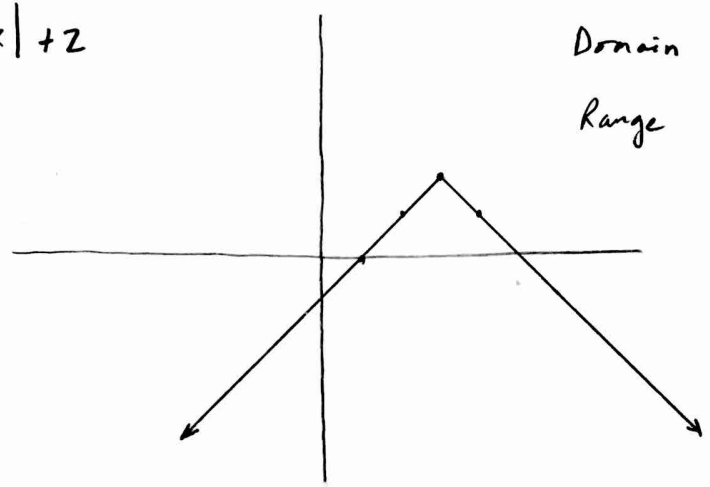


29) $f(x) = -|3-x| + 2$

x	f(x)
-2	-3
-1	-2
0	-1
1	0
2	1
3	2
4	1
6	-1

Domain $(-\infty, \infty)$

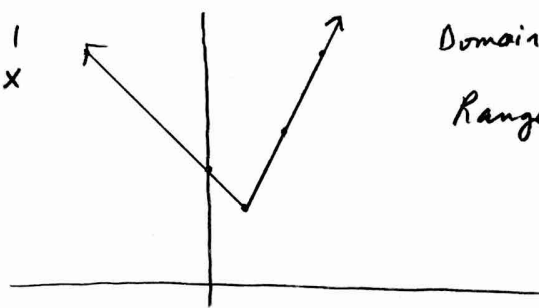
Range $(-\infty, 2]$



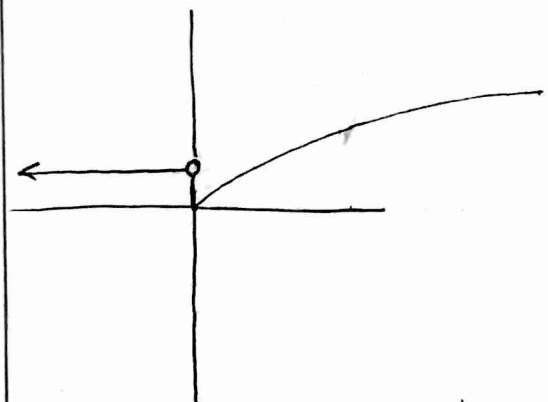
31) $f(x) = \begin{cases} 3-x & x \leq 1 \\ 2x & 1 < x \end{cases}$

Domain $(-\infty, \infty)$

Range $[2, \infty)$



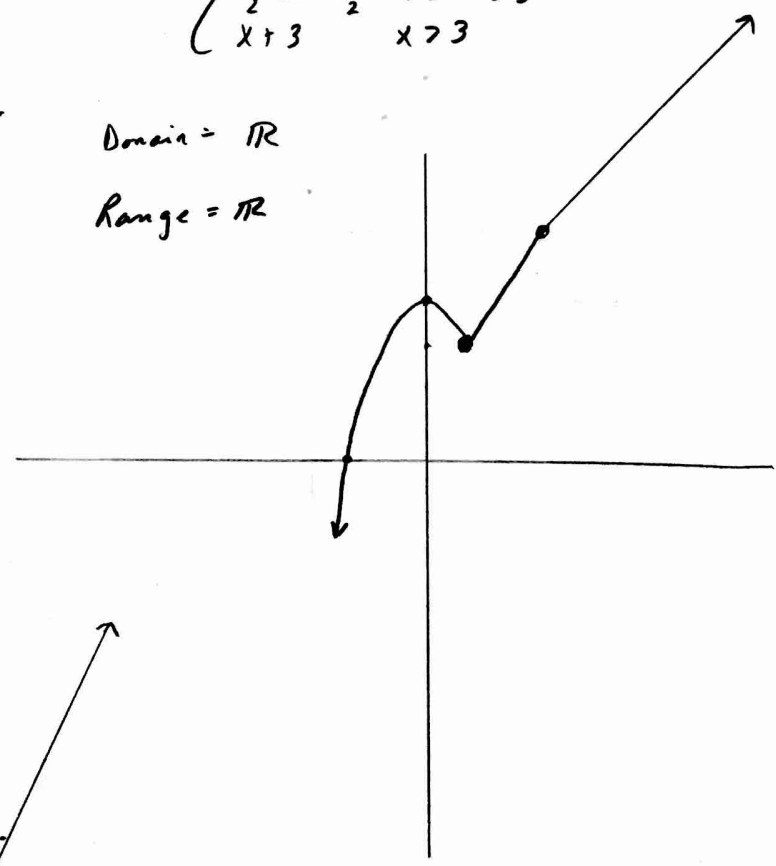
32) $f(x) = \begin{cases} 1 & x < 0 \\ \sqrt{x} & x \geq 0 \end{cases}$



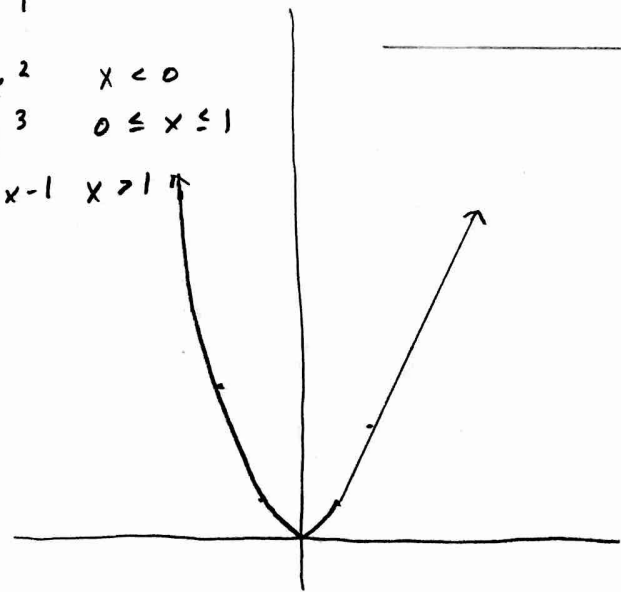
33) $f(x) = \begin{cases} 4-x^2 & x < 1 \\ \frac{3}{2}x + \frac{3}{2} & 1 \leq x \leq 3 \\ x+3 & x > 3 \end{cases}$

Domain = \mathbb{R}

Range = \mathbb{R}



34) $f(x) = \begin{cases} x^2 & x < 0 \\ x^3 & 0 \leq x \leq 1 \\ 2x-1 & x > 1 \end{cases}$

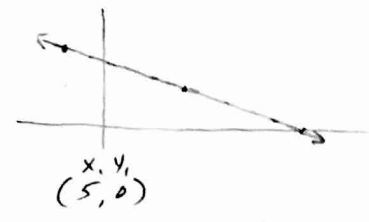


41)

$$f(x) = \begin{cases} x; & 0 \leq x \leq 1 \\ -x+2; & 1 < x \leq 2 \end{cases}$$

43)

$$f(x) = \begin{cases} -x+2; & 0 < x \leq 2 \\ -\frac{1}{3}x + \frac{5}{3}; & 2 < x \leq 5 \end{cases}$$



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

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

45)

$$f(x) = \begin{cases} -x; & -1 \leq x < 0 \\ 1; & 0 < x \leq 1 \\ -\frac{1}{2}x + \frac{3}{2}; & 1 < x \leq 3 \end{cases}$$

47)

$$f(x) = \begin{cases} 0; & 0 \leq x \leq \frac{T}{2} \\ x-1; & \frac{T}{2} < x \leq T \end{cases}$$

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

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

49)

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

- a) $f(g(x))$ b) $g(f(x))$ c) $f(g(0))$ d) $g(f(0))$
- e) $g(g(-2))$ f) $f(f(x))$

a) $f(x^2 - 3) = x^2 - 3 + 5$
 $= x^2 + 2$

b) $g(x+5) = (x+5)^2 - 3$
 $(x+5)(x+5) - 3$
 $x^2 + 10x + 25 - 3$
 $x^2 + 10x + 22$

c) $f(g(0)) = 0^2 + 2$
 $= 2$

d) $g(f(0)) = 0^2 + 0 + 22$
 $= 22$

e) $g(g(-2))$
 $g(-2) = (-2)^2 - 3$
 $= 4 - 3$
 $= 1$
 $g(1) = -2$

f) $f(f(x))$
 $f(x+5) = x+5+5$
 $= x+10$

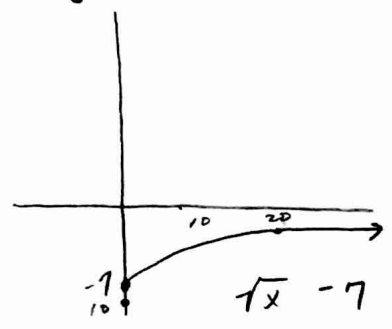
51) $f(x) = x - 7$ $g(x) = \sqrt{x}$

$f \circ g$

$f(g(x)) = f(\sqrt{x}) = \sqrt{x} - 7$

Domain $[0, \infty)$

Range $[-7, \infty)$

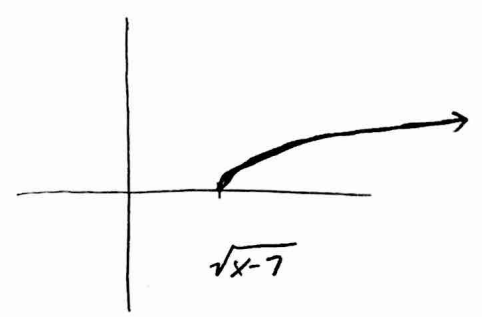


$g \circ f$

$g(f(x)) = g(x - 7) = \sqrt{x - 7}$

Dom $[7, \infty)$

Range $[0, \infty)$



53) $f(x) = x^2 - 3$ $g(x) = \sqrt{x+2}$

$f \circ g$

$f(g(x)) = (\sqrt{x+2})^2 - 3$

$f \circ g = x + 2 - 3$
 $= x - 1$

Domain $x \geq -2$

Range $[-3, \infty)$

$g \circ f$

$g(x^2 - 3)$

$\sqrt{x^2 - 3 + 2}$

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

Dom $(-\infty, -1] \cup [1, \infty)$

Range $[0, \infty)$