

algebraically  
- Switch x and y  
- solve for y

graphically  
Symmetric to  $y=x$   
41 original  
42 each choice  
43 X  
Date \_\_\_\_\_  
Algebra II.

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## Finding the Inverse of a Function

1. What is the inverse of the function  $y = 2x - 3$ ?

①  $y = \frac{x+3}{2}$

(3)  $y = -2x + 3$

$$\begin{array}{r} x = 2y - 3 \\ +3 \quad +3 \\ \hline \end{array}$$

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

(4)  $y = \frac{1}{2x-3}$

$$\begin{array}{r} x+3 = 2y \\ \hline \end{array}$$

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

2. If a function is defined by the equation  $y = 3x + 2$ , which equation defines the inverse of this function?

(1)  $x = \frac{1}{3}y + \frac{1}{2}$

③  $y = \frac{1}{3}x - \frac{2}{3}$

$$\begin{array}{r} x = 3y + 2 \\ -2 \quad -2 \\ \hline \end{array}$$

(2)  $y = \frac{1}{3}x + \frac{1}{2}$

(4)  $y = -3x - 2$

$$\begin{array}{r} 1x - 2 = 3y \\ \hline \end{array}$$

$$\frac{1}{3}x - \frac{2}{3} = y$$

3. If  $f(x) = 5x - 7$ , find  $f^{-1}(x)$  <sup>→ inverse</sup> Switch x and y

$$y = 5x - 7$$

$$\begin{array}{r} x = 5y - 7 \\ +7 \quad +7 \\ \hline \end{array}$$

$$\frac{x+7}{5} = \frac{5y}{5}$$

$$\frac{1}{5}x + \frac{7}{5} = y$$

$$f^{-1}(x) = \frac{1}{5}x + \frac{7}{5}$$

4. What is  $g^{-1}(x)$  if  $g(x) = 3x + 6$

$$y = 3x + 6$$

$$\begin{array}{r} x = 3y + 6 \\ -6 \quad -6 \\ \hline \end{array}$$

$$\frac{x-6}{3} = \frac{3y}{3}$$

$$\frac{1}{3}x - 2 = y$$

$$g^{-1}(x) = \frac{1}{3}x - 2$$

5. What is the inverse of  $y = \frac{1}{2}x + 2$ ?

$$2(x - 2) = y$$

$$2x - 4 = y$$

$$2x = y + 4$$

$$x = \frac{y + 4}{2}$$

6. If  $f(x) = x^2$ , find  $f^{-1}(x)$

$$y = x^2$$

$$\sqrt{x} = \sqrt{y^2}$$

$$\sqrt{x} = y$$

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

7. What is  $h^{-1}(x)$  if  $h(x) = x^2 + 2$ ?

$$y = x^2 + 2$$

$$x = y^2 + 2$$

$$x - 2 = y^2$$

$$\sqrt{x - 2} = y$$

$$h^{-1}(x) = \sqrt{x - 2}$$

8. What is the inverse of the function  $y = 4x + 5$ ?

1)  $x = \frac{1}{4}y - \frac{5}{4}$       $x = 4y + 5$      3)  $y = 4x - 5$

2)  $y = \frac{1}{4}x - \frac{5}{4}$       $x - 5 = 4y$      4)  $y = \frac{1}{4x + 5}$

$$\frac{1}{4}x - \frac{5}{4} = y$$

~~$y = 4x + 5$~~

~~$y - 5 = 4x$~~

~~$y - 5 = 4x$~~

~~$y = 4x + 5$~~

9. What is the inverse of  $f(x) = -6(x - 2)$ ?

1)  $f^{-1}(x) = -2 - \frac{x}{6}$       $x = -6(y - 2)$      3)  $f^{-1}(x) = \frac{1}{-6(x - 2)}$

2)  $f^{-1}(x) = 2 - \frac{x}{6}$      4)  $f^{-1}(x) = 6(x + 2)$

~~$y = -6(x - 2)$~~

~~$y = -6x + 12$~~

~~$y - 12 = -6x$~~

~~$y - 12 = -6x$~~

~~$y - 12 = -6x$~~

~~$\frac{x}{-6} = y - 2$~~

~~$\frac{x}{-6} = y - 2$~~

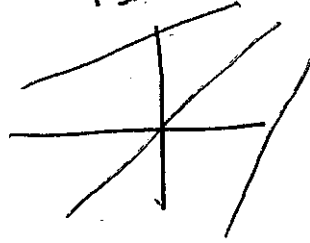
~~$\frac{x}{-6} + 2 = y$~~

10. Given  $f(x) = \frac{1}{2}x + 8$ , which equation represents the inverse,  $g(x)$ ?

- 1)  $g(x) = 2x - 8$   $y = \frac{1}{2}x + 8$   
 2)  $g(x) = 2x - 16$   $(x = \frac{1}{2}y + 8) \cdot 2$   
 3)  $g(x) = -\frac{1}{2}x + 8$   
 4)  $g(x) = -\frac{1}{2}x - 16$

$$\begin{aligned} 2x &= y + 16 \\ -16 & \quad -16 \\ \hline 2x - 16 &= y \end{aligned}$$

$y_1 = \frac{1}{2}x + 8$   
 $y_2 = 2x - 16$   
 $y_3 = x$

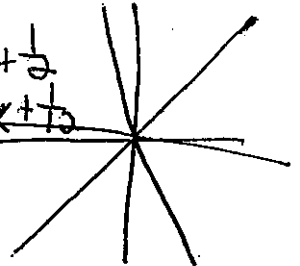


11. The inverse of  $f(x) = -6x + \frac{1}{2}$  is

- 1)  $f^{-1}(x) = 6x - \frac{1}{2}$   $(x = -6y + \frac{1}{2}) \cdot 6$  ③  $f^{-1}(x) = -\frac{1}{6}x + \frac{1}{12}$   
 2)  $f^{-1}(x) = \frac{1}{-6x + \frac{1}{2}}$   $2x = -12y + 1$  4)  $f^{-1}(x) = -\frac{1}{6}x + 2$

$$\begin{aligned} -12y + 1 &= 2x \\ -12y &= 2x - 1 \\ \frac{-12y}{-12} &= \frac{2x - 1}{-12} \\ y &= -\frac{1}{6}x + \frac{1}{12} \end{aligned}$$

$y_1 = -6x + \frac{1}{2}$   
 $y_2 = -\frac{1}{6}x + \frac{1}{12}$   
 $y_3 = x$

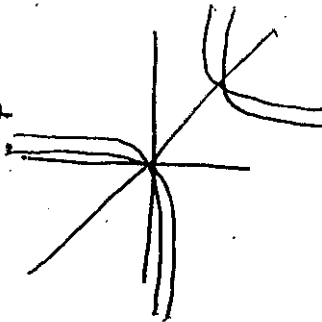


12. The inverse of the function  $f(x) = \frac{x+1}{x-2}$  is

- 1)  $f^{-1}(x) = \frac{x+1}{x+2}$   $y = \frac{x+1}{x-2}$  3)  $f^{-1}(x) = \frac{x+1}{x-2}$   
 2)  $f^{-1}(x) = \frac{2x+1}{x-1}$   $(x = \frac{y+1}{y-2}) \cdot (y-2)$  4)  $f^{-1}(x) = \frac{x-1}{x+1}$

$$\begin{aligned} x(y-2) &= y+1 \\ xy - 2x &= y+1 \\ xy - y &= 2x+1 \\ \frac{y(x-1)}{x-1} &= \frac{2x+1}{x-1} \\ y &= \frac{2x+1}{x-1} \end{aligned}$$

$y_1 = \frac{x+1}{x-2}$   
 $y_2 = \frac{2x+1}{x-1}$   
 $y_3 = x$

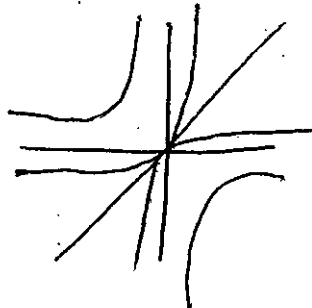


13. What is the inverse of  $f(x) = \frac{x}{x+2}$ , where  $x \neq -2$ ?

- 1)  $f^{-1}(x) = \frac{2x}{x-1}$   $y = \frac{x}{x+2}$  3)  $f^{-1}(x) = \frac{x}{x-2}$   
 2)  $f^{-1}(x) = \frac{-2x}{x-1}$   $(x = \frac{y}{y+2}) \cdot (y+2)$  4)  $f^{-1}(x) = \frac{-x}{x-2}$

$$\begin{aligned} x(y+2) &= y \\ xy + 2x &= y \\ -y - 2x &= -y - 2x \\ \frac{y(x+2)}{x+2} &= \frac{-2x}{x+2} \\ y &= \frac{-2x}{x+2} \end{aligned}$$

$y_1 = \frac{x}{x-2}$   
 $y_2 = \frac{-2x}{x-1}$   
 $y_3 = x$



14. What is the inverse of  $f(x) = x^3 - 2$ ?

- 1)  $f^{-1}(x) = \sqrt[3]{x} + 2$   $x = y^3 - 2$  ③  $f^{-1}(x) = \sqrt[3]{x+2}$   
 2)  $f^{-1}(x) = \pm \sqrt[3]{x+2}$   $+2 \quad +2$  4)  $f^{-1}(x) = \pm \sqrt[3]{x+2}$

$$\begin{aligned} \sqrt[3]{x+2} &= y \\ \sqrt[3]{x+2} &= y \end{aligned}$$

$y_1 = x^3 - 2$   
 $y_2 = \sqrt[3]{x+2}$   
 $y_3 = x$

