

Solving For Missing Angles
Algebra I

SOH CAH TOA

Today we will learn how to use right triangle trigonometry to find missing angles of a right triangle. In the first exercise, though, we will review how to solve for a missing side using trigonometry.

Exercise #1: Find the length of \overline{AB} to the nearest tenth.

$$\cos 32^\circ = \frac{AB}{125}$$

$$\times 125$$

$$0.8480 \dots = \frac{AB}{125}$$

$AB = 106.0$

hyp
reference angle
opp

May 6-3:20 PM

Solving for a Missing Angle – The process for finding a missing angle in a right triangle is very similar to that of finding a missing side. The key is to identify a trigonometric ratio that can be set up and then use the inverse trigonometric functions to solve for that angle.

From Friday.....

Exercise #2: Solve for $m\angle B$ to the nearest degree.

$$\sin \angle B = \frac{3}{5}$$

$$\angle B = \sin^{-1}\left(\frac{3}{5}\right)$$

$$\angle B = 37^\circ$$

hyp
opp
adj

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NEW SKILLS: WORKING WITH ANGLE OF ELEVATION AND DEPRESSION

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When you look up at an airplane flying overhead, the angle between the horizontal and your line of sight is called an **angle of elevation**. When you look down from a cliff to a boat passing by, the angle between the horizontal and your line of sight is called an **angle of depression**.

For more details, see pages 288–289 of *MathWorks 10*.

angle of elevation: the angle formed between the horizontal and the line of sight while looking upward; sometimes referred to as the angle of inclination

angle of depression: the angle formed between the horizontal and the line of sight when looking downward

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BUILD YOUR SKILLS

10. George is in a hot air balloon that is 125 metres high. The angle of elevation from a house below, to the balloon, is 18° . How far is George from the house?

SOH

$$\sin 18^\circ = \frac{125}{x}$$

$$x = \frac{125}{\sin 18^\circ}$$

$$x = 404.5m$$

hyp? = x
house adj
125 opp

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BUILD YOUR SKILLS

4. What is the angle of depression from the top of a 65-metre cliff to an object metres from its base?

65m
48m
hyp

$$\tan \angle C = \frac{65}{48}$$

$$\angle C = \tan^{-1}\left(\frac{65}{48}\right)$$

53.56°

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HOMEWORK

Pg. 305 Q. 11 & 12

Pg. 321 Q. 3

Pg. 327 Q. 5 & 6

Pg. 329 - 330 Q. 8, & 9

Worksheet: Angle of Elevation & Depression

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