

4. We'll now learn how to solve this equation analytically. Simplify the equation: $-5000 \cos\left(\frac{\pi}{6}t\right) + 10,000 = 12,000$.

5. If we want to solve this equation, we'll need to use an inverse function. We know not all functions have inverses. How do we determine which functions have inverses? Does the cosine function have an inverse?

The **inverse cosine function** is written as $y = \cos^{-1} x$ or $y = \arccos x$.

It means that $x = \cos y$ for $0 \leq y \leq \pi$

6. Graph arccosine functions on your calculator over the interval $[-1, 1]$. What are the domain and range of the function? Sketch the graph below.

7. Solve the equation you simplified in #4 using the arccosine function. How many solutions did you get?

8. Evaluate the following:

(a) $\cos^{-1}(0)$

(a) $\arccos(1)$

(a) $\cos(\cos^{-1}(0))$

The **inverse sine function** is written as $y = \sin^{-1} x$ or $y = \arcsin x$.

$$\text{It means that } x = \sin y \text{ for } \frac{-\pi}{2} \leq y \leq \frac{\pi}{2}$$

The **inverse tangent function** is written as $y = \tan^{-1} x$ or $y = \arctan x$.

$$\text{It means that } x = \tan y \text{ for } \frac{-\pi}{2} < y < \frac{\pi}{2}$$

9. Your height on a ferris wheel is given by $h(t) = 250 + 250 \sin\left(\frac{\pi}{10}t - \frac{\pi}{2}\right)$. How much time do you spend above 400 feet if your ride lasts 20 minutes?