Warm-up:

$f(x) = x^2 + 1$ Find $f(g(x)) =$

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

$f(x) = \frac{2}{3}x - 5$

$g(x) = \frac{3}{2}x + \frac{15}{2}$

Use calculator

Find the inverses

1) $x = \sqrt{y-1} + 2$

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

$x \geq 2$

2) $x = y^2 + 4$

$\sqrt{x-4} = y$

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

3) $x = 2y - 1$

$x + 1 = 2y$

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

4) $x = \left(\frac{1}{2}\right)^y$

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

Graph and give domain and range of each function. in interval notation

1) $y = \sqrt{x-1} + 2$

2) $y = (x^2 + 4)$ for $x \geq 0$

3) $y = 2x - 1$

4) $y = \left(\frac{1}{2}\right)^x$

5) $y = \frac{10}{x}$ ← is its own inverse

1) d $[+1, \infty)$
r $[2, \infty)$

2) d $[0, \infty)$
r $[4, \infty)$

3) d $(-\infty, \infty)$
r $(-\infty, \infty)$

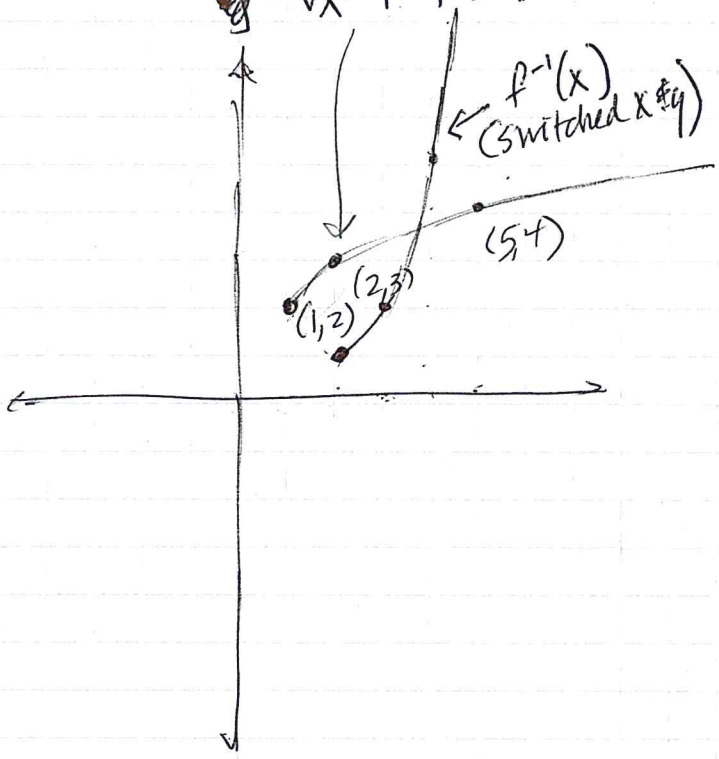
4) d $(-\infty, \infty)$
r $(0, \infty)$

5) d $(-\infty, 0) \cup (0,$
r $(-\infty, 0) \cup (0,$

Do 1-5 pass horizontal & vertical line test? So one-to-one? So all are invertible. Domain & range will switch on inverses.

Find inverse graphically.

$f(x) = \sqrt{x-1} + 2$.



Find inverse algebraically.

$y = \sqrt{x-1} + 2$ d $[1,\infty)$ r $[2,\infty)$

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

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

$(x-2)^2 = y-1$

$(x-2)^2 + 1 = y$

$f^{-1}(x) = (x-2)^2 + 1$ if $x \geq 2$

d $[2,\infty)$

r $[1,\infty)$

Warm-up:

1) $f(x) = x^2 + 1$

$g(x) = x - 2$

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

$x^2 - 4x + 4 + 1$

$= x^2 - 4x + 5$

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

$= x^2 - 1$

2) $f(x) = \frac{2}{3}x - 5$

$g(x) = \frac{3}{2}x + \frac{15}{2}$

$f(g(x)) = \frac{2}{3}\left(\frac{3}{2}x + \frac{15}{2}\right) - 5$

$= x + 5 - 5$ ✓

$= x$

$g(f(x)) = \frac{3}{2}\left(\frac{2}{3}x - 5\right) + \frac{15}{2}$

$= x - \frac{15}{2} + \frac{15}{2}$

$= x$ ✓

$f(x)$ & $g(x)$ are inverses.