

4.2 Trig Basic

Name: _____ Class: _____ Date: _____

KEY WORDS hypotenuse

<!-- Session 2 native-skill companion -->

Objective

Practise trig basic within the labelled native lessons. Public original tasks; locally authored answer guidance.

1 Key knowledge and worked examples

■ Right triangles and non-right triangles · Foundation

Use Pythagoras in a right triangle and use sine, cosine or tangent with the sides labelled relative to the chosen angle.

$$a^2 + b^2 = c^2, \quad \tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

The ladder length is $c = \sqrt{3^2 + 4^2} = 5$ m. Its angle to the ground satisfies $\tan \theta = 4/3$, so $\theta \approx 53.1^\circ$. A right triangle with legs 6 and 8 has area $6 \times 8 / 2 = 24$.

Label sides relative to the chosen angle. Pythagoras needs a right angle. A calculator angle mode error can produce a plausible but wrong result. Keep unrounded values for later steps.

This Foundation/Core lesson uses right-angled triangles only. Sine and cosine rules for non-right triangles belong to the advanced-tier lesson.

■ Right triangles and non-right triangles · Higher

In a right triangle $a^2 + b^2 = c^2$; $\sin \theta = \text{opposite} / \text{hypotenuse}$, $\cos \theta = \text{adjacent} / \text{hypotenuse}$ and $\tan \theta = \text{opposite} / \text{adjacent}$. For other triangles, use the sine or cosine rule, or $\text{area} = ab \sin C / 2$.

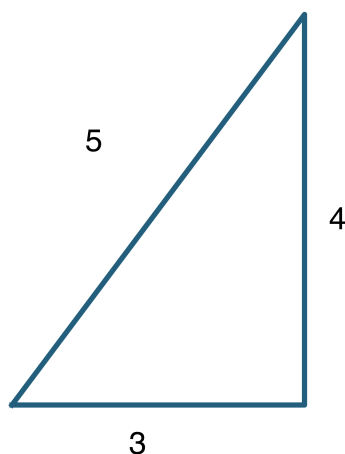
$$a^2 + b^2 = c^2, \quad \tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

The ladder length is $c = \sqrt{3^2 + 4^2} = 5$ m. Its angle to the ground satisfies $\tan \theta = 4/3$, so $\theta \approx 53.1^\circ$. With two sides 6 and 8 enclosing 60° , $c^2 = 6^2 + 8^2 - 2 \times 6 \times 8 \cos 60^\circ = 52$.

Label sides relative to the chosen angle. Pythagoras needs a right angle. A calculator angle mode error can produce a plausible but wrong result. Keep unrounded values for later steps.

Use a plan or elevation for a three-dimensional problem before applying a triangle rule. Explain why the chosen triangle contains the required length or angle.

Label the known sides before choosing a rule



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 (Foundation) Find the hypotenuse when the legs are 3 and 4.

2.2 (Foundation) Find $\sin\theta$ when opposite=3 and hypotenuse=5.

2.3 (Foundation) Two sides 6 and 8 enclose 90° . Find their area.

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: Pythagoras applies to every triangle, including triangles without a right angle.

Solutions

2.1 Pythagoras gives $\sqrt{(3^2+4^2)}=5$.

2.2 $\text{Sine}=\text{opposite}/\text{hypotenuse}=3/5=0.6$.

2.3 The sides are perpendicular, so $\text{area}=6\times 8/2=24$.

3.1 False. An equilateral triangle of side 1 has $1^2+1^2=2\neq 1^2$. Pythagoras requires a right angle and identifies the opposite hypotenuse.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.