

10-21-13

3<sup>rd</sup> Tris

$$f(x) = 3x - 5$$

$$f(2x-1) = 3(2x-1) - 5$$
$$6x - 3 - 5$$
$$6x - 8$$

$$f(f(x)) = f(3x-5)$$
$$3(3x-5) - 5$$
$$9x - 15 - 5$$
$$9x - 20$$

$$f(x) = 3x - 10 \quad g(x) = 2x + 1$$

$$g(f(x)) = g(3x-10)$$
$$= 2(3x-10) + 1$$
$$= 6x - 20 + 1$$
$$= 6x - 19$$

$$h(x) = x^2$$

$$g(x) = x - 5$$

$$h(g(x)) = h(x-5) = (x-5)^2$$
$$= x^2 - 10x + 25$$

$$g(h(x)) = g(x^2) = x^2 - 5$$

$$\begin{aligned}f(x) &= 3x \\g(x) &= 5x + 2 \\h(x) &= x - 1\end{aligned}$$

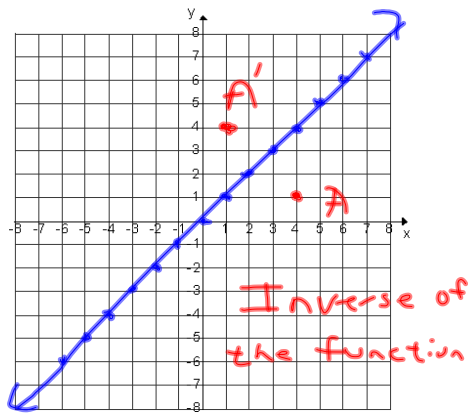
$$f(g(h(x))) =$$

$$f(g(x-1)) = f(5(x-1) + 2)$$

$$f(5x - 5 + 2)$$
$$f(5x - 3)$$

$$3(5x - 3)$$

$$15x - 9$$



If  $f(x) = 6x - 1$ , what is its inverse  $\rightarrow f^{-1}(x)$

① Change  $f(x)$  to  $y$ .

$$y = 6x - 1$$

② Flip your  $x$  and  $y$ .

$$x = 6y - 1$$

③ Solve for  $y$ .

$$\begin{array}{r} x = 6y - 1 \\ \hline x + 1 = 6y \end{array}$$

$$y = \frac{x+1}{6}$$

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

Find inverse of  $f(x) = \frac{x}{2} + 1$

①  $y = \frac{x}{2} + 1$

②  $x = \frac{y}{2} + 1$

③  $2(x-1) = \frac{y}{2} \cdot 2$

$$2x - 2 = y$$

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

10-21-13  
4<sup>th</sup> Trig

$$f(x) = 3x + 1 \quad g(x) = 5x - 2$$

$$f(g(x)) = f(5x - 2)$$

$$\begin{aligned} & 3(5x - 2) + 1 \\ & 15x - 6 + 1 \\ & 15x - 5 \end{aligned}$$

$$g(f(x)) = g(3x + 1)$$

$$\begin{aligned} & 5(3x + 1) - 2 \\ & 15x + 5 - 2 \\ & 15x + 3 \end{aligned}$$

$$h(x) = x^2 \quad d(x) = x - 3$$

$$h(d(x)) = h(x - 3)$$

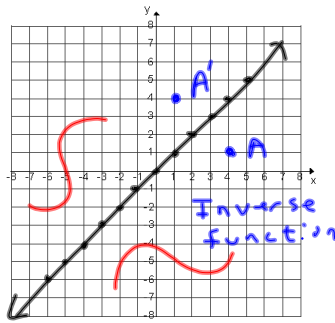
$$\begin{aligned} & = (x - 3)^2 \\ & x^2 - 6x + 9 \end{aligned}$$

$$\begin{aligned} d(h(x)) &= d(x^2) \\ &= x^2 - 3 \end{aligned}$$

$$g(x) = 2x \quad h(x) = 5x - 1 \quad d(x) = 3x + 1$$

$$g(h(d(x))) = g(h(3x + 1))$$

$$\begin{aligned} & \downarrow \\ & 5(3x + 1) - 1 \\ & 15x + 5 - 1 \\ & g(15x + 4) \\ & = 2(15x + 4) \\ & 30x + 8 \end{aligned}$$



$$f(x) = 5x - 4$$

$$f^{-1}(x) \leftarrow \text{inverse of function}$$

- ① Rewrite  
 $y = 5x - 4$
- ② Switch the  $x$  and the  $y$   
 $x = 5y - 4$
- ③ Solve for  $y$ 

$$\begin{array}{r} x = 5y - 4 \\ +4 \quad \quad +4 \\ \hline x + 4 = 5y \\ \frac{x+4}{5} = \frac{5y}{5} \\ y = \frac{x+4}{5} \end{array}$$

$$\therefore f^{-1}(x) = \frac{x+4}{5}$$

Find the inverse of

$$f(x) = \frac{x}{2} + 100$$

- ①  $y = \frac{x}{2} + 100$
- ②  $x = \frac{y}{2} + 100$
- ③  $2(x - 100) = \frac{y}{2} \cdot 2$ 

$$2x - 200 = y$$

$$\therefore f^{-1}(x) = 2x - 200$$

Find inverse of

$$f(x) = x^2 + 3$$

- ①  $y = x^2 + 3$
- ②  $x = y^2 + 3$
- ③  $\sqrt{x - 3} = |y|$ 

$$\pm \sqrt{x - 3} = y$$

$$f^{-1}(y) = \pm \sqrt{x - 3}$$