13.1. Advanced Algebra

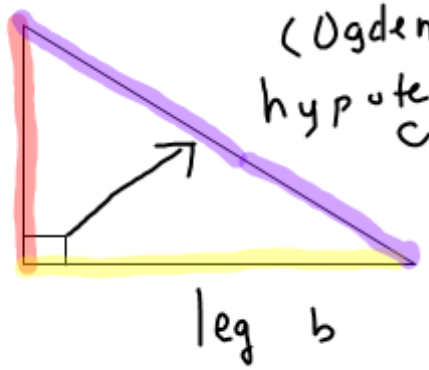
DATE: 4/25

Right Δ Trigonometry (Part 1)

Target 9A. Solve right triangles and extend knowledge of sine, cosine, and tangent ratios to their respective reciprocals.

$a^2 + b^2 = c^2$

a leg, b leg, c hyp.



(Ogden)
hypotenuse : c

1. Always the longest side
2. Always across from 90° ∠.

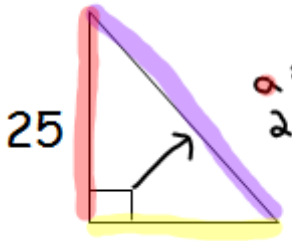
Pythagorean Theorem Review: When given two sides of a right triangle, the third side can be found using the Pythagorean Theorem, $a^2 + b^2 = c^2$, where a and b are legs and c is the hypotenuse.

Find the missing side of each of the following right triangles to the nearest tenth.

$a^2 + b^2 = c^2$, where a and b are legs and c is the hypotenuse.

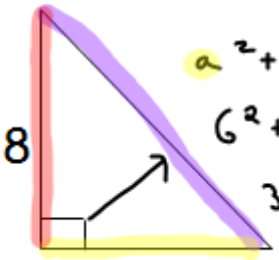
Find the missing side of each of the following right triangles to the nearest tenth.

1.



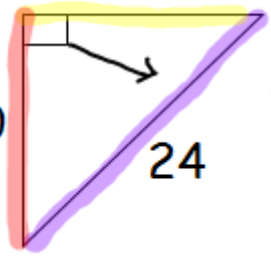
$a^2 + b^2 = c^2$
$25^2 + 8^2 = c^2$
$625 + 64 = c^2$
$\sqrt{689} = \sqrt{c^2}$
$26.2 = c$

2.



$a^2 + b^2 = c^2$
$6^2 + 8^2 = c^2$
$36 + 64 = c^2$
$\sqrt{100} = \sqrt{c^2}$
$10 = c$

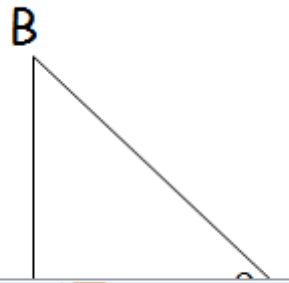
3.



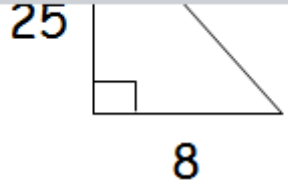
$a^2 + b^2 = c^2$
$20^2 + b^2 = 24^2$
$400 + b^2 = 576$
$-400 \quad -400$
$\sqrt{b^2} = \sqrt{176}$
$b = 13.2$

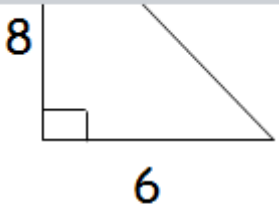
Trigonometry is the study of the relationships among the angles and sides of a right triangle.

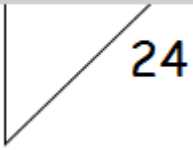
Consider the right ΔABC in which the measure of acute angle A is identified by the Greek letter *theta*, _____. The sides of the triangle are the



. the leg

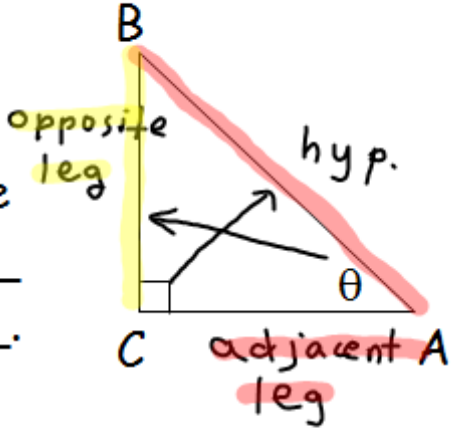






Trigonometry is the study of the relationships among the angles and sides of a right triangle.

Consider the right ΔABC in which the measure of acute angle A is identified by the Greek letter *theta*, θ. The sides of the triangle are the hypotenuse, the leg opposite $\angle\theta$ and the leg adjacent to $\angle\theta$.



Using these sides, you can define six **Trigonometric Functions**: sine (sin), cosine (cos), tangent (tan), cosecant (csc), secant (sec), and cotangent (cot).

"Definitions"

Trigonometric Functions (SOH-CAH-TOA)

$\sin\theta = \frac{opp.}{hyp}$ flip $\csc\theta = \frac{hyp.}{opp.}$

$\cos\theta = \frac{adj}{hyp}$ flip $\sec\theta = \frac{hyp.}{adj.}$

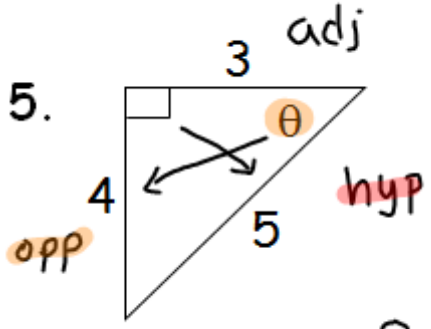
$\tan\theta = \frac{opp.}{adj.}$ flip $\cot\theta = \frac{adj.}{opp.}$

Examples

Examples

Find the values of the six trigonometric functions for angle θ.

5.



① $\sin\theta = \frac{O}{H} = \frac{4}{5}$ ✓

② $\cos\theta = \frac{A}{H} = \frac{3}{5}$ ✓

③ $\tan\theta = \frac{O}{A} = \frac{4}{3}$ ✓

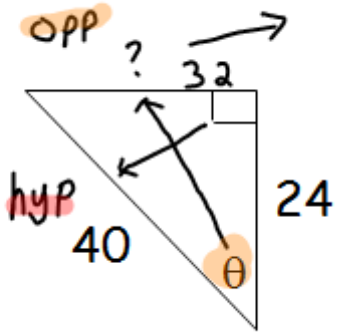
④ $\csc\theta = \frac{5}{4}$ ✓

⑤ $\sec\theta = \frac{5}{3}$ ✓

⑥ $\cot\theta = \frac{3}{4}$ ✓

flip flip flip

6.



By Pyth. Thm (and Matthew)

① $\sin\theta = \frac{32}{40} = \frac{4}{5}$ ✓

② $\cos\theta = \frac{24}{40} = \frac{3}{5}$ ✓

③ $\tan\theta = \frac{32}{24} = \frac{4}{3}$ ✓

④ $\csc\theta = \frac{40}{32} = \frac{5}{4}$ ✓

⑤ $\sec\theta = \frac{40}{24} = \frac{5}{3}$ ✓

⑥ $\cot\theta = \frac{24}{32} = \frac{3}{4}$ ✓