

Math 1060 ~ Trigonometry

13 Solving Trigonometric Equations

The inverse functions allow us to calculate angles in a right triangle, given two of the sides.

EX 1

Determine the acute angles in a 3-4-5 right triangle.

EX 2

If a 50 -meter rope is attached to the top of a 20 -meter pole for a tight-rope event, what angle does the rope make with the ground?

We can also solve trigonometric equations for angles in radians.

Remember: $x = \sin^{-1}(a)$ returns a single, principal value and $\sin x = a$ will have an infinite number of solutions, if defined.

Sample: Solve for x .

$$x = \sin^{-1}\left(-\frac{1}{2}\right)$$

$$\sin x = -\frac{1}{2}$$

EX 3

Solve these for x , where x is in radians. State the solution on the interval $[0, 2\pi)$ and then state the general solution for all angles which provide a solution to the equation.

3a)

$$\sqrt{2}\sin x - 1 = 0$$

3b)

$$\sec^2 x = 4$$

EX 4

State the general solution for each of these.

4a)

$$\tan^2 x - 3 = 1$$

4b)

$$\cos(2x) = -\frac{\sqrt{3}}{2}$$

EX 5

State all radian values where the line $y = 2$ intersects with the function $y = \sec x$.