

U3D5_T INVERSES

Monday, March 18, 2019 6:45 PM



U3D5_T
INVERSES

U3D5 MCR 3UI

INVERSE FUNCTIONS

WARM UP: State the domain and range for $y = -\sqrt{x+2} - 4$

$$\begin{array}{|l} \hline \text{Domain} \\ \hline \end{array} \left\{ x \geq -2 \right\} \quad \begin{array}{|l} \hline \text{Range} \\ \hline \end{array} \left\{ y \leq -4 \right\}$$

Domain = $\{x \geq -2\}$

Range = $\{y \leq -4\}$

Inverse Functions

1. Consider the following sets.

$$E = \{(0,1), (1,2), (2,3), (3,4)\} \quad F = \{(1,0), (2,1), (3,2), (4,3)\}$$

E and F are considered to be INVERSES.

An inverse function is said to “reverse” the processes of another function. For a function $f(x)$, the value of x would be input, and the value of y would result. For the inverse of $f(x)$, the value of y would be input, and the value of x would result. The inverse of a function has a set of ordered pairs that are obtained by interchanging the coordinates of ordered pairs of the function.

Notation

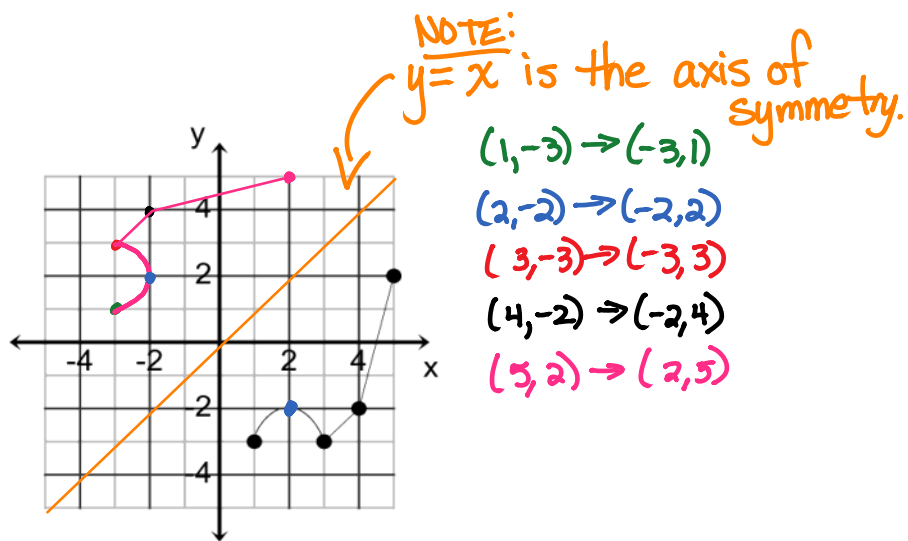
The inverse of $y = g(x)$ is written as $y = g^{-1}(x)$.

Note this is not an exponent.

It is only used if the x and y -values are switched.

The inverse of $(7, -8)$ is $(-8, 7)$.

The inverse of $f(3) = 9$ is $f^{-1}(9) = 3$.



2. Method for finding the equation of an inverse.

a. $f(x) = 2x + 1$

for f^{-1} ,

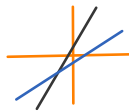
$2y + 1 = x$

$2y = x - 1$

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

OR $y = \frac{1}{2}x - \frac{1}{2}$

$\therefore f^{-1}(x) = \frac{1}{2}x - \frac{1}{2}$



← **form:** to explain you are finding the inverse

← interchange variables x & y in equation

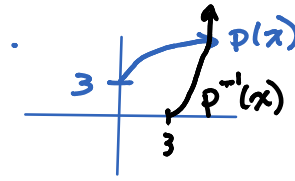
← isolate y

← you may write this in either form

← form to make it clear that the answer is not the original function but its inverse.

b. $p(x) = \sqrt{x} + 3$

$D: \{x \geq 0\}$ $R: \{y \geq 3\}$



for p^{-1} ,

$$\sqrt{y} + 3 = x$$

$$(\sqrt{y})^2 = (x-3)^2$$

$$y = (x-3)^2 \quad D: \{x \geq 3\} \quad R: \{y \geq 0\}$$

$$p^{-1}(x) = (x-3)^2, \quad x \geq 3$$

Pg. 215 #3a, 5

...Continued on Unit3 Day 6