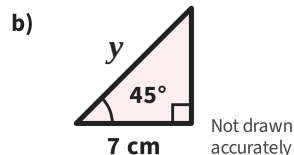
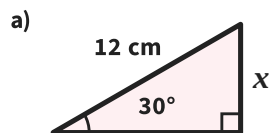


1 Exact trig values

Without a calculator, find the exact lengths x and y .



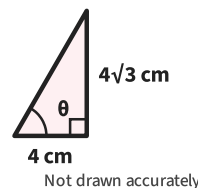
$$a) x = 12 \sin 30^\circ = 12 \times \frac{1}{2} = 6 \text{ cm}$$

$$b) y = 7 \div \cos 45^\circ = 7 \div \frac{1}{\sqrt{2}} = 7\sqrt{2} \text{ cm}$$

2 Exact trig values

Do not use a calculator.

- a) Work out the exact value of $4 \sin 60^\circ \times \tan 30^\circ$.
b) Find the angle θ .



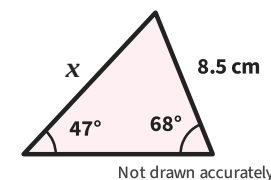
$$a) 4 \times \frac{\sqrt{3}}{2} \times \frac{1}{\sqrt{3}} = 2$$

$$b) \tan \theta = \frac{4\sqrt{3}}{4} = \sqrt{3}, \theta = 60^\circ$$

3 Sine rule: finding a side

Give each answer to 1 decimal place.

- a) Find the length x .
b) Find the perimeter of the triangle.



$$a) x = \frac{8.5 \sin 68^\circ}{\sin 47^\circ} = 10.8 \text{ cm}$$

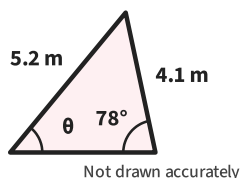
$$\text{third angle } 65^\circ, \text{ side } \frac{8.5 \sin 65^\circ}{\sin 47^\circ} = 10.53$$

$$b) 8.5 + 10.78 + 10.53 = 29.8 \text{ cm}$$

4 Sine rule: finding an angle

The diagram shows a roof frame.

- a) Find the angle θ to 1 decimal place.
b) Find the length of the third side to 2 decimal places.



$$a) \sin \theta = 4.1 \sin 78^\circ \div 5.2, \theta = 50.5^\circ$$

$$\text{third angle } 180 - 78 - 50.46 = 51.54^\circ$$

$$b) 5.2 \sin 51.54^\circ \div \sin 78^\circ = 4.16 \text{ m}$$

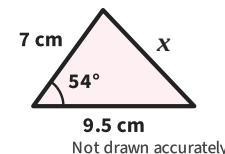
Pythagoras' theorem and trigonometry 2

revision mat answers

Higher A

5 The cosine rule

- a) Find x to 1 decimal place.
b) From a camp, Ayo walks 6 km on a bearing of 040° .
Bea walks 8 km on a bearing of 115° . How far apart are they?

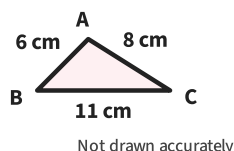


$$a) x^2 = 7^2 + 9.5^2 - 2 \times 7 \times 9.5 \cos 54^\circ, x = 7.8 \text{ cm}$$

$$b) \text{angle } 115 - 40 = 75^\circ, \sqrt{6^2 + 8^2 - 96 \cos 75^\circ} = 8.7 \text{ km}$$

6 The cosine rule

- a) Which angle of triangle ABC is the largest?
Explain how you know.
b) Find the largest angle to 1 decimal place.

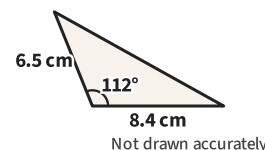


$$a) \text{angle } BAC, \text{ opposite the longest side}$$

$$b) \cos A = \frac{8^2 + 6^2 - 11^2}{2 \times 8 \times 6} = \frac{-21}{96}, A = 102.6^\circ$$

7 Area of a triangle: $\frac{1}{2}ab \sin C$

- a) Find the area of this triangle to 1 decimal place.
b) Triangle PQR has area 30 cm^2 .
PQ = 8 cm, PR = 11 cm and angle QPR is acute.
Find angle QPR.



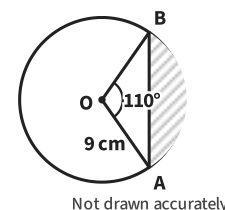
$$a) \frac{1}{2} \times 8.4 \times 6.5 \times \sin 112^\circ = 25.3 \text{ cm}^2$$

$$b) 44 \sin P = 30, P = \sin^{-1}\left(\frac{30}{44}\right) = 43.0^\circ$$

8 Area of a triangle: $\frac{1}{2}ab \sin C$

O is the centre of the circle.
Give each answer to 1 decimal place.

- a) Find the area of triangle AOB.
b) Find the area of the shaded segment.



$$a) \frac{1}{2} \times 9 \times 9 \times \sin 110^\circ = 38.1 \text{ cm}^2$$

$$\text{sector } \frac{110}{360} \times \pi \times 9^2 = 77.75 \text{ cm}^2$$

$$b) 77.75 - 38.06 = 39.7 \text{ cm}^2$$