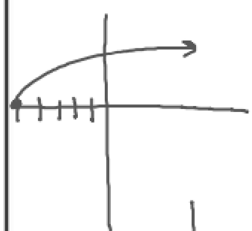
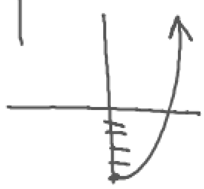
$f^{-1}(x) \to$ Inverse

1) Change f(x) to y
2) Switch x and y
3) Solve for y

$f(x)$	$f^{-1}(x)$
Domain (x)	
Range (y)	Domain





Find a formula for $f^{-1}(x)$. Give the domain of $f^{-1}(x)$, including any restrictions "inherited" from f.

D: $(-\infty,\infty)$ R: $(-\infty,\infty)$

A. $f(x) = 5x + 2$

$f^{-1}(x) = \frac{1}{5}x - \frac{2}{5}$

D: $(-\infty,\infty)$

D: $(-\infty,1)\cup(1,\infty)$ R: $(-\infty,3)\cup(3,\infty)$

B. $f(x) = \dfrac{3x+2}{x-1}$

$f^{-1}(x) = \dfrac{x+2}{x-3}$

D: $(-\infty,3)\cup(3,\infty)$

D: $[-5,\infty)$ R: $[0,\infty)$

C. $f(x) = \sqrt{x+5}$

$y = \sqrt{x+5}$

$(x)^2 = (\sqrt{y+5})^2$

$x^2 = y+5$

$y = x^2 - 5$

$f^{-1}(x) = x^2 - 5$

D: $[0,\infty)$

$[\sqrt[3]{2},\infty)$ $x^3 - 2 \geq 0$ $x \geq \sqrt[3]{2}$

$x^3 \geq 2$

$[1.26,\infty)$ D. $f(x) = \sqrt{x^3 - 2}$

R: $[.02,\infty)$ $y = \sqrt{x^3 - 2}$

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

$x^2 = y^3 - 2$

$y^3 = x^2 + 2$

$y = \sqrt[3]{x^2+2}$

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

D: $[.02,\infty)$

E. $f(x) = \sqrt[3]{2x+1}$ D: $(-\infty,\infty)$ R: $(-\infty,\infty)$

$y = \sqrt[3]{2x+1}$

$x = \sqrt[3]{2y+1}$

$x^3 = 2y+1$

$x^3 - 1 = 2y$

$y = \dfrac{x^3-1}{2}$

$f^{-1}(x) = \dfrac{x^3-1}{2}$

D: $(-\infty,\infty)$

$f(g(x)) = g(f(x)) = x$	Confirm that f and g are inverses by showing that f(g(x)) and g(f(x)) = x. A. $f(x) = x^3 + 1$ and $g(x) = \sqrt[3]{x-1}$ $f(g(x))$ $f(\boxed{\sqrt[3]{x-1}}) = x^3 + 1$ $= (\sqrt[3]{x-1})^3 + 1$ $x - 1 + 1$ x $g(f(x)) =$ $g(x^3+1) = \sqrt[3]{x-1}$ $= \sqrt[3]{x^3+1-1}$ $= \sqrt[3]{x^3}$ $= x$
$\frac{2x-3}{x-1} - 2$	32) $f(x) = \frac{x+3}{x-2}$ and $g(x) = \frac{2x+3}{x-1}$ $f(g(x)) =$ $f\left(\frac{2x+3}{x-1}\right) = \frac{\frac{2x+3}{x-1} + \frac{3}{1}\frac{(x-1)}{(x-1)}}{\frac{2x+3}{x-1} - \frac{2}{1}\frac{(x-1)}{(x-1)}}$ $\frac{\frac{2x+3}{x-1} + \frac{3x-3}{x-1}}{\frac{2x+3}{x-1} + \frac{-2x+2}{x-1}}$ $\frac{\frac{5x}{\cancel{x-1}} \cdot \frac{\cancel{x-1}}{5}}{\frac{5}{x-1}}$ $g(f(x)) = \frac{2\left(\frac{x+3}{x-2}\right) + 3}{\frac{x+3}{x-2} - 1}$ $= \frac{\frac{2x+6}{x-2} + \frac{3}{1}\frac{(x-2)}{(x-2)}}{\frac{x+3}{x-2} - \frac{1}{1}\frac{(x-2)}{(x-2)}}$ $\frac{\frac{2x+6}{x-2} + \frac{3x-6}{x-2}}{\frac{x+3}{x-2} + \frac{-x+2}{x-2}}$ $\frac{\frac{5x}{\cancel{x-2}} \cdot \frac{\cancel{x-2}}{5}}{\frac{5}{x-2}}$

$\frac{5x}{5}$

x

$\frac{5x}{5}$

x

$$f(x) = \frac{x+3}{4} \qquad g(x) = 4x-3$$

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

$$f(4x-3) = \frac{x+3}{4}$$

$$= \frac{4x-3+3}{4}$$

$$= \frac{4x}{4}$$

$$= x$$

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

$$g\left(\frac{x+3}{4}\right) = 4x-3$$

$$= \cancel{4}\left(\frac{x+3}{\cancel{4}}\right) - 3$$

$$x+3-3$$

$$x$$

$$f(x) = \sqrt{x+2}$$

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

$$(x)^2 = \left(\sqrt{y+2}\right)^2$$

$$x^2 = y+2$$

$$y = x^2 - 2$$

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

$$D: [0, \infty)$$