Use sine, cosine and tangent to find missing angles

1 Complete the calculations.

a) $\sin 30° = 0.5$

$\sin^{-1} 0.5 =$ 30 °

b) $\cos 60° = 0.5$

$\cos^{-1} 0.5 =$ 60 °

c) $\tan 45° = 1$

$\tan^{-1} 1 =$ 45 °

d) $\sin 90° = 1$

$\sin^{-1} 1 =$ 90 °

2 Which calculation would work out the value of θ? Tick your answers.

a) $\sin\theta = 0.8$

$\sin 0.8$	$\cos 0.8$	$\tan 0.8$	✓ $\sin^{-1} 0.8$	$\cos^{-1} 0.8$	$\tan^{-1} 0.8$

b) $\cos\theta = 0.45$

$\sin 0.45$	$\cos 0.45$	$\tan 0.45$	$\sin^{-1} 0.45$	✓ $\cos^{-1} 0.45$	$\tan^{-1} 0.45$

c) $\tan\theta = 1.4$

$\sin 1.4$	$\cos 1.4$	$\tan 1.4$	$\sin^{-1} 1.4$	$\cos^{-1} 1.4$	✓ $\tan^{-1} 1.4$

3 Use your calculator to find the value of θ to the nearest degree.

a) $\sin\theta = 0.2$

$\theta =$ 12 °

b) $\cos\theta = 0.15$

$\theta =$ 81 °

c) $\tan\theta = 1.7$

$\theta =$ 60 °

d) $\sin\theta = 0.6$

$\theta =$ 37 °

e) $\tan\theta = \frac{8}{5}$

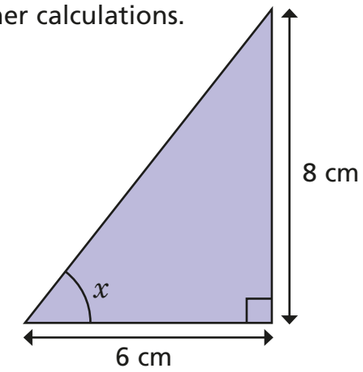
$\theta =$ 58 °

f) $\cos\theta = \frac{2}{7}$

$\theta =$ 73 °

4 Alex is calculating the size of angle x.

Here are her calculations.



$$\tan x = \frac{6}{8}$$

$$x = \tan \frac{6}{8}$$

$$x = 0.01°$$

a) Alex has made two mistakes. Explain each mistake.

Mistake 1 She has done adjacent divided by opposite rather than opposite divided by adjacent.

Mistake 2 She hasn't used $\tan^{-1}$

b) Find the size of angle x to the nearest degree.

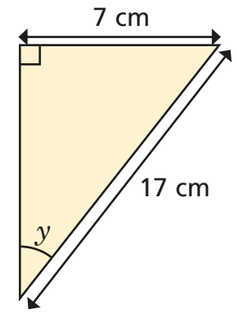
$x =$ 53°

c) How could Alex have noticed her answer was incorrect when checking her solutions? Discuss it with a partner.

5 **a)** Work out the size of the angle marked y.

Give your answer to 1 decimal place.

$\sin y = \frac{7}{17}$



$y =$ 24·3 °

b) Ron says, "To find the other angle, I'd need to use trigonometry again."

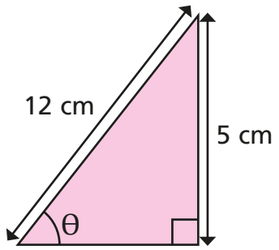
Do you agree? No

Discuss it with a partner.

6 Find the size of angle θ in each triangle.

Give your answers to the nearest degree.

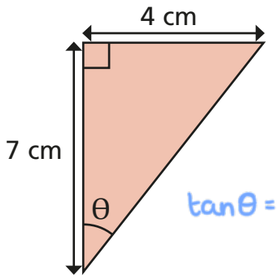
a)



$\sin\theta = \frac{5}{12}$

$\theta =$ 25 °

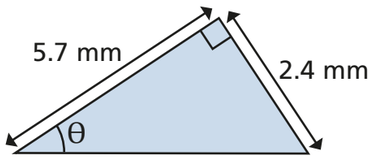
b)



$\tan\theta = \frac{4}{7}$

$\theta =$ 30 °

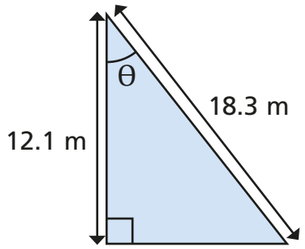
c)



$\tan\theta = \frac{2.4}{5.7}$

$\theta =$ 23 °

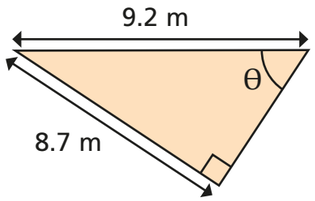
d)



$\cos\theta = \frac{12.1}{18.3}$

$\theta =$ 49 °

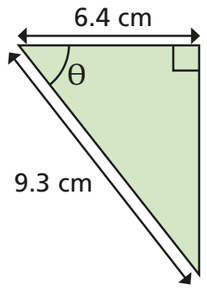
e)



$\sin\theta = \frac{8.7}{9.2}$

$\theta =$ 71 °

f)



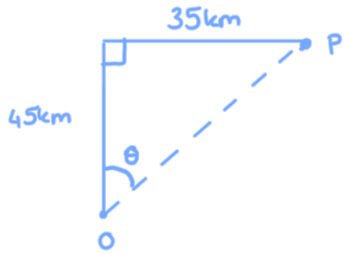
$\cos\theta = \frac{6.4}{9.3}$

$\theta =$ 47 °

7 A ship sets sail north from point O.

It sails for 45 km then turns due east and sails for 35 km to point P.

a) Draw a sketch of the right-angled triangle formed by the path that the ship takes, and the line segment OP.

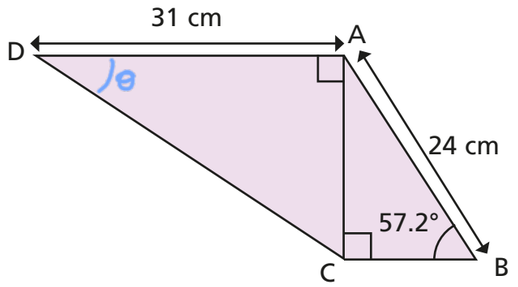


b) What is the bearing of point P from point O?

Give your answer to the nearest degree.

038°

8 Work out the size of angle ADC.



$\sin 57.2 = \frac{AC}{24}$

$AC = 20.1735\,9848$

$\tan\theta = \frac{AC}{31}$

33.1°