

4.2 Trigonometric Functions of Acute Angles

Target 5A: Evaluate trigonometric functions and expressions (using the unit circle)

Review of Prior Concepts

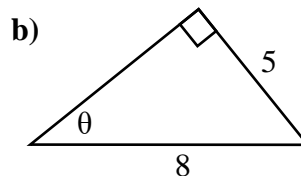
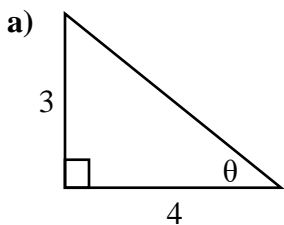
1. Convert each radian measure to degrees:

a) $\frac{\pi}{6}$

b) $\frac{\pi}{4}$

c) $\frac{\pi}{3}$

2. Find the values of $\sin \theta$, $\cos \theta$, $\tan \theta$.



More Practice

Trigonometry

<https://www.khanacademy.org/math/trigonometry/trigonometry-right-triangles>

<http://www.mathsisfun.com/algebra/trigonometry.html>

<http://www.regentsprep.org/regents/math/algebra/at2/ltrig.htm>

<http://www.mathgoodies.com/lessons/vol2/circumference.html>

<https://www.youtube.com/watch?v=SqFQZWRALGc>

<https://www.youtube.com/watch?v=Jsiy4TxgIME>



SAT Connection

Passport to Advanced Math

14. Use structure to isolate or identify a quantity of interest in an expression

Example: In a right triangle, one angle measures x° , where

$$\sin x^\circ = \frac{4}{5}. \text{ What is } \cos(90^\circ - x^\circ) ?$$

/	○	○		
.	○	○	○	○
0	○	○	○	○
1	○	○	○	○
2	○	○	○	○
3	○	○	○	○
4	○	○	○	○
5	○	○	○	○
6	○	○	○	○
7	○	○	○	○
8	○	○	○	○
9	○	○	○	○

NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.

[Solution](#)

Six Trigonometric Ratios

$\sin \theta = \text{---}$

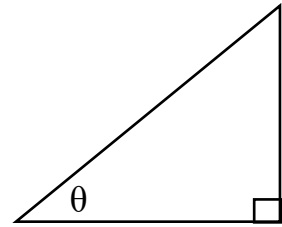
$\csc \theta = \text{---}$

$\cos \theta = \text{---}$

$\sec \theta = \text{---}$

$\tan \theta = \text{---}$

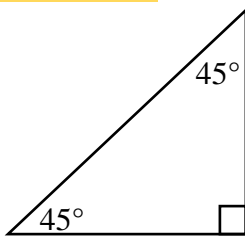
$\cot \theta = \text{---}$



Special Right Triangles

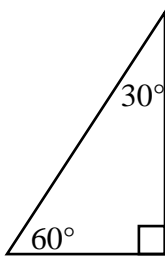
45°-45°-90° Δ

What do you know about a 45°-45°-90° Δ?



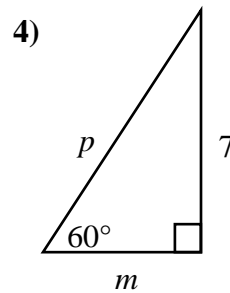
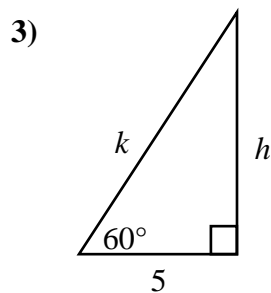
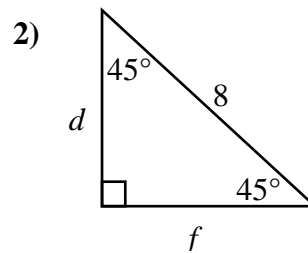
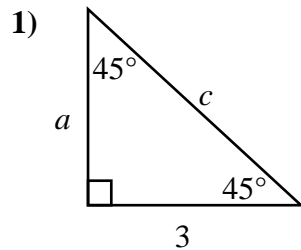
30°-60°-90° Δ

What do you know about a 30°-60°-90° Δ?



Examples

Find the value of the variables.



Evaluate without using a calculator:

5) $\tan\left(\frac{\pi}{3}\right)$

6) $\csc\left(\frac{\pi}{4}\right)$

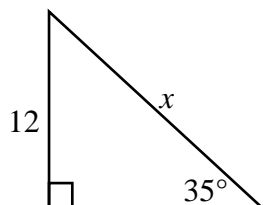
Find the acute angle θ , in both degrees and radians, without using a calculator.

7) $\tan \theta = \sqrt{3}$

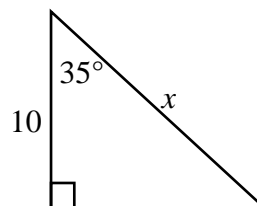
8) $\cos \theta = \frac{\sqrt{3}}{2}$

Find the value of x in the triangle.

9)



10)



More Practice

Special Right Triangles

<http://www.regentsprep.org/regents/math/algtrig/att2/ltri45.htm>

<http://www.regentsprep.org/regents/math/algtrig/att2/ltri30.htm>

<https://www.khanacademy.org/math/trigonometry/trigonometry-right-triangles/trig-ratios-special-triangles/a/trig-ratios-of-special-triangles>

https://www.youtube.com/watch?v=Wy_e8QANH_g

<https://www.youtube.com/watch?v=2mlsvpox9sI>

Trigonometric Ratios

<http://www.regentsprep.org/regents/math/algtrig/att1/trigsix.htm>

<http://www.themathpage.com/atrig/solve-right-triangles.htm>

<http://www.mathguide.com/lessons/RightTriTrig.html>

<https://www.youtube.com/watch?v=l5VbdqRjTXc>

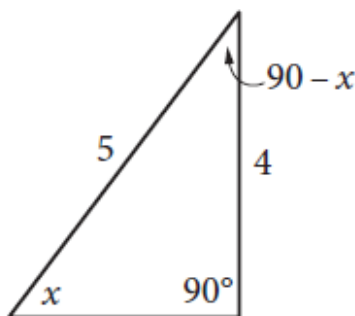
Homework Assignment

p.335 #7,19,22,41,44,47,49,51,53,61,62

SAT Connection
Solution

The correct answer is $\frac{4}{5}$ or 0.8. By the complementary angle relationship for sine and cosine, $\sin(x^\circ) = \cos(90^\circ - x^\circ)$. Therefore, $\cos(90^\circ - x^\circ) = \frac{4}{5}$. Either the fraction $\frac{4}{5}$ or its decimal equivalent, 0.8, may be gridded as the correct answer.

Alternatively, one can construct a right triangle that has an angle of measure x° such that $\sin(x^\circ) = \frac{4}{5}$, as shown in the figure below, where $\sin(x^\circ)$ is equal to the ratio of the opposite side to the hypotenuse, or $\frac{4}{5}$.



Since two of the angles of the triangle are of measure x° and 90° , the third angle must have the measure $180^\circ - 90^\circ - x^\circ = 90^\circ - x^\circ$. From the figure, $\cos(90^\circ - x^\circ)$, which is equal to the ratio of the adjacent side to the hypotenuse, is also $\frac{4}{5}$.