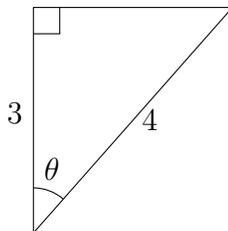


These are *sample* topics and problems to help you study for Exam 1. This list is *not* meant to be exhaustive.

- Be able to convert between degrees and radians (in both directions).
 - Write $\frac{7\pi}{9}$ in degrees. Write 108° in radians. *No decimal approximations.*
- Know what quadrant the terminal side of an angle lies in (in standard position).
 - What quadrant do the following angles lie in: $\theta = -820^\circ$? $\beta = \frac{4\pi}{5}$? $\lambda = 6$?
- Be able to find complementary and supplementary angles.
 - Find the complementary and supplementary angles to $\theta = 100^\circ$, if they exist.
- Know the **six basic trig function** definitions as they relate to triangles, the unit circle, and general points.

$\sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{y}{r}$	$\cos \theta = \frac{\text{adj}}{\text{hyp}} = \frac{x}{r}$	$\tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{y}{x}$
$\csc \theta = \frac{1}{\sin \theta}$	$\sec \theta = \frac{1}{\cos \theta}$	$\cot \theta = \frac{1}{\tan \theta}$

- Given the following right triangle, find the exact value of all six basic trig functions for θ .



- Find the exact value of $\sin \theta$, $\sec \theta$ and $\tan \theta$ for $\theta = -\frac{7\pi}{6}$.
- Find the exact value of $\sin \theta$, $\cos \theta$ and $\tan \theta$ for $\theta = 0$.
- Find the exact value of each of the six basic trig functions for the angle in standard position whose terminal side goes through the point $(-2, -5)$.

5. Know how to find arc length, sector area, linear speed and angular speed.
- Find the arc length and sector area corresponding to a central angle of 70° in a circle with a radius of 5 feet. Round your answers to the nearest whole number.
 - A carousel with a 50 foot diameter makes 4 revolutions per minute. Find the angular speed of the carousel in radians per minute and the linear speed of an outermost seat of the carousel (50 feet from the center) in feet per minute. Round your answers to two decimal places.
6. Solve problems involving angle of elevation and angle of depression.
- You are traveling in a hot air balloon and you see your friend on the ground at an angle of depression of 43° . If the balloon is 200 feet in the air, what is the distance between you and your friend? Draw a fully labeled diagram and round your answer to 2 decimal places.
 - How long should an escalator be if it is to make an angle of 26° with the first floor of a mall and carry people a horizontal distance of 38 feet on their way to the second floor? Draw a fully labeled diagram and round your answer to the nearest foot.
7. Know how to find reference angles. (Remember the reference angle always connects to the *x-axis*.)
- What is the reference angle for $\beta = \frac{17\pi}{12}$? $\alpha = -100^\circ$?
8. Know the quadrant location and the trig function values of an angle (in standard position) given specific conditions.
- What quadrant is the angle θ in if $\cos \theta = -\frac{2}{7}$ and $\csc \theta < 0$? Find $\csc \theta$.
 - What quadrant is the angle θ in if $\sin \theta > 0$ and $\sec \theta = 5$? Find $\sin \theta$, $\cos \theta$ and $\tan \theta$.
 - Given $\cos \theta = -\frac{1}{3}$ and $\tan \theta > 0$, find the values of the other four basic trig functions.
 - If $\cos \theta = -\frac{1}{2}$, what quadrants could θ be in? Find 2 possible values for θ between 0 and 2π .

9. Know about the graphs of $y = a \sin(bx - c) + d$ and $y = a \cos(bx - c) + d$.
- Be able to determine the period, phase shift, vertical shift, range, domain and amplitude of the function given an equation or given a graph.
 - Amplitude = $|a|$
 - Vertical shift = d
 - Period = $\frac{2\pi}{b}$
 - Phase shift = $\frac{c}{b}$
 - Be able to draw the graphs for at least two cycles and label key points including maxima, minima, x -intercepts and y -intercepts.
 - Be able to write an equation based on $y = \sin x$ or $y = \cos x$ given a graph.
10. Know about the graphs of functions based on $y = \sec x$, $y = \csc x$, $y = \tan x$ and $y = \cot x$.
- Be able to determine the period, domain, range and vertical asymptotes of each.
 - Be able to draw each graph for at least two cycles, labeling key points and asymptotes.
 - Know about transformations of these graphs, and be able to identify the period, horizontal shift, vertical shift, range, domain and vertical asymptotes of the transformed graph.
 - Be able to draw a transformation of each graph given an equation and write a transformed equation given such a graph.
 - Remember: Vertical asymptotes are *vertical lines* and should be written as $x = c$ where c is a number.