

Topic 7.1 Trigonometric Functions and Acute Angles

Essential Question:

How can ratios of lengths of sides within right triangles help determine other lengths and angle measures in the triangles?

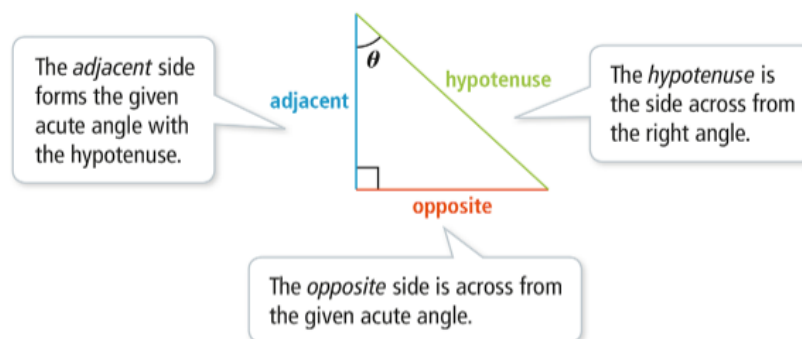
Explore and Reason

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CONCEPT: Trigonometry Ratios

The three sides of a right triangle are referred to as the hypotenuse and two legs.

The Greek letter θ , read "theta", is often used to represent an acute angle in a right triangle. Angle θ is an abbreviation for "angle with measure θ ".



These are the six basic trigonometric functions of the angle θ .

Sine	Cosine	Tangent
$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$	$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$	$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$

The **reciprocal trigonometric functions** of the angle θ are formed by exchanging the terms in each ratio.

Cosecant	Secant	Cotangent
$\csc \theta = \frac{\text{hypotenuse}}{\text{opposite}}$	$\sec \theta = \frac{\text{hypotenuse}}{\text{adjacent}}$	$\cot \theta = \frac{\text{adjacent}}{\text{opposite}}$

Q: What is the key foundation to working with trigonometric functions?

CONCEPT SUMMARY:

SOH

CAH

TOA

NOTES

Examples & Questions

Examples 1

Q: What Strategy can you use to keep the process organized when writing the trigonometric functions?

Q: What relationships can you use to check for accuracy after writing the ratios?

Examples 2

Q: How can you use the values in one trigonometric ratio to determine the lengths of an unknown side of a right triangle?

Examples 3

Q: What assumptions must be made about the positioning of the truck and the building in order to answer the question?

Q: How do you determine the correct trigonometric function to use?

Q: How do you solve an equation involving a trigonometric function?

Examples 4

Part A:

Q: What properties are specific to an isosceles right triangle?

Q: What do you notice about the trigonometric ratios for θ in the isosceles right triangle?

Part B:

Q: What do you know about special right triangles and their side lengths that you can use to evaluate trigonometric functions?

Examples 5

Q: What is the result when you divide 1 by a fraction?

Q: Why is it useful to understand that the two acute angles of a right triangle are complementary?

When using given information about trigonometric functions from a right triangle, what strategies can you use to verify relationships?

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Lesson Quiz 7.1