10-28-19 1st Trig

Domain

① $f(x) = \sqrt{2x-1} \geq 0$

$+1 \quad +1$

$\frac{2x}{2} \geq \frac{1}{2}$

D: $x \geq \frac{1}{2}$

② $f(x) = \frac{x+3}{5}$ D: $\mathbb{R}$

③ $f(x) = \frac{8}{x-1 \neq 0}$

$+1 \quad +1$

D: except $x \neq 1$

④ $f(x) = \sqrt{-3x-6} \geq 0$

$+6 \quad +6$

$\frac{-3x}{-3} \geq \frac{6}{-3}$

D: $x \leq -2$

⑤ $f(x) = 2x-1$ $g(x) = x^2+1$

$f(f(g(-2)))$

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

$= 5$

$f(f(5))$

$f(5) = 2 \cdot 5 - 1$

$= 9$

$f(9) = 2 \cdot 9 - 1$

$= 17$

⑥ $f(x) = 3x - 2 \quad g(x) = 2x + 1$

$f(f(x)) =$

$f(3x-2) = 3 \cdot (3x-2) - 2$

$9x - 6 - 2$

$9x - 8$

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

$g(f(2x+1))$

$g(6x+1) = 2 \cdot \square + 1$

$f(x) = 3(2x+1) - 2$

$= 6x + 3 - 2$

$f(x) = 6x + 1$

$2(6x+1)+1$

$12x + 2 + 1$

$12x + 3$

⑦ Give inverse of $f(x) = \frac{3x}{2} + 1$

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

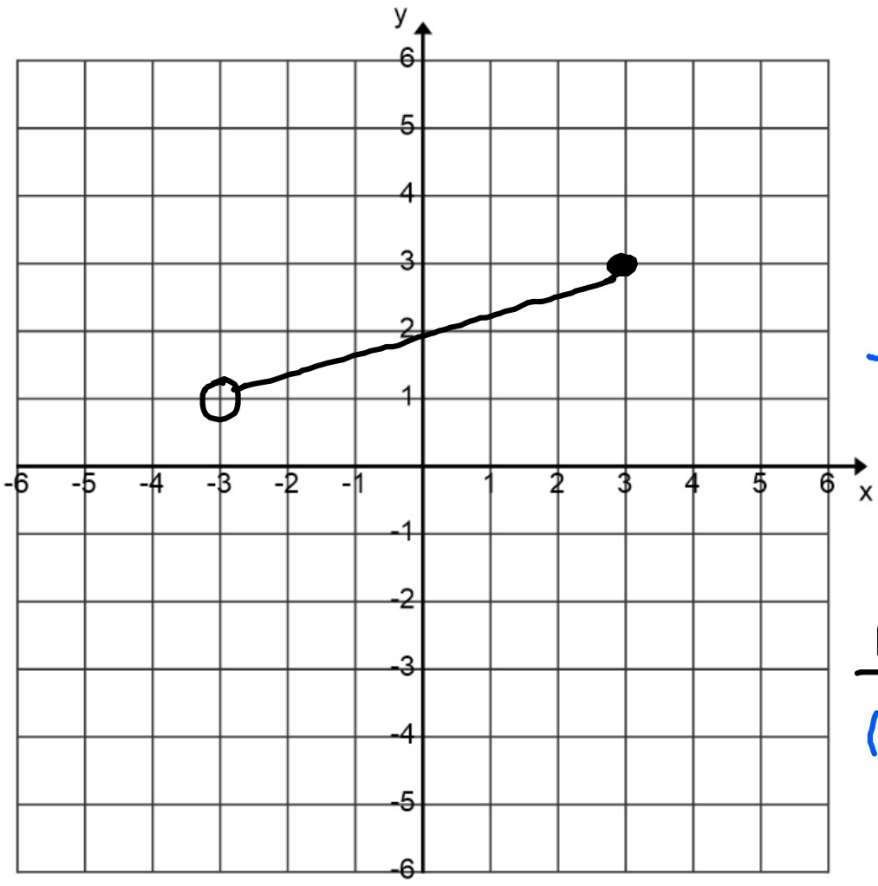
$x = \frac{3y}{2} + 1$

$-1 \qquad -1$

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

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

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

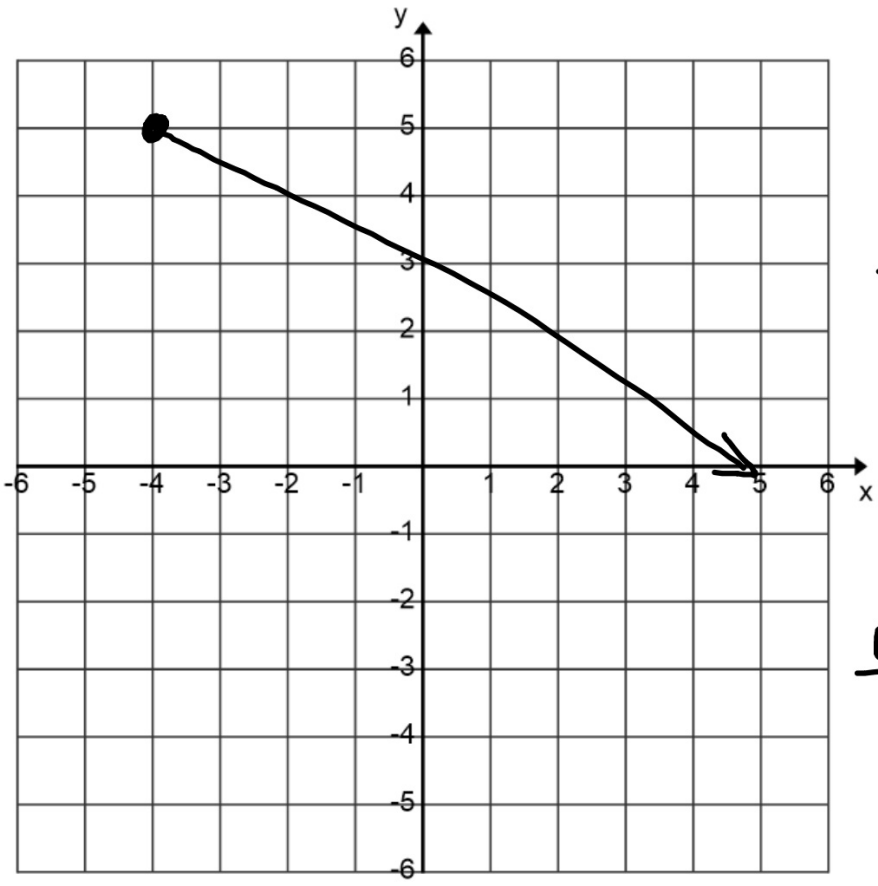


Domain

$-3 < x \leq 3$

Range

$1 < y \leq 3$

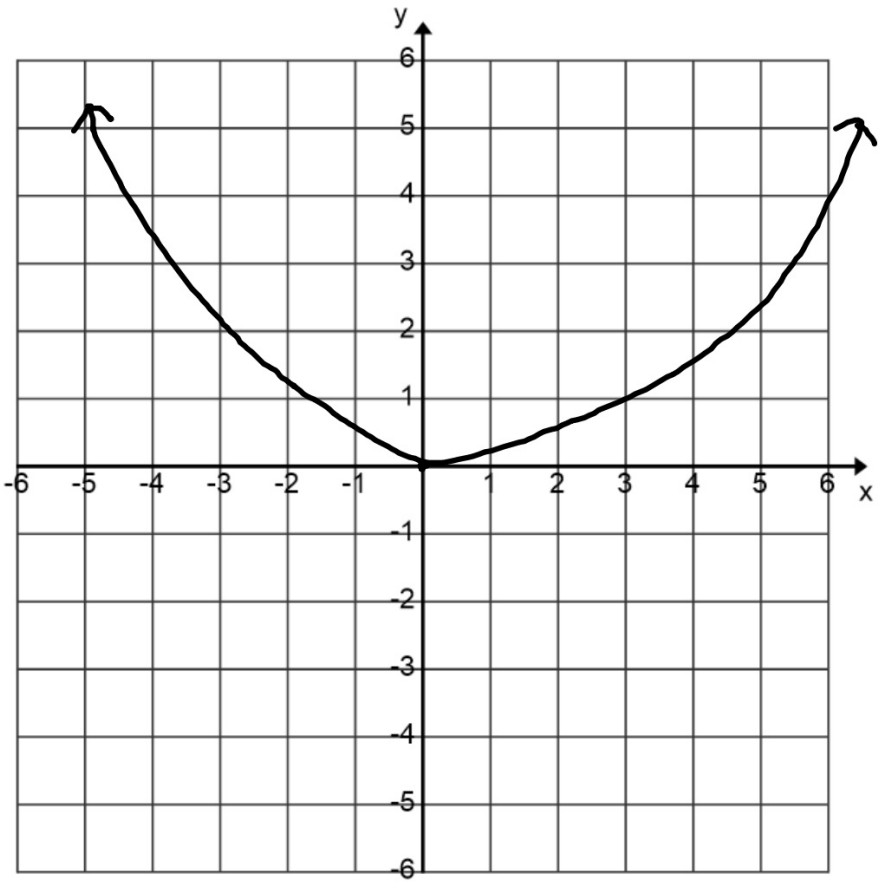


Domain

$x \geq -4$

Range

$y \leq 5$

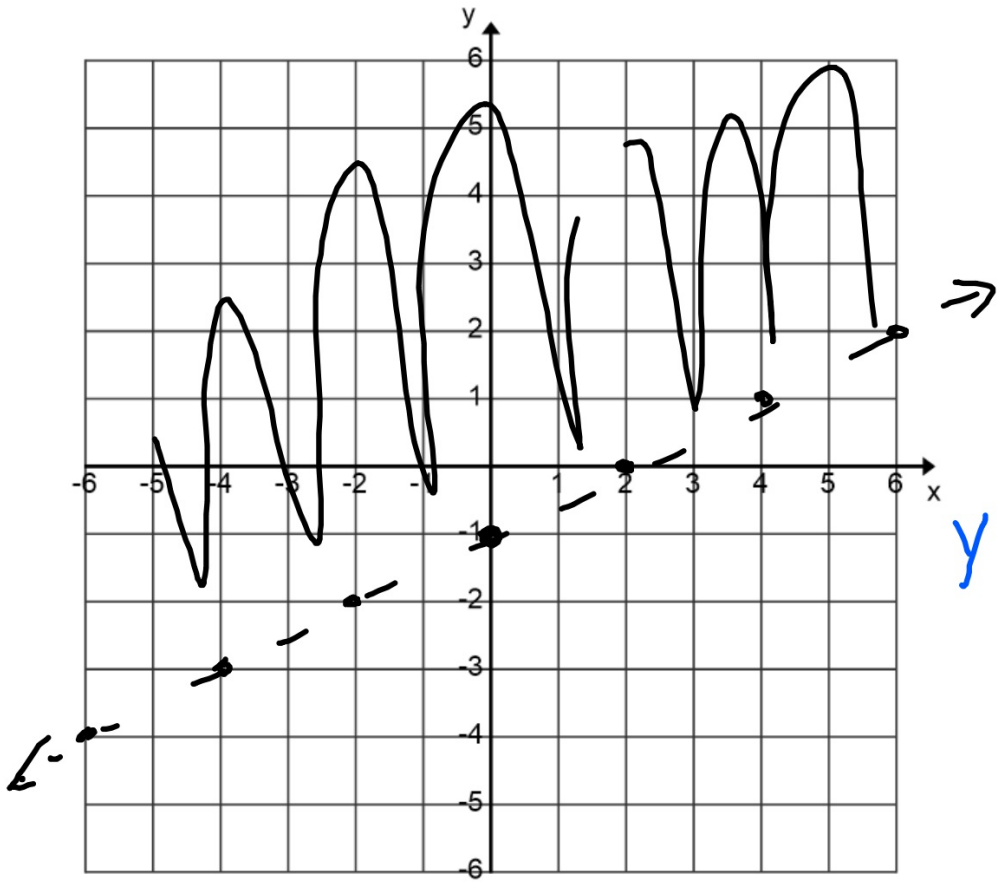


Domain

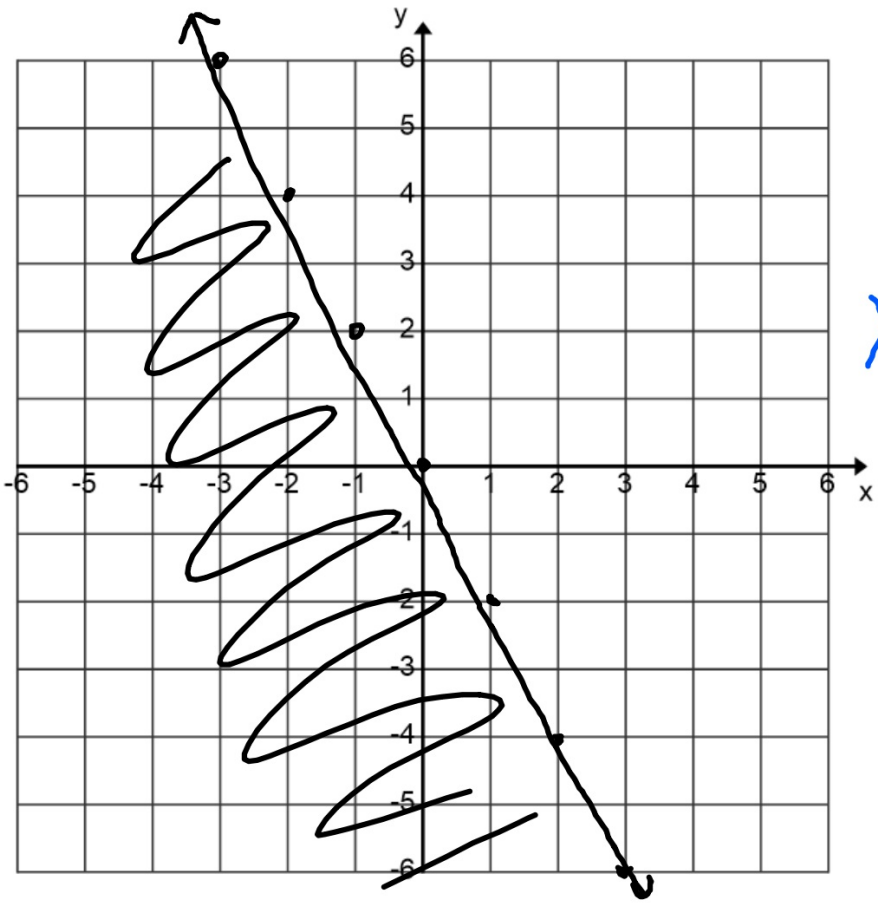
$\mathbb{R}$

Range

$y \geq 0$



$y > \frac{1}{2}x - 1$



$y \leq -2x$

10-28-19 3rd Try

Domain

① $f(x) = \sqrt{2x+6}$ $2x+6 \geq 0$, $x \geq -3$

② $f(x) = \frac{x+1}{5}$ $\mathbb{R}$

③ $f(x) = \frac{3}{x-2}$ $x-2 \neq 0$, $+2 \; +2$

$\mathbb{R}$ except $x \neq 2$

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

④ $f(g(-2))$

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

$= -9$

$f(-9) = 3(-9)-2$

$= -29$

⑤ $g(g(x))$

$g(5x+1) = 5(5x+1)+1$

$25x+5+1$

$25x+6$

⑥ $f(x) = 2x+4$

$f(f(f(x)))$

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

$f(4x+12) = 2\cdot(4x+12)+4$

$8x+24+4$

$8x+28$

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

$4x+8+4$

$4x+12$

⑦ $g(x) = 2x+7$ $\quad h(x) = 4x-1$

$g(h(g(x)))$

$g(h(2x+7))$

$g(8x+27) = 2\cdot(8x+27)+7$

$16x+54+7$

$16x+61$

$h(2x+7) = 4(2x+7)-1$

$8x+28-1$

$8x+27$

⑧ Give inverse of $f(x) = 8x-1$

$y = 8x-1$

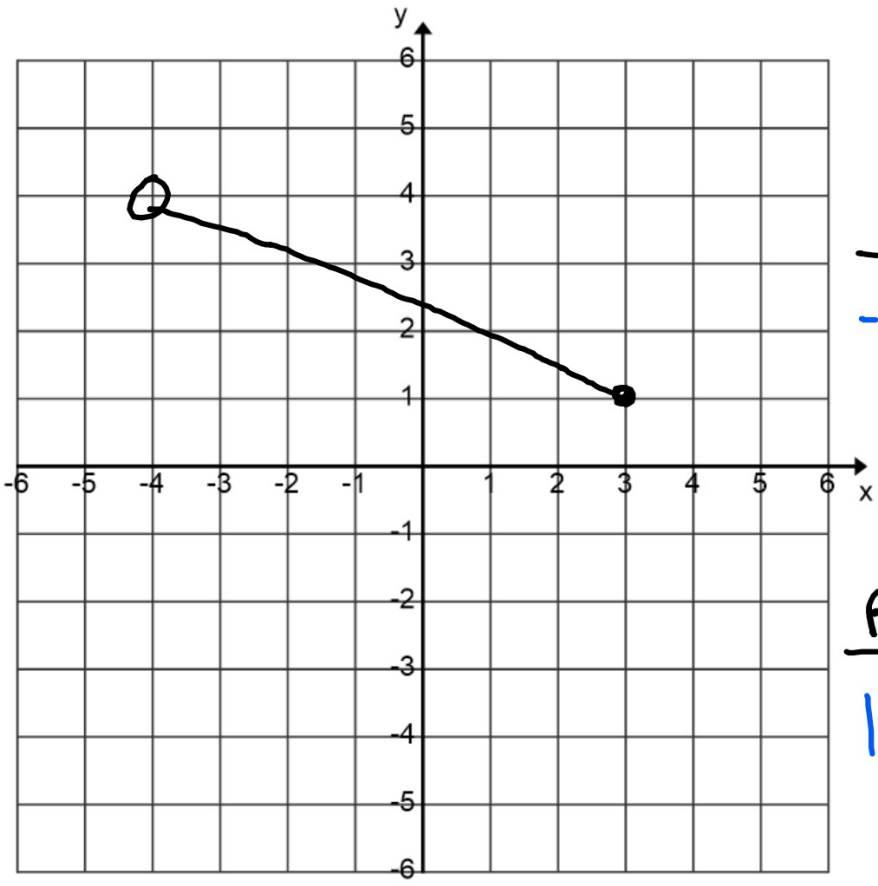
$x = 8y-1$

$+1 \quad +1$

$x+1 = 8y$

$\frac{x+1}{8} = \frac{8y}{8}$

$f^{-1}(x) = \frac{x+1}{8}$

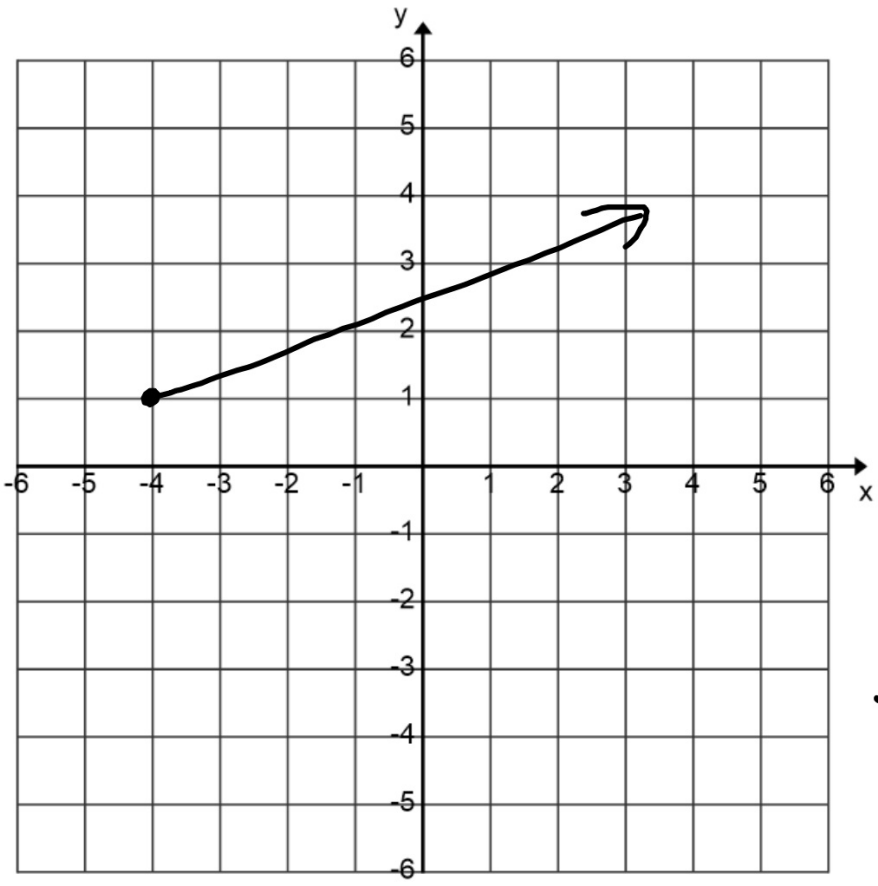


Domain

$-4 < x \leq 3$

Range

$1 \leq y < 4$

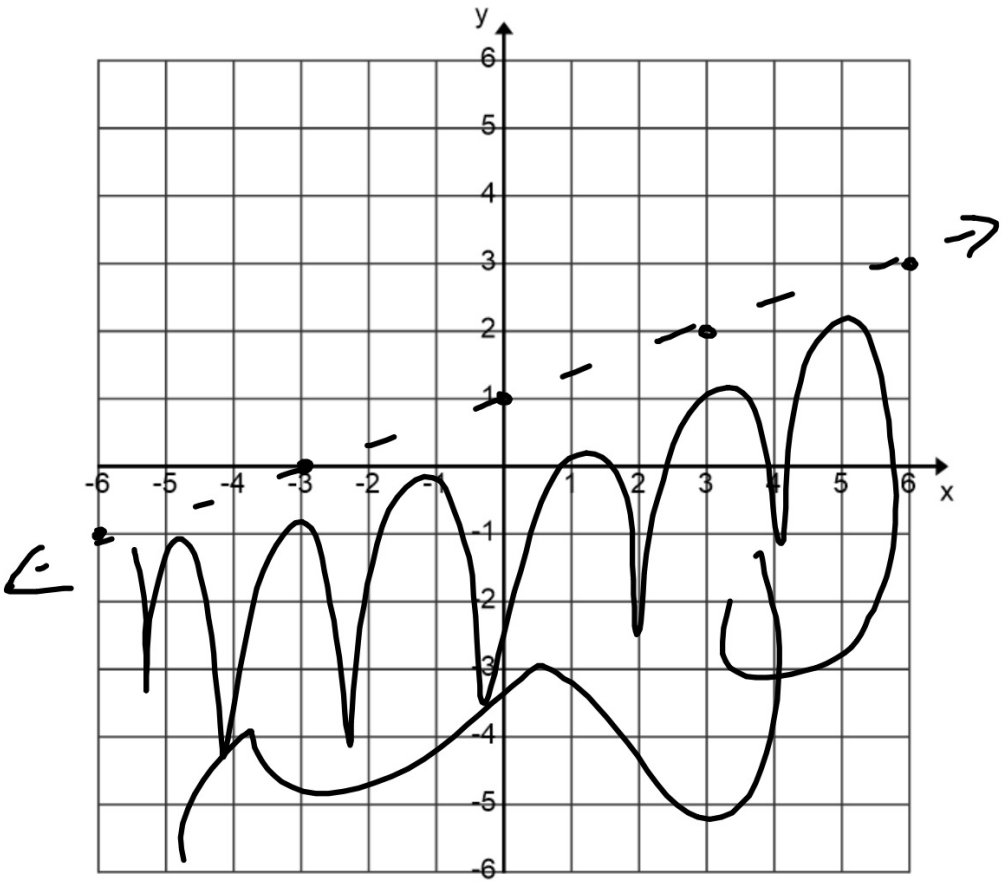


Domain

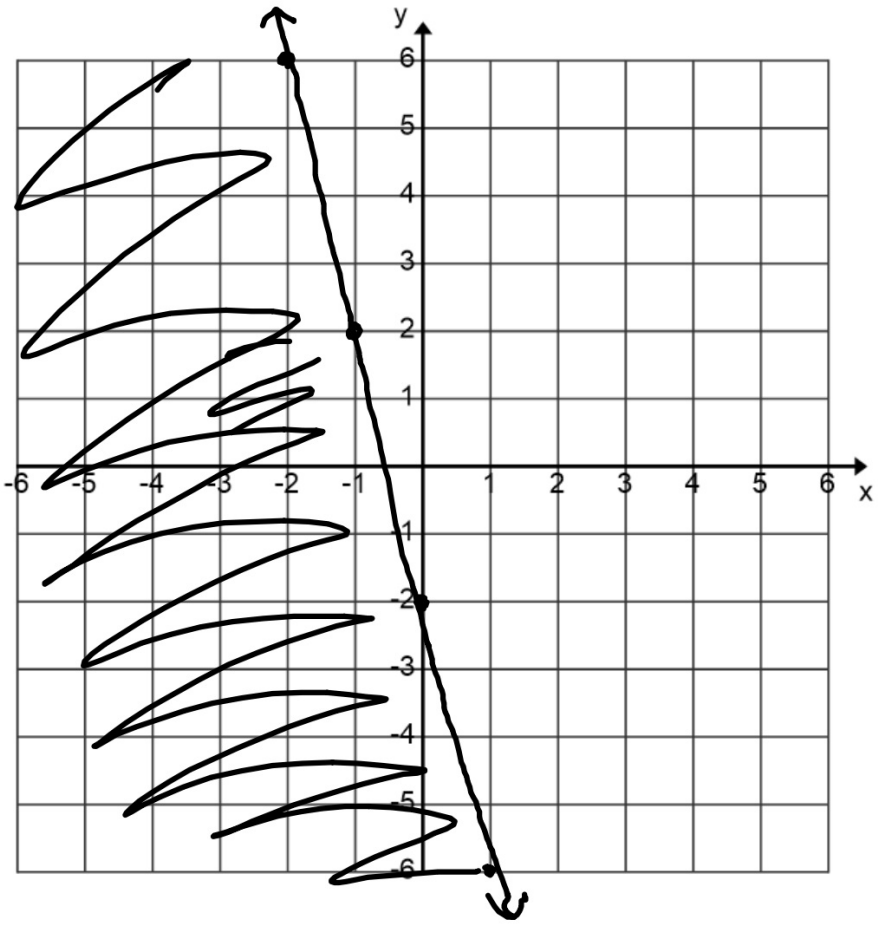
$x \geq -4$

Range

$y \geq 1$



$y < \frac{1}{3}x + 1$



$y \leq -4x - 2$

10-28-19 4th Trig

Domain

① $f(x) = \sqrt{2x-10} \geq 0$

R: $x \geq 5$

② $f(x) = \frac{8x+1}{x-14} \neq 0$ R except $x \neq 14$

③ $f(x) = \frac{x+2}{5}$ R

④ $f(x) = 3x - 1$

$f(f(-2))$

$f(-2) = 3(-2) - 1 = -7$

$f(-7) = 3(-7) - 1 = -22$

⑤ $f(x) = 10x + 4$

$f(f(x))$

$f(10x+4) = 10 \cdot (10x+4) + 4$

$100x + 40 + 4$

$100x + 44$

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

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

$f(g(2x+1))$

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

$= 6x+3-5$

$= 6x-2$

$f(6x-2) = 2\cdot(6x-2)+1$

$12x-4+1$

$12x-3$

(7) Give inverse of $f(x) = \frac{x}{2} - 1$

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

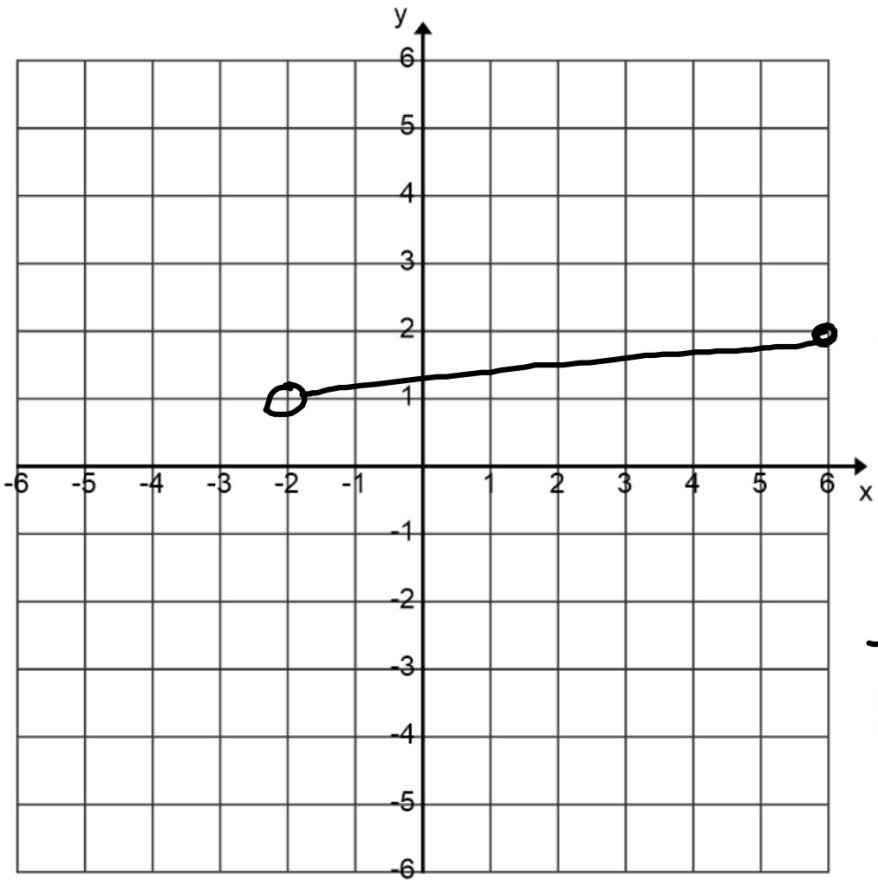
$x = \frac{y}{2} - 1$

$+1 \qquad +1$

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

$2x+2 = y$

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

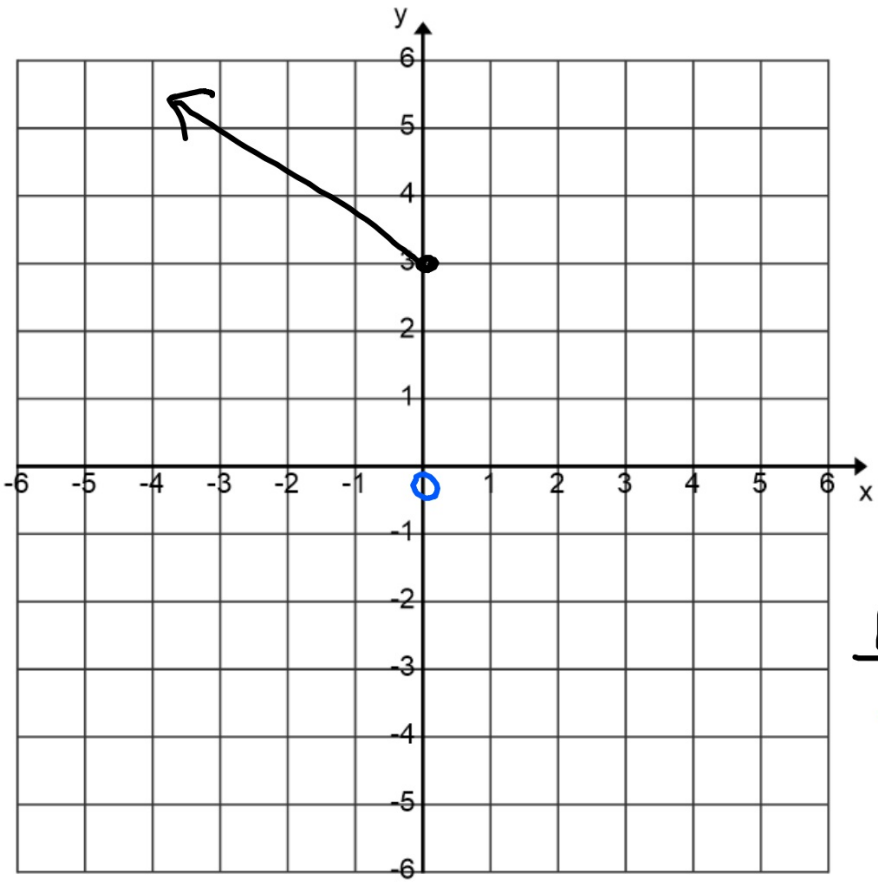


Domain

$-2 < x \leq 6$

Range

$1 < y \leq 2$

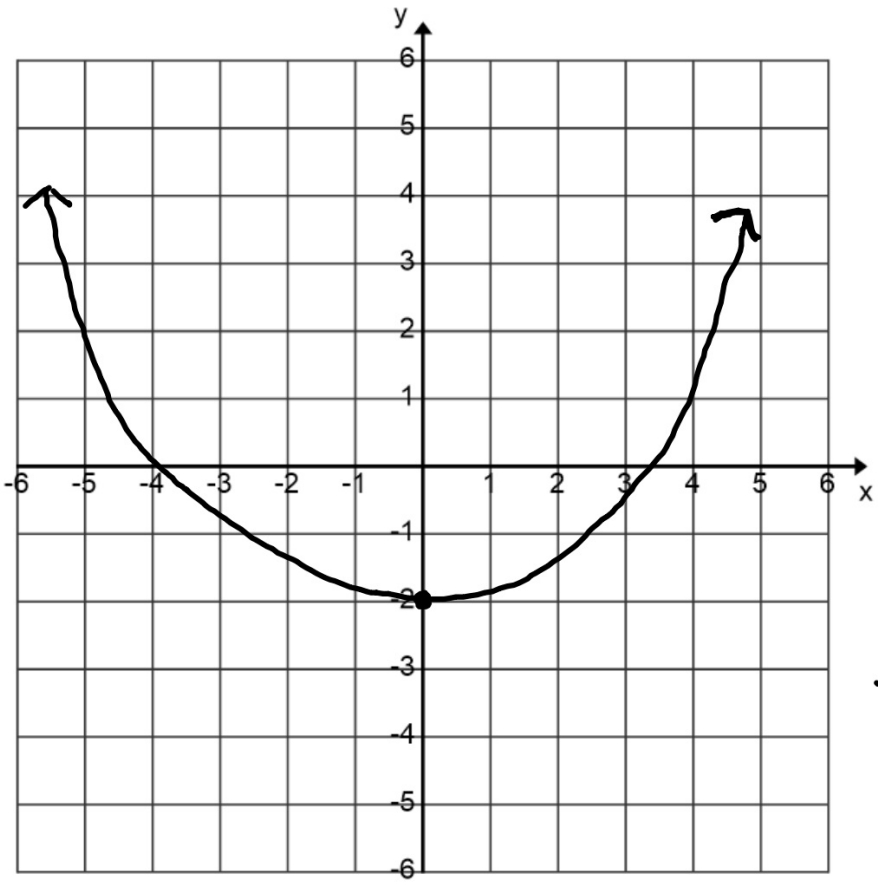


Domain

$x \leq 0$

Range

$y \geq 3$

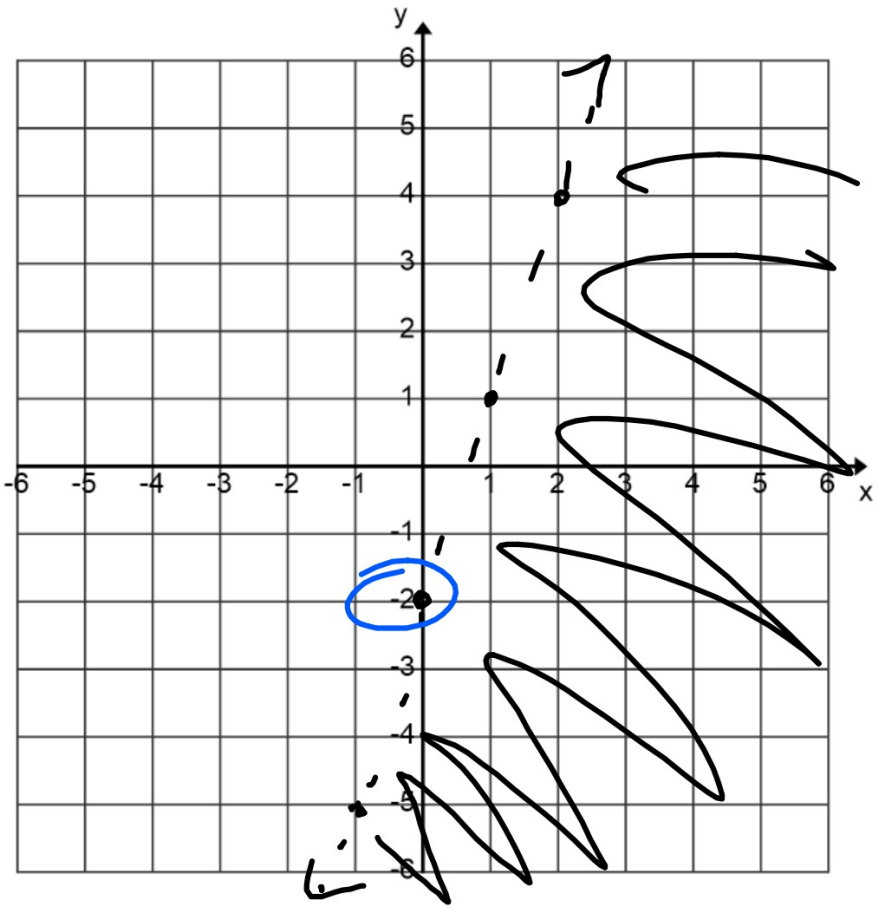


Domain

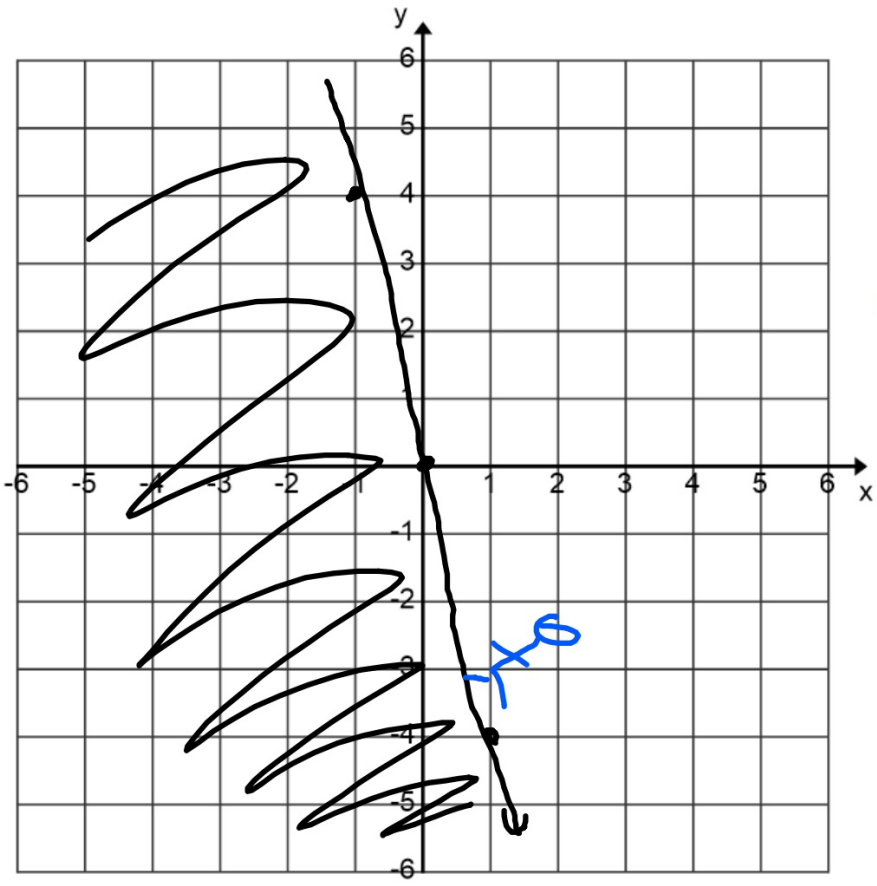
$\mathbb{R}$

Range

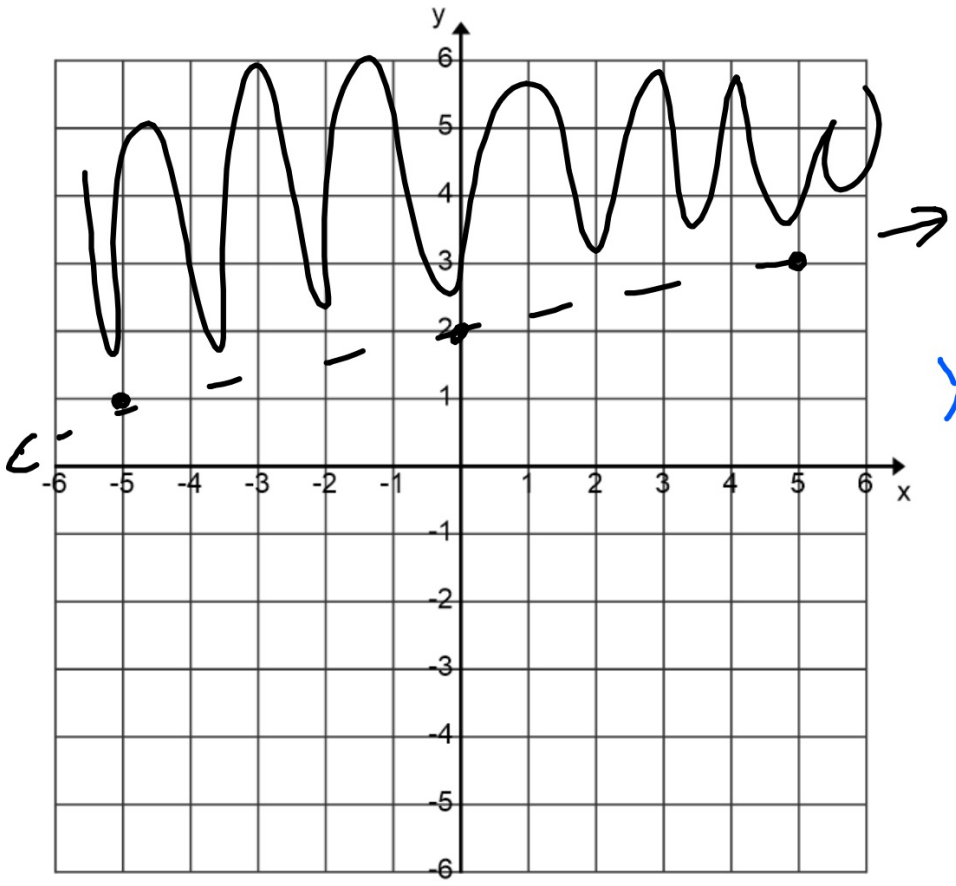
$y \geq -2$



$y < 3x - 2$



$y \leq -4x$



$y > \frac{1}{5}x + 2$