

Trigonometry Problems

1. Convert the following from degrees to radians:

(a) 90°

(b) 135°

(c) 405°

2. Convert the following from radians to degrees:

(a) $\frac{11\pi}{4}$

(b) $\frac{7\pi}{6}$

(c) $\frac{\pi}{2} + \frac{\pi}{3}$

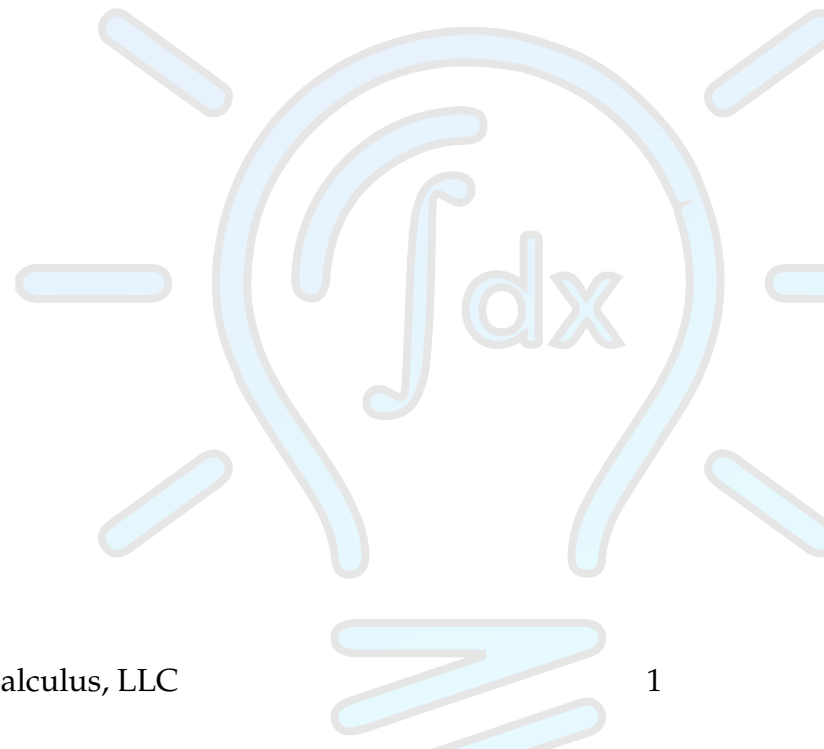
3. Evaluate the following trigonometric functions:

(a) $\sin 60^\circ$

(b) $\cos 135^\circ$

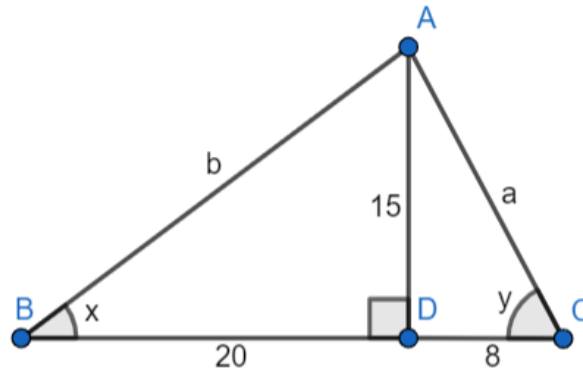
(c) $\sec \pi$

(d) $\tan \frac{7\pi}{4}$



4. In the following diagram, find:

- (a) The missing side lengths.
 (b) $\tan x$, $\sec y$, and $\sin(x + y)$.



5. Determine the equation of a sine function with amplitude 2, period π , and midline $y = 4$.

6. Sketch one period of the function $f(x) = 2 \cos\left(\frac{x}{2}\right) + 1$.

7. Simplify $\frac{(\csc^2 x)(\tan x)}{2 \cot x}$.

8. Solve the following trigonometric equations for $0 \leq x < 2\pi$:

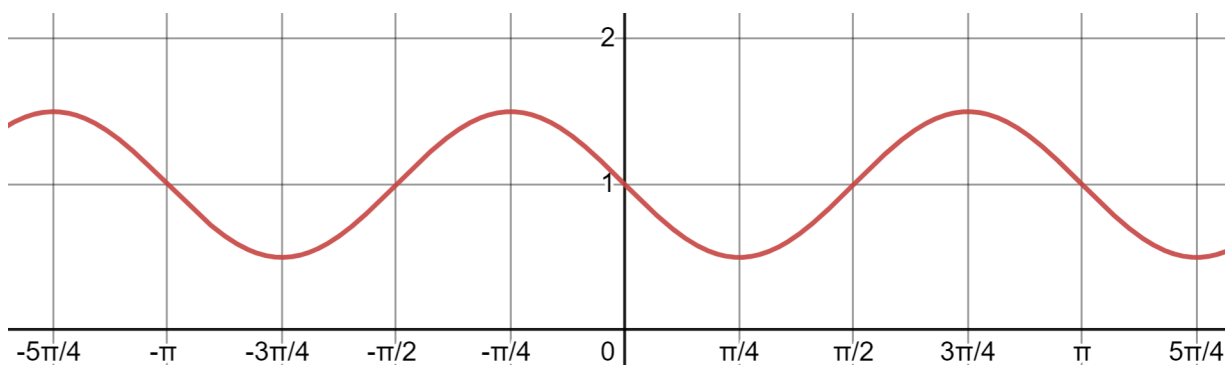
(a) $2 \sin x = \tan x$

(b) $\sin^2 x + 2 \cos^2 x = 2$

9. Suppose that $\cos x = \frac{\sqrt{3}}{2}$ and $\tan y = \sqrt{3}$ in the interval $x, y \in \left[0, \frac{\pi}{2}\right]$. Find the value of $\cos(x + y)$.

10. Given that $\sec^2 x = 4$ in the interval $\frac{3\pi}{2} \leq x \leq 2\pi$, find $\tan x$.

11. Determine the equation of the sine wave below. (Assume that the amplitude of the graph is $\frac{1}{2}$.)



12. Determine the domain and the range of the following functions:

(a) $f(x) = -2 \sin(2x) + 5$

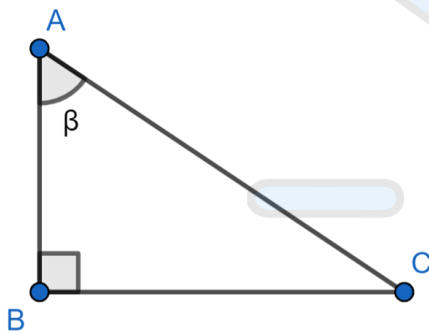
(b) $g(x) = 7 \cos x - 2$

(c) $h(x) = \arcsin(2x)$

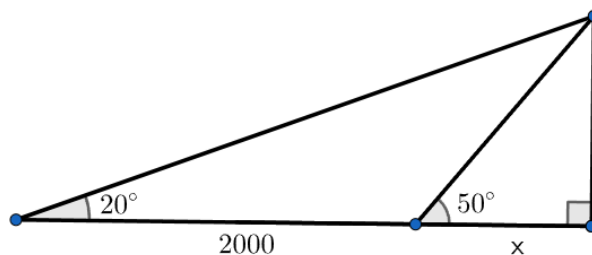
13. In the figure below is a right triangle $\triangle ABC$.

(a) If $\arcsin\left(\frac{AB}{AC}\right) = \frac{\pi}{3}$, what would be the measure of β in radians.

(b) If $\tan \beta = \frac{4}{3}$, what would be the degree measure of $\arcsin\left(\frac{BC}{AC}\right)$, rounded to the nearest tenth of a degree.



14. If Martin stands x feet away from a building and looks at the top of the building, his sight line forms an angle of 50° with the ground. If he walks 2000 feet away from the building and looks at the top of the building, his sight line forms an angle of 20° with the ground. Find x .



15. Determine the unknown value given the information about $\triangle ABC$.

(a) Given that $AC = 9$ and $\sin \beta = \frac{5}{18}$, find BC .

(b) Given that $\tan \beta = \frac{15}{8}$, find $\frac{AB}{AC}$.

(c) Given that $AB = 5$ and $BC = 3$, find $\cos(90^\circ - \beta)$.

