

Worksheet: Trigonometric Ratios: Sine, Cosine and Tangent

This worksheet has questions about the trigonometric ratios sine, cosine and tangent. These ratios are **properties** of the angles in a right-angled triangle which are related to the length of its sides.

Model answers to
this sheet



Trigonometric Ratios
study guide



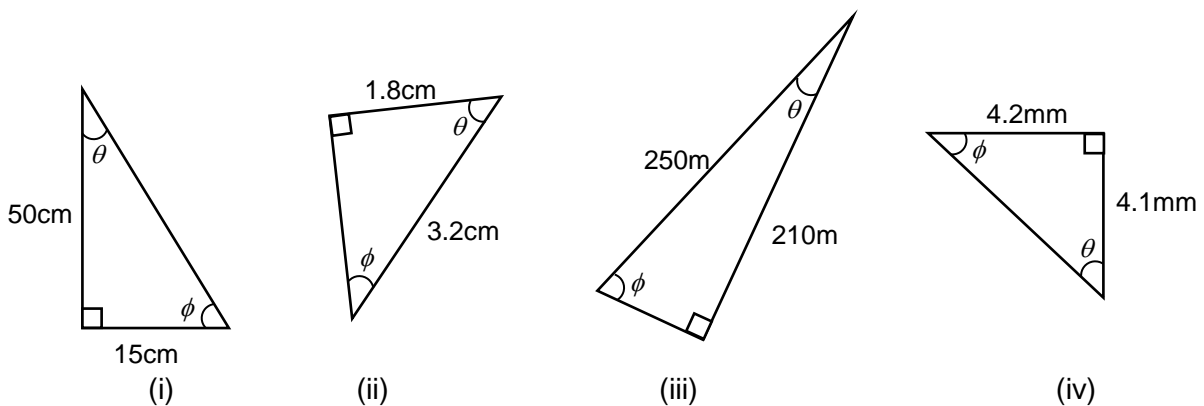
1. In a right-angled triangle the trigonometric ratios are defined as:

$$\text{sine of an angle} = \frac{\text{length of side **opposite** to the angle}}{\text{length of the **hypotenuse**}}$$

$$\text{cosine of an angle} = \frac{\text{length of side **adjacent** to the angle}}{\text{length of the **hypotenuse**}}$$

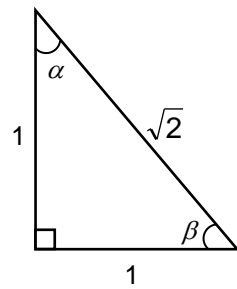
$$\text{tangent of an angle} = \frac{\text{length of side **opposite** to the angle}}{\text{length of side **adjacent** to the angle}}$$

Given this, decide which quantities, the sine, cosine or tangent of the angles θ and ϕ you can calculate in the following triangles. Calculate the appropriate ratios to 2 decimal places.

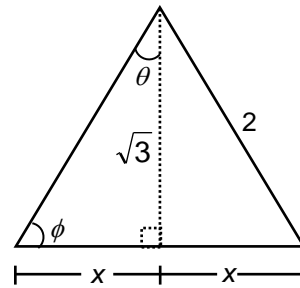


2. Use the inverse trigonometric functions to find the **values** of the angles θ and ϕ in question 1.

3. This question relates to the two triangles below.



(i)



(ii)

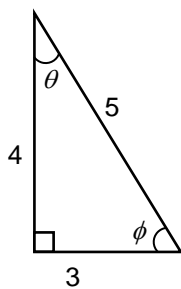
- (a) Given that triangle (i) is an isosceles triangle, what are the values of the two angles α and β ?
- (b) Given that triangle (ii) is an equilateral triangle, what are the values of the angles θ and ϕ and the length x ?
- (c) Use the trigonometric ratios to find the values of the following trigonometric ratios, giving your answers as square roots where appropriate:

$\sin 45^\circ$, $\cos 45^\circ$, $\tan 45^\circ$,

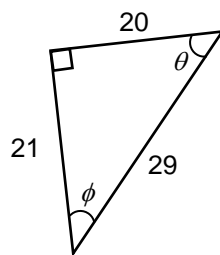
$\sin 30^\circ$, $\cos 30^\circ$, $\tan 30^\circ$,

$\sin 60^\circ$, $\cos 60^\circ$, $\tan 60^\circ$.

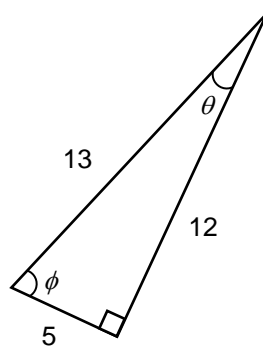
4. Calculate the sine, cosine and tangent of the angles θ and ϕ in the following Pythagorean Triple triangles giving your answers to 2 decimal places.



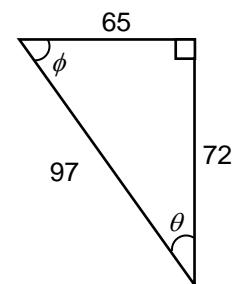
(i)



(ii)



(iii)



(iv)

5. Use the inverse trigonometric functions to find the **values** of the angles θ and ϕ in question 4.



This worksheet is one of a series on mathematics produced by the Learning Enhancement Team.

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