

Problem Set 9

1. Convert $(32, 128^\circ)$ to rectangular coordinates.
2. Prove each of the following identities.
 - (a) $\frac{1}{\tan x} + \tan x = \sec x \csc x$
 - (b) $\sin x - \sin x \cos^2 x = \sin^3 x$
 - (c) $\frac{\cos \alpha}{1 + \sin \alpha} + \frac{1 + \sin \alpha}{\cos \alpha} = 2 \sec \alpha$
3. Solve the equation $\tan x = -\frac{3}{4}$. Find an approximate value for all solutions. present your answer in radians.
4. Find the side of a regular polygon of 12 sides that is written into a circle of radius 10 ft.
5. Find $\cos \alpha$ if we know that $90^\circ < \alpha < 180^\circ$ and $\sin \alpha = \frac{2}{3}$.
6. Convert 1 radian to degrees.
7. A 5.4 ft tall person is standing 44 ft away from a street light that is 27 ft tall. How long is her shadow?
8. Find the angle that is formed by the positive part of the x -axis and the straight line $2x - 5y = 1$.
9. Find the exact value for each of the following expressions.
 - (a) $\tan \frac{3\pi}{4} - 2 \cos \frac{\pi}{3} \cos \frac{2\pi}{3} =$
 - (b) $\sin 225^\circ \cos(-45^\circ) - \cos 420^\circ + \cos 240^\circ =$
 - (c) $\sin^2(150^\circ) + \cos^2(330^\circ) =$
10. An object is traveling around a circle of radius 45 m. It completes a cycle in 3 seconds. Find the speed of the object in meter per second.
11. True or false? $\sin 2\alpha = 2 \sin \alpha$.