} \times 3$$

Discussion.

Why is it "he"? used "he" for height rather than "h" so not to be confused with hypotenuse (I like to use a meaningful letter but with hindsight "he" probably not the best.)

what do you need to undo to get unknown by itself? $\div 3$

how do you undo? $\times 3$

Why do you multiply by 3? because $\frac{3}{3} = 1$

So if you multiply one side by 3 what must you remember to do?

multiply the other side also by 3

Why?

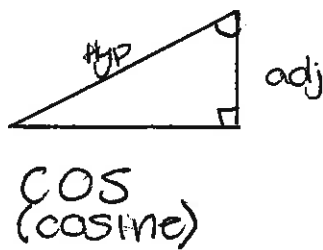
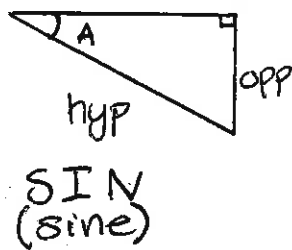
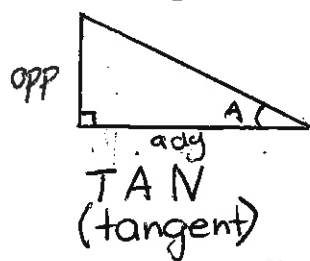
to keep it balanced

algebra tool of simplifying

algebra tool of solving

Trig Ratio

notes



Soh Cah Toa

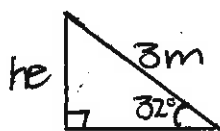
Using Trig To Solve Problems

- you must have a \triangle
- you must memorise

Soh Cah Toa

$$\sin A = \frac{o}{h} \quad \cos A = \frac{a}{h} \quad \tan A = \frac{o}{a}$$

eg. A ladder 3m long is up against a wall. The angle it makes with the ground is 32° . How far up the wall does it reach.



$$\sin A = \frac{o}{h}$$

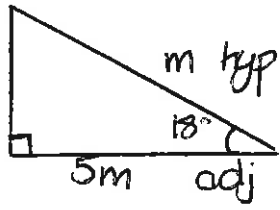
$$3 \times \sin 32 = \frac{he}{3}$$

$$he = 1.59\text{m (2dp)}$$

Steps:

- Draw a diagram (if needed)
- Label/name the sides that have a letter/# on it.
- Decide on trig. ratio and write it down.
- Substitute in info
- use algebra to solve for the unknown.

eg 2.



$$\cos A = \frac{a}{h}$$

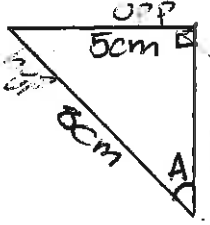
$$\cos 18^\circ = \frac{5}{m}$$

$$m \times \cos 18^\circ = 5$$

$$m = \frac{5}{\cos 18^\circ}$$

$$m = 5.26 \text{ m (2dp)}$$

eg 3.



$$\sin A = \frac{o}{h}$$

$$\sin(A) = \left(\frac{5}{8}\right) \sin^{-1}$$

$$A = \sin^{-1}\left(\frac{5}{8}\right)$$

$$A = 38.7^\circ \text{ (1dp)}$$

$$\cos A = \frac{a}{h}$$

$$\cos A = \frac{8}{10}$$

$$A = \cos^{-1} \left(\frac{8}{10} \right)$$

$$A = 36.87$$

$$\cos A = \frac{a}{h}$$

$$\cos A = \frac{8}{11}$$

$$A = \cos^{-1} \left(\frac{8}{11} \right)$$

$$A = 43.34$$

$$\cos A = \frac{a}{h}$$

$$12 \times \cos 42 = \frac{a}{12} \times 12$$

$$a = 8.92$$

$$\cos A = \frac{a}{h}$$

$$12 \times \cos 44 = \frac{a}{12} \times 12$$

$$12 \times \cos 44 = \frac{a}{12} \times 12$$

$$a = 12.51$$

$$\cos 44 = \frac{a}{h}$$

$$\cos 43 = \frac{5}{e} \times e$$

$$e \times \cos 43 = \frac{5}{\cos 43}$$

$$e = 6.84$$

$$\cos 59 = \frac{5}{e} \times e$$

$$e \times \cos 59 = \frac{5}{\cos 59}$$

$$e = 9.71$$

$$\cos 49 = \frac{9}{e} \times e$$

$$e \times \cos 49 = \frac{9}{\cos 49}$$

$$e = 13.72$$

$$\cos 51 = \frac{4}{e} \times e$$

$$e \times \cos 51 = \frac{4}{\cos 51}$$

$$e = 6.36$$

$$\cos 55 = \frac{9}{e} \times e$$

$$e \times \cos 55 = \frac{9}{\cos 55}$$

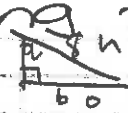
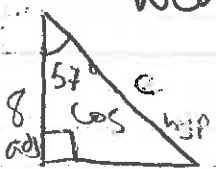
$$e = 15.69$$

$$12 \times \cos 44 = \frac{5}{12} \times 12$$

$$12 \times \cos 44 = \frac{5}{12} \times 12$$

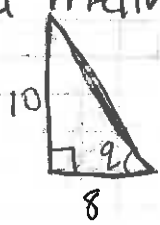
$$d = 6.95$$

Working to go with a mathematics exercise

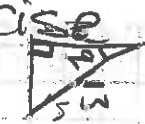


$\sin A = \frac{a}{c}$
 $\sin q = \frac{a}{c}$
 $\sin^{-1}(\frac{a}{c})$

$q = 48.6$
 $\sin q = \frac{6}{8}$



$\tan A = \frac{a}{b}$
 $\tan q = \frac{10}{8}$
 $\tan^{-1}(\frac{10}{8})$
 $q = 51.34^\circ$



$\cos A = \frac{a}{c}$
 $\cos q = \frac{10}{13}$
 $\cos^{-1}(\frac{10}{13})$
 $q = 39.12^\circ$

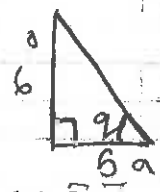
$\cos A = \frac{a}{c}$

$e \cdot \cos 57 = 8$ remove $\cdot e$

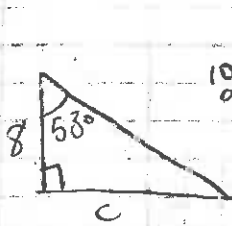
~~scribbles~~

$e \cdot \cos 57 = 8$ remove $\cdot e$
 $\cos 57 = \frac{8}{e}$

$e = 14.69$



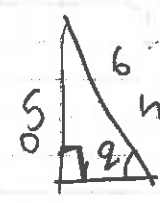
$\tan A = \frac{a}{b}$
 $\tan q = \frac{6}{5}$
 $\tan^{-1}(\frac{6}{5})$
 $q = 50.19$



$\tan A = \frac{a}{b}$
 $\tan q = \frac{4}{10}$
 $\tan^{-1}(\frac{4}{10})$
 $q = 21.80$

$\tan A = \frac{a}{b}$

$\sin A = \frac{a}{c}$



$\sin A = \frac{a}{c}$
 $\sin q = \frac{5}{6}$
 $\sin^{-1}(\frac{5}{6})$
 $q = 56.44$

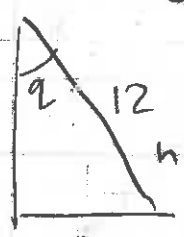
$\tan 53 = \frac{c}{8}$

$8 \times \tan 53 = c$

$c = 10.62$

$q = 65.38$

$\sin 56 = \frac{10}{e}$ remove $\cdot e$

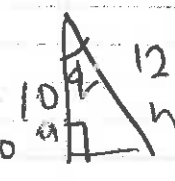


$\sin q = \frac{8}{9}$

$\sin^{-1}(\frac{8}{9})$

$q = 62.73$

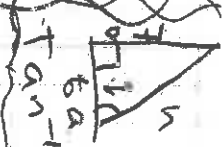
$q = 33.56^\circ$



$\cos A = \frac{a}{c}$

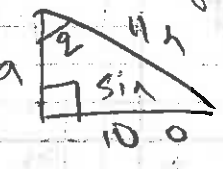
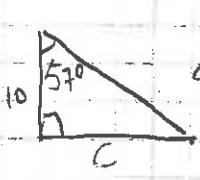
$\cos q = \frac{10}{12}$

$\cos^{-1}(\frac{10}{12})$

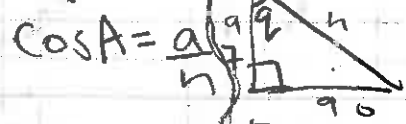


$\tan A = \frac{a}{b}$
 $\tan q = \frac{10}{17}$

$\tan^{-1}(\frac{10}{17})$
 $q = 49.4^\circ$

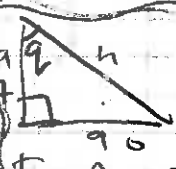


$\tan A = \frac{a}{b}$
 $\sin A = \frac{a}{c}$
 $\sin q = \frac{10}{11}$



$\cos A = \frac{a}{c}$
 $\cos q = \frac{9}{12}$

$\cos^{-1}(\frac{9}{12})$



$\tan A = \frac{a}{b}$
 $\tan q = \frac{9}{7}$

$\tan^{-1}(\frac{9}{7})$

$10 \times \tan 57 = \frac{c}{10}$

$10 \times \tan 57 = c$ $c = 15.4$

$q = 52.13^\circ$