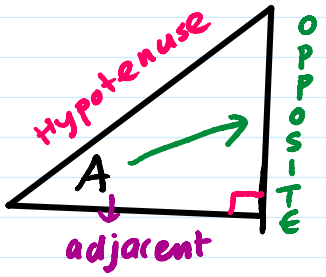
Solving right angled triangles

26 February 2020 12:45

Method

1) Label the sides in relation to the given angle

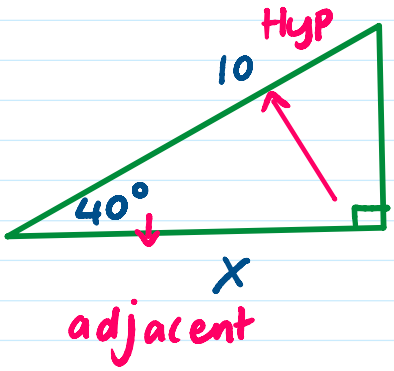


2) Using the sides find which trig ratio to use

Sin = O/H Cos = A/H Tan = O/A

3) Using the trig ratio, the given angle and the sides given and needed - make an equation

Eg 1) Find the value of x



Trig ratio

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

$\cos 40^\circ = \frac{x}{10}$ Equation

$10 \cos 40^\circ = x$

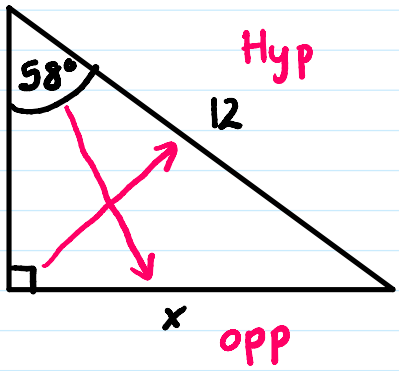
$7.66 = x$

Eg 2) Find x

Hyp

Trig ratio

$\frac{O}{}$



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

$\sin 58^\circ = \frac{x}{12}$

$12 \sin 58 = x$

$10.18 = x$

Pg 441 Q 3

T&Th 22.4
Solving rig...

T&Th 22.4
Solving rig...

Trigonometry

chapter 22

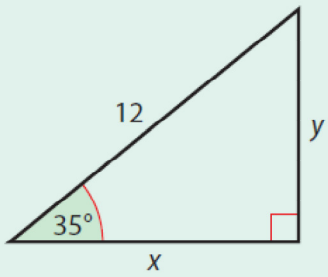
440

Section 22.4 Solving right-angled triangles

Example 1

Find the lengths of the sides marked x and y in the given triangle.

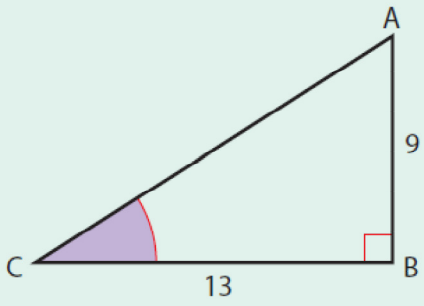
Give your answers correct to 1 decimal place.



Example 2

In the given triangle, $|AB| = 9$ and $|BC| = 13$.

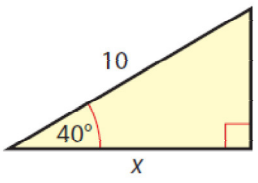
Find $|\angle ACB|$, correct to the nearest degree.



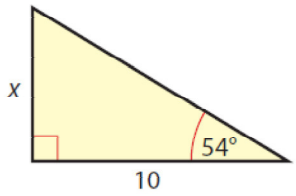
Exercise 22.4

1. Write down which trigonometric ratio is needed to calculate the length of the side marked x in each of these triangles:

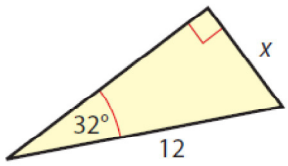
(i)



(ii)

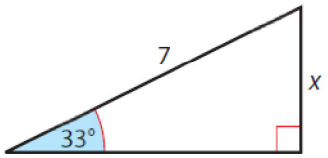


(iii)

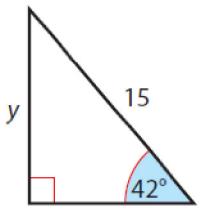


2. In each of the following triangles, work out the length of the side marked with a letter.
Give each answer correct to 1 decimal place.

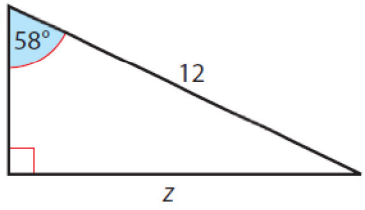
(i)



(ii)

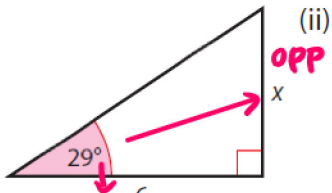


(iii)



3. Find the length of the side marked *x* in these triangles.
Give your answers correct to one decimal place.

(i)

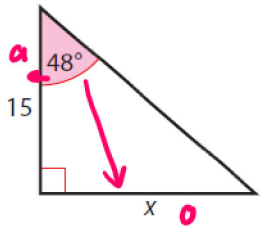


$\tan 29 = \frac{x}{6}$

$6 \tan 29 = x$

$3 \cdot 3 = x$

(ii)

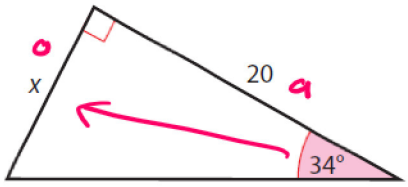


$\frac{15}{15} \tan 48 = \frac{x}{15}$

$15 \tan 48 = x$

$16.7 = x$

(iii)



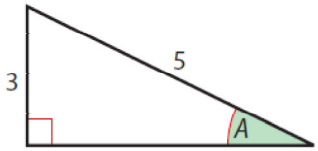
$\frac{20}{20} \tan 34 = \frac{x}{20}$

$20 \tan 34 = x$

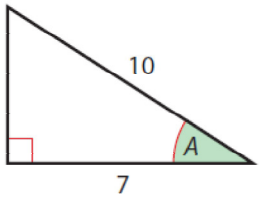
$13.5 \quad x$

4. Find the size of the angle marked A in each of these triangles.
Give your answers correct to the nearest degree.

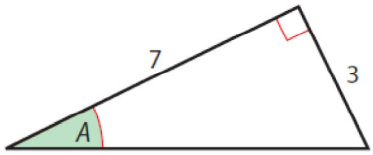
(i)



(ii)



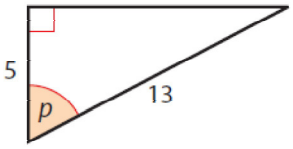
(iii)



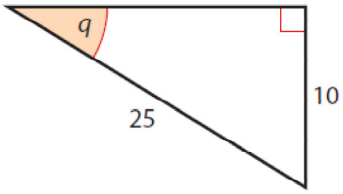
HW

5. Find the measure of the angles marked p, q and r in each of these triangles.
Give each answer correct to the nearest degree.

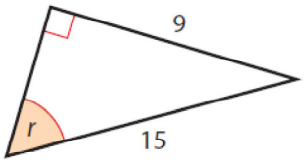
(i)



(ii)



(iii)

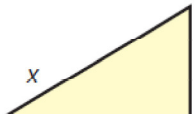


HW

6. Copy and complete the following to find the length of the side marked x.

$$\frac{8}{x} = \cos 32°$$

$$x \times \cos 32° = 8$$



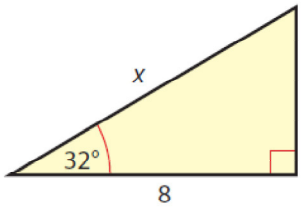
HTW

6. Copy and complete the following to find the length of the side marked x.

$$\frac{8}{x} = \cos 32°$$

$$x \times \cos 32° = 8$$

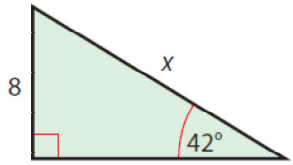
$$x = \frac{8}{\cos 32°}$$



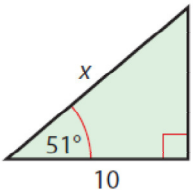
Give your answer correct to 1 decimal place.

7. Find the length of the hypotenuse marked x in each of these triangles:

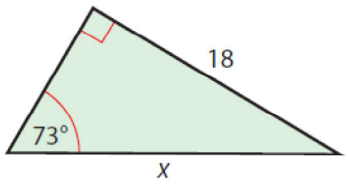
(i)



(ii)

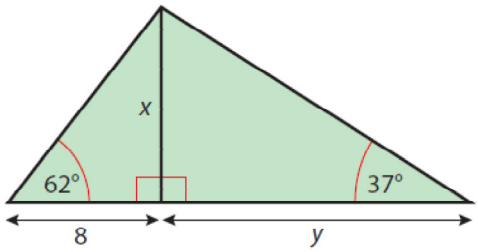


(iii)

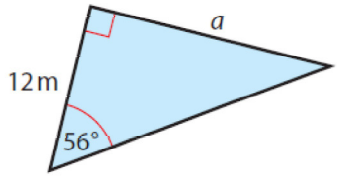


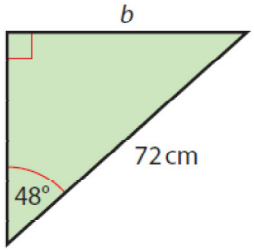
Give each answer correct to 1 decimal place.

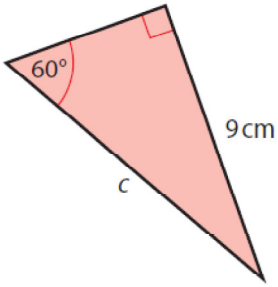
8. Find the values of x and y, correct to the nearest whole number, in the given triangle.



9. Work out the length of the side marked with a letter in each of the following triangles. Give each answer correct to 1 decimal place.



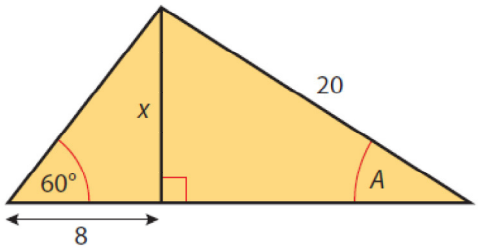




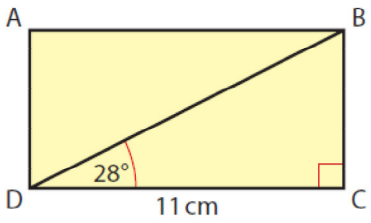
10. In the given triangle, find

(i) x, correct to 1 decimal place

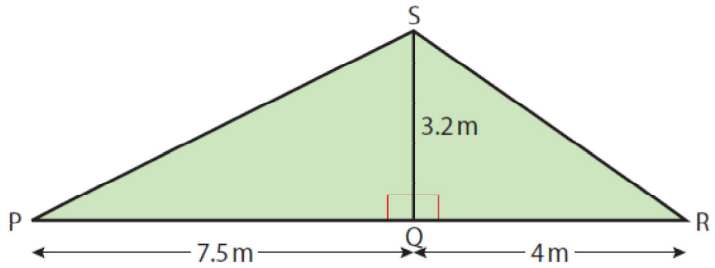
(ii) the angle A, correct to the nearest degree.



11. ABCD is a rectangle as shown.
If $|DC| = 11$ cm and $|\angle BDC| = 28°$, find the length of the diagonal [DB].
Give your answer in centimetres, correct to one decimal place.



12. The diagram represents the frame, PQRS, of a roof.



$|PQ| = 7.5$ m, $|QR| = 4$ m and $|SQ| = 3.2$ m.

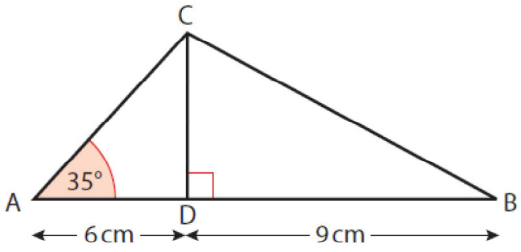
(i) Calculate the length of [PS].

(ii) Find $|\angle SRQ|$, correct to the nearest degree.

13. In the given diagram, $|AD| = 6$ cm, $|DB| = 9$ cm, $|\angle CAD| = 35°$ and $CD \perp AB$.

Find (i) $|CD|$, correct to 1 decimal place

(ii) $|\angle CBD|$, correct to the nearest degree.



Answers

Exercise 22.4

1. (i) Cos (ii) Tan (iii) Sin
2. (i) 3.8 (ii) 10.0 (iii) 10.2
3. (i) 3.3 (ii) 16.7 (iii) 13.5
4. (i) 37° (ii) 46° (iii) 23°
5. (i) 67° (ii) 24° (iii) 37°
6. $x = 9.4$
7. (i) 12.0 (ii) 15.9 (iii) 18.8
8. $x = 15, y = 20$
9. $a = 17.8\,\text{m}, b = 53.5\,\text{cm}, c = 10.4\,\text{cm}$
10. (i) 13.9 (ii) 44°
11. 12.5 cm
12. (i) 8.2 m (ii) 39°
13. (i) 4.2 cm (ii) 25°