

ALGEBRA III

11.1 Inverse Functions

What are examples of inverse operations?

Examples of inverse functions:

$$f(x) = \{(2, 3), (-1, 7), (6, 5)\} \quad f(2) = 3 \quad f(-1) = 7 \quad f(6) = 5$$

$$f^{-1}(x) = \{(3, 2), (7, -1), (5, 6)\}$$

$$g(x) = x - 3$$

$$g(1) = -2$$

$$g^{-1}(x) = x + 3$$

$$g^{-1}(-2) = 1$$

EX #2: Find the inverse equation of $y = \frac{x}{5}$

$$y = -\frac{x}{5}$$

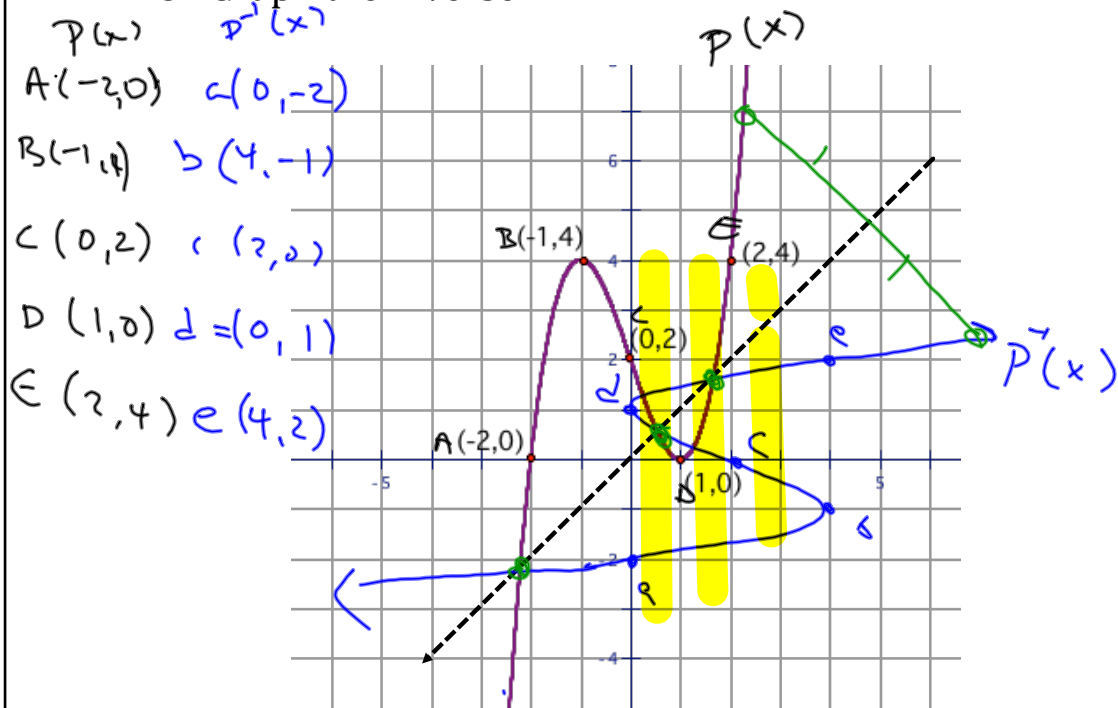
$$5x = \frac{y}{5} - 5$$

$$5x = y$$

$$y = \frac{5}{x}$$

$$y = 5x$$

EX #3: Graph the inverse.



Is the original graph a function?

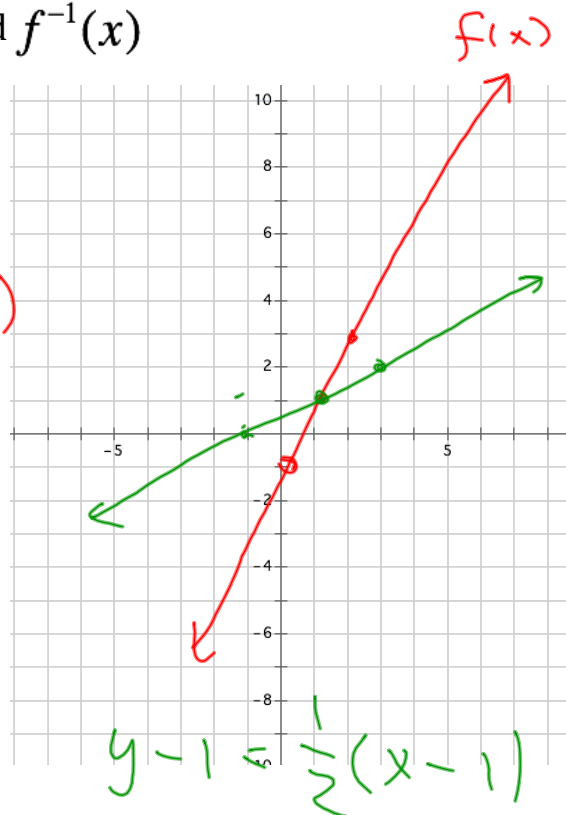
Is the inverse graph a function?

EX #4: Graph $f(x)$ and $f^{-1}(x)$

$$f(x) = 2x - 1$$

$$(1, 1) \quad (0, -1) \\ (2, 3)$$

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



Is the original graph a function?

Is the inverse graph a function?

Function:

One-to-one Function:

EX #5: Find the inverse equation

$$f(x) = \frac{3}{2}x + 6$$

a. $y = \frac{3}{2}x + 6$

$$x = \frac{2}{3}y + 6$$

$$\frac{2}{3}(x-6) = \left(\frac{3}{2}y\right)\frac{2}{3}$$

$$\frac{2}{3}(x-6) = y$$

$$\frac{2}{3}x - \frac{12}{3} = y$$

$$\frac{2}{3}x - 4 = y$$

$$f(x) = x^2 + 4$$

b. $y = x^2 + 4$

$$x = y^2 + 4$$

$$x - 4 = y^2$$

$$\sqrt{x-4} = y$$

$$f^{-1}(x) = \pm\sqrt{x-4}$$

Homework:

pg. 538 #6, 7, 8, 25-30, 32, 35

