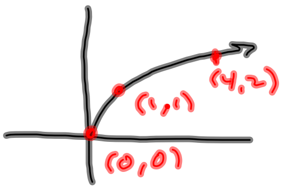
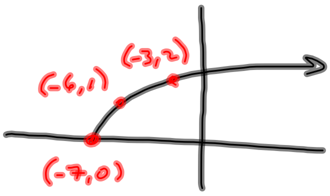
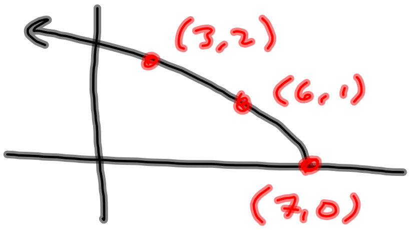
$$g(x) = -\sqrt{7 - x} + 3$$

$f(x) = \sqrt{x}$ $\longrightarrow$ $f(x+7)$ $\sqrt{x+7}$ HORIZ SHIFT $\longrightarrow$ $f(-x+7)$ $\sqrt{-x+7}$ HORIZ. REFLECTION



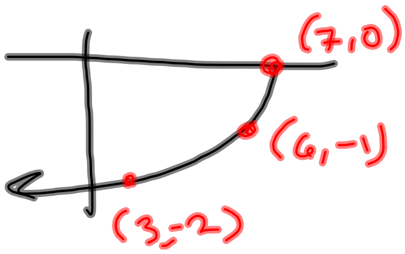


$\sqrt{x+7}$



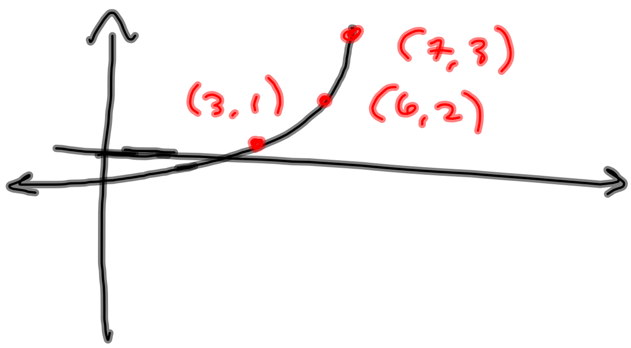
$$-f(-x+7)$$

$$-\sqrt{-x+7}$$



$$-\sqrt{-x+7} + 3 = g(x)$$

$$= -f(-x+7) + 3$$



$g(x) = -\sqrt{7-x} + 3$

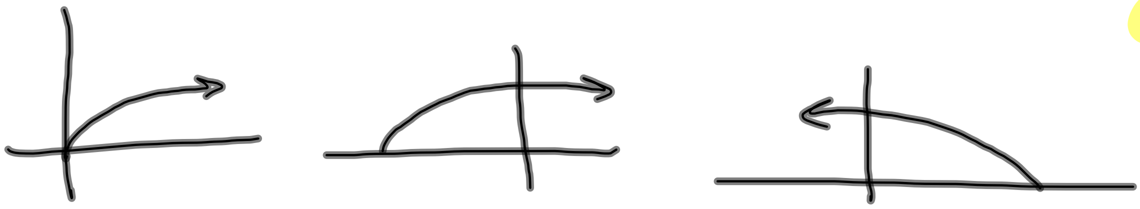
Horizontal Reflection B4 HORIZONTAL SHIFT

$7 - x = -x + 7 = -(x-7)$

$\sqrt{x} \longrightarrow \sqrt{-x} \longrightarrow \sqrt{-(x-7)}$

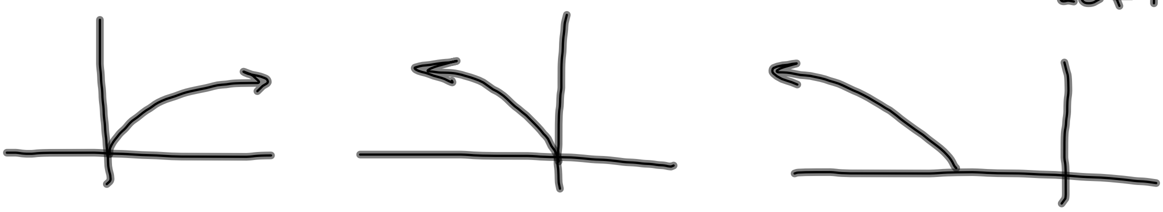
other way:

$\sqrt{x} \longrightarrow \sqrt{x+7} \longrightarrow \sqrt{-x+7}$



COMMON MISTAKE:

$\sqrt{x}$ $\sqrt{-x}$ $\sqrt{-(x-7)}$ RIGHT 7
$\sqrt{-x+7}$ NOT LEFT 7



There is no rule for
replacing $-x$ by $-x+7$
only x by $-x$
and x by $x \pm h$

Sep 24-10:14 AM

§2.4 #s 1-10, 15, 16, 24, 26, 28, 30-33, 37-42, 51, 52, 63, 66, 68, 73, 74, 81, 82

Operations on/with functions.

Sums / Differences $(f \pm g)(x)$

Products / Quotients $(f \cdot g)(x) = (fg)(x)$, $\left(\frac{f}{g}\right)(x)$

COMPOSITION $(f \circ g)(x) = f(g(x))$

$f(x) = 3x-1$, $g(x) = x^2 - 7$

$(f+g)(x) = \underline{3x-1 + x^2-7} = f(x) + g(x)$

$(f-g)(x) = \underline{3x-1-(x^2-7)} = f(x) - g(x)$

$(fg)(x) = \underline{(3x-1)(x^2-7)} = \left(f(x)\right)\left(g(x)\right)$

$\left(\frac{f}{g}\right)(x) = \frac{3x-1}{x^2-7} = \frac{f(x)}{g(x)}$

$f(x) = 3x-1, \quad g(x) = x^2 - 7$

$(f \circ g)(x) =$ f composed with g of x.

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

$= 3(x^2-7) - 1$

$(g \circ f)(x) = g(f(x)) = (3x-1)^2 - 7$

Pretty Standard.

write $H(x)$ as a composition of two functions.

$H(x) = (2x+5)^2 - 3(2x+5) + 11$

Want $(f \circ g)(x) = \boxed{f(g(x)) = H(x).}$

$f(x) = x^2 - 3x + 11$

$g(x) = 2x+5$

The cheat that I hate:

$f(x) = (2x+5)^2 - 3(2x+5) + 11$

$g(x) = x$

Then $f(g(x)) = (2g(x)+5)^2 - 3(2g(x)+5) + 11$

$= (2x+5)^2 - 3(2x+5) + 11$

$= H(x)$ you cheater.

Sep 24-10:27 AM

Profit $= P(x) = 4x-3$ in \$, describes how much I make from x shirts

Suppose I can make 5 shirts in 1 hour. How fast am I making money (\$/hr)

x = the # of shirts.
t = time, in hours. Then
$x = 5t$ and profit

$= P(x) = P(x(t)) = 4(5t)-3$
$= \boxed{20t-3}$

\$
$40-3=37$

$2000-3 =$ \$1997 in 100 hrs.

The \$3 is fixed cost
(Taxes/bribes

Other lame example:
Fuel cost per mile: A function of gas mileage and cost per gallon of gas.
Function of a function

Sep 24-10:34 AM

$f = \{(-3,1), (0,4), (2,0)\} = \{(-3, f(-3)), (0, f(0)), (2, f(2))\}$

$g = \{(-3,2), (1,2), (2,6)\}$ But $6 \notin \mathcal{D}(f)$

$f+g = \{(-3,3), (2,6)\}$

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

$f(-3) = 1$

$g(-3) = 2$

$(f+g)(-3) = 3$

0 & 1 aren't in the domain of the sum.

$(f \circ g)(x) = \{(-3,0), (1,0)\}$

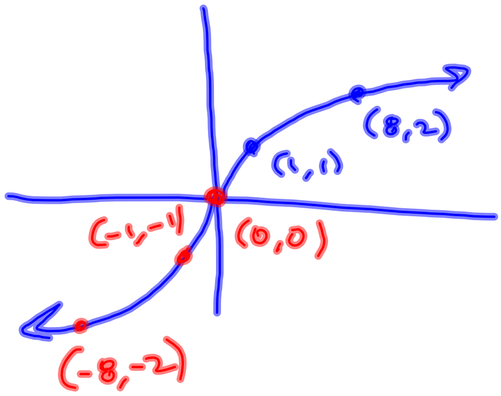
$f(g(x))$

g sends 1 to 2 and f sends 2 to 0.

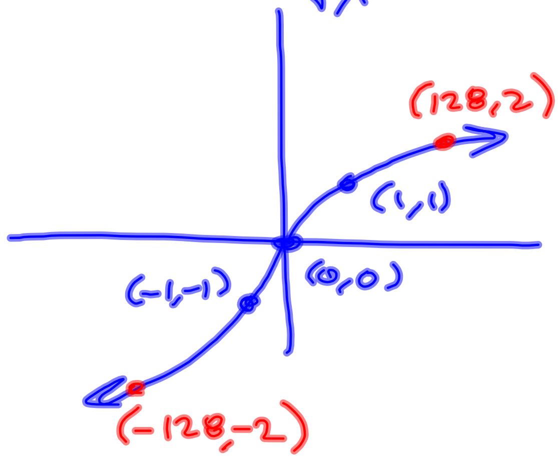
g sends -3 to 2 & f sends 2 to 0.

Questions on §2.1 – 2.4

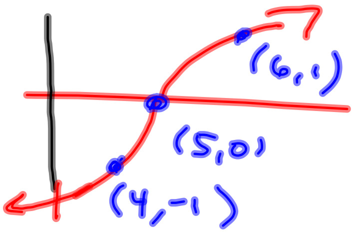
$f(x) = \sqrt[3]{x}$



$\sqrt[7]{x}$



$\sqrt[3]{x-5}$



$\{(1,2^*), (3,4), (2,-3), (4,2^*)\}$
is a function.

But it's <u>NOT</u> <u>1-to-1</u> function.

1-to-1 function is a function that has no repetitions in the 2nd coordinate

Function: x has just one y
1-to-1 Function: " " " " " and
y has just one x.

Why do we care?

$f = \{(1,2), (3,4)\}$ is 1-to-1 func.

Then $g = \{(2,1), (4,3)\}$ is the <u>inverse relation</u> AND it's a function.

$= f^{-1}$ = "f inverse"

Sep 24-10:55 AM