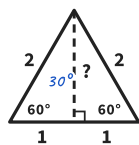


Exact Trigonometric Values

ANSWERS

1

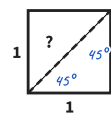
Cut each shape in half. Find the missing side ? by Pythagoras. Leave it as a surd.
Half of a triangle with sides of 2



$$? = \sqrt{2^2 - 1^2}$$

$$? = \sqrt{3}$$

Half of a square with sides of 1

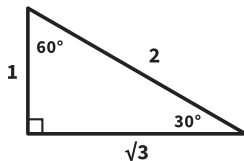


$$? = \sqrt{1^2 + 1^2}$$

$$? = \sqrt{2}$$

2

Use the triangle to write the exact value of $\cos 60^\circ$.

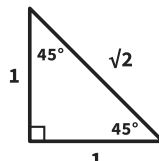


$$\cos 60^\circ = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{1}{2}$$

$$\cos 60^\circ = \frac{1}{2}$$

3

Use the triangle to write the exact value of $\tan 45^\circ$.

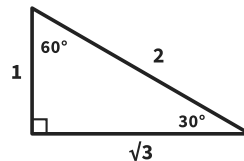


$$\tan 45^\circ = \frac{\text{opposite}}{\text{adjacent}} = \frac{1}{1}$$

$$\tan 45^\circ = 1$$

4

Use the triangle to write the exact value of $\cos 30^\circ$.

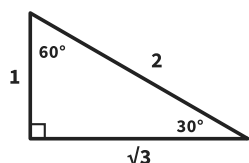


$$\cos 30^\circ = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{\sqrt{3}}{2}$$

$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$

5 Notice the change!

Use the triangle to write the exact value of $\sin 60^\circ$.

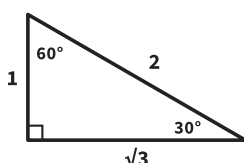


$$\sin 60^\circ = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{\sqrt{3}}{2}$$

$$\sin 60^\circ = \frac{\sqrt{3}}{2}$$

6

Use the triangle to write the exact value of $\tan 60^\circ$.



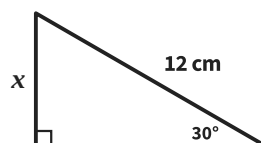
$$\tan 60^\circ = \frac{\text{opposite}}{\text{adjacent}} = \frac{\sqrt{3}}{1}$$

$$\tan 60^\circ = \sqrt{3}$$

7

Notice the change!

Find x. Use an exact value, not a calculator.



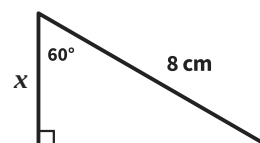
$$x = 12 \times \sin 30^\circ$$

$$= 12 \times \frac{1}{2}$$

$$x = 6 \text{ cm}$$

8

Find x. Use an exact value, not a calculator.



$$x = 8 \times \cos 60^\circ$$

$$= 8 \times \frac{1}{2}$$

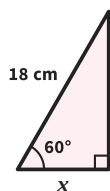
$$x = 4 \text{ cm}$$

Exact Trigonometric Values further practice

ANSWERS

9

Find x. Use an exact value, not a calculator.



$$x = 18 \times \cos 60^\circ$$

$$= 18 \times \frac{1}{2}$$

$$x = 9 \text{ cm}$$

10

Work out the value of $6 \sin 30^\circ + 4 \tan 45^\circ$

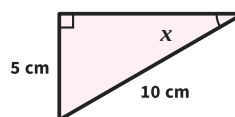
Do not use a calculator.

$$6 \times \frac{1}{2} + 4 \times 1$$

$$\text{Answer } 7$$

11

Find angle x without a calculator.

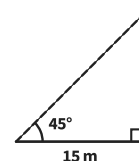


$$\sin x = 5 \div 10 = \frac{1}{2}$$

$$x = 30^\circ$$

12

From a point on level ground 15 m from the foot of a tower, the angle up to the top of the tower is 45° . How tall is the tower?



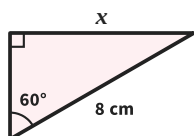
$$\tan 45^\circ = 1$$

$$\text{height} = 15 \times \tan 45^\circ$$

$$\text{Answer } 15 \text{ m}$$

13

Find x. Give your answer as an exact value.



$$x = 8 \times \sin 60^\circ$$

$$= 8 \times \frac{\sqrt{3}}{2}$$

$$x = 4\sqrt{3} \text{ cm}$$

14

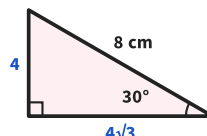
A straight zip wire makes an angle of 30° with the level ground. It drops 12 m from top to bottom. How long is the zip wire? Do not use a calculator.

$$\text{length} = 12 \div \sin 30^\circ = 12 \div \frac{1}{2}$$

$$\text{Answer } 24 \text{ m}$$

15

Find the exact area of the triangle. Give your answer in the form $a\sqrt{3}$.



$$\text{height} = 8 \times \sin 30^\circ = 4$$

$$\text{base} = 8 \times \cos 30^\circ = 4\sqrt{3}$$

$$\text{Area } 8\sqrt{3} \text{ cm}^2$$

16

Jo says $\sin 60^\circ = 2 \times \sin 30^\circ$ because 60 is double 30. Is Jo right? Explain using exact values.

$$\sin 60^\circ = \frac{\sqrt{3}}{2} \div 2, \text{ about } 0.87$$

$$2 \times \sin 30^\circ = 2 \times \frac{1}{2} = 1$$

$$\text{Answer } \text{No, } \frac{\sqrt{3}}{2} \div 2 \text{ is not } 1$$