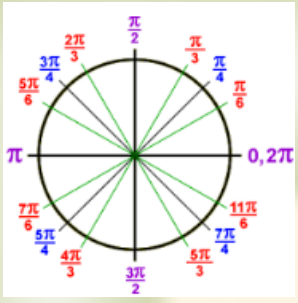
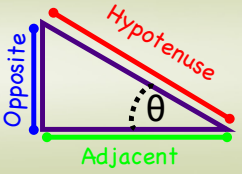
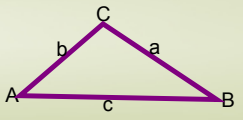
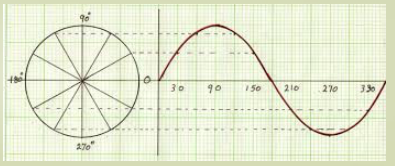








Math 1060 ~ Trigonometry

$\sin^2 u + \cos^2 u = 1$

$\sin 2u = 2 \sin u \cos u$

$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

$c^2 = a^2 + b^2 - 2ab\cos C$

Review of the Concept of Inverse Functions

Learning Objectives

In this section you will:

- **Determine whether a function has an inverse.**
- **Use correct notation to write the inverse of a function.**
- **Find and verify the inverse if there is one.**
- **Sketch a function and its inverse.**

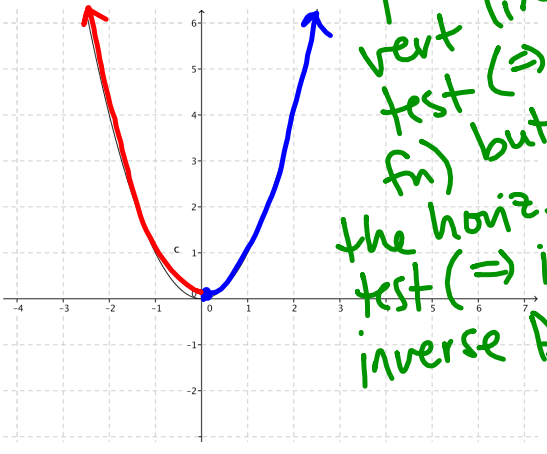
Reminders About a Function and Its Inverse

- The inverse of a function, $f(x)$, is written $f^{-1}(x)$ (read "f-inverse"). (not a reciprocal)
- The -1 is NOT an exponent.
- The original function must be 1-to-1. (passes vert. and horiz. line test)
- The graph of $y = f^{-1}(x)$ (the inverse function) is a reflection of $y = f(x)$ across the line $y = x$.
- An (a,b) point on the graph of the function becomes a (b,a) point on the graph of the inverse function.
- The domain of $f^{-1}(x)$ is the range of $f(x)$ and vice versa.
- $f(f^{-1}(x)) = f^{-1}(f(x)) = x$ for every x in the domain of f.

(i.e. colloquially, we could say f and f^{-1} undo each other)

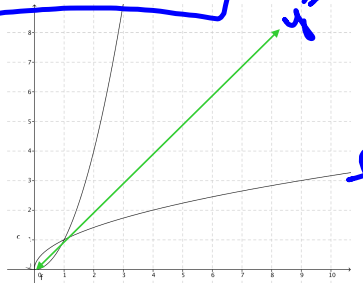
Let's demonstrate this with $f(x) = x^2$ and its inverse function.

$f(x) = x^2$

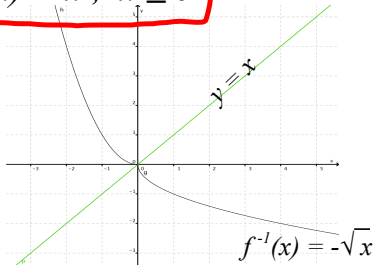


passes vert line test (⇒ is a fn) but not the horiz. line test (⇒ its inverse DNE)

$f(x) = x^2,\ x \geq 0$



$f(x) = x^2,\ x \leq 0$



For the quadratic function, $f(x) = x^2, x \geq 0,$

the inverse function is $f^{-1}(x) = \sqrt{x}$

Ex 1: Answer each of these:

a) What number can I square to get 4? 2, -2

b) If $x^2 = 4$, then $x =$ 2 or -2

c) $\sqrt{4} =$ 2

d) What is the principal square root of 4? 2

e) List all square roots of four. 2 or -2

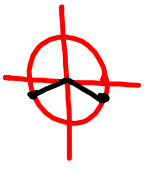
Notice that the way the question is asked determines the number of answers.

Thus, when we develop inverses for the trigonometric functions, we must consider this.

$\sin x = -\frac{1}{2} \Rightarrow x =$ $\frac{7\pi}{6}, \frac{11\pi}{6}$

eqn

(or any other coterminal angles)



$\sin^{-1}\left(-\frac{1}{2}\right) = \arcsin\left(-\frac{1}{2}\right) =$? $\frac{-\pi}{6}$

(there can only be ONE answer)