WORKSHEET: REVIEW OF TRIGONOMETRY & INVERSE FUNCTIONS

1. What does it mean to say that $y = g(x)$ is the inverse of $y = f(x)$? Give some examples of functions f and g that are inverses of each other? How do you know they are inverses?

2. There are three particularly useful ways of thinking about trigonometric functions: (A) sides of a right triangle, (B) points on the unit circle in the xy-plane, (C) as a graph. Can you describe the sine function in each of these ways?

What is a radian?

3. You are given the function $f(x)$. Without explicitly finding a formula for $f^{-1}(x)$, find $f^{-1}(1)$ for each function below:

(a) $f(x) = 1 - \sqrt[3]{x+2}$

(b)

x	0	0.25	0.5	0.75	1	1.25	1.5	1.75	2.0
$f(x)$	20	10	5	3	2.5	2	1.5	1	0.25

4. Solve each equation below for x.

(a) $10 = 2e^{x+1}$

(b) $\ln(x^2 - 1) = 1$

5. What does the previous problem have to do with inverses?

6. A wooden ramp is to be built with one end on the ground and the other end at the top of a short staircase. If the top of the staircase is 4 ft from the ground and the angle between the ground and the ramp is to be 10^o, how long does the ramp need to be?

7. Convert $2\pi/3$ radians to degrees.

8. Without a calculator evaluate:

   (a) $\sin(\frac{2\pi}{3})$ (b) $\cos(\frac{5\pi}{4})$ (c) $\tan(\frac{-\pi}{4})$

9. Use graphs to solve the equations below.

   (a) $\cos x = 1$

   (b) $\sin x = 1$

   (c) $\tan x = 0$

   (d) $\sin x = 1/2$ (Find all solutions in $[0, 2\pi]$.)

10. Find the equation of the line between the points $(-1, 2)$ and $(3, 6)$.

11. Assume $P(t) = \sqrt{4t + 4} - 2$ gives the distance traveled by a runner in the first 30 seconds of a race where t is measured in seconds and P is measured in meters. (So the domain of P is $[0, 30]$.)

    (a) Find the slope, m, of the line between the points $(3, P(3))$ and $(15, P(15))$.

    (b) What should the units of m be and why?