Warm Up

If $f(x)=\frac{4}{x-1}$ and $g(x)=2x$, then the solution set of $f(g(x))=g(f(x))$ is

(A) $\left\{\frac{1}{3}\right\}$ (B) $\{2\}$ (C) $\{3\}$ (D) $\{-1,2\}$ (E) $\left\{\frac{1}{3},2\right\}$

$f(g(x))$

$f(2x)$

$\frac{4}{2x-1}$

$g(f(x))$

$g\left(\frac{4}{x-1}\right)$

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

$=\frac{8}{x-1}$

$(\cancel{x-1})(2x-1)$

$\frac{8}{\cancel{x-1}}=\frac{4}{\cancel{2x-1}}(x-1)(\cancel{2x-1})$

$8(2x-1)=4(x-1)$

$16x-8=4x-4$

$\frac{12x}{12}=\frac{4}{12}$

A $x=\frac{1}{3}$

Check Up

Given the three functions....

$f(x) = 1 - x$ $\qquad$ $g(x) = \sqrt{x+1}$ $\qquad$ $h(x) = x^2 + 5$

Evaluate each of the following:

1. $(f \circ g)(3)$
2. $(g \circ h)(0)$
3. $(g \circ g \circ f)(-7)$
4. $(h \circ g \circ h \circ f)(-1)$
5. $(f \circ h \circ g)(m)$

1/ $g(3) = \sqrt{4} = 2$
$f(2) = -1$

2/ $h(0) = 5$
$g(5) = \sqrt{6}$

3/ $f(-7) = 8$
$g(8) = 3$
$g(3) = 2$

4/ $f(-1) = 2$
$h(2) = 9$
$g(9) = \sqrt{10}$
$h(\sqrt{10}) = 15$

5/ $g(m) = \sqrt{m+1}$
$h(\sqrt{m+1}) = (\sqrt{m+1})^2 + 5$
$= m+6$
$f(m+6) = 1 - (m+6)$
$= -m-5$

Given the graph of f(x) shown below, evaluate the following:

$$\frac{3f(1)-5\left[f(3)-7f(0)\right]}{2f(-2)-3f(-4)}$$

$f(1) \Rightarrow$ "What is y-value when x-value = 1"

$f(1) = 4$

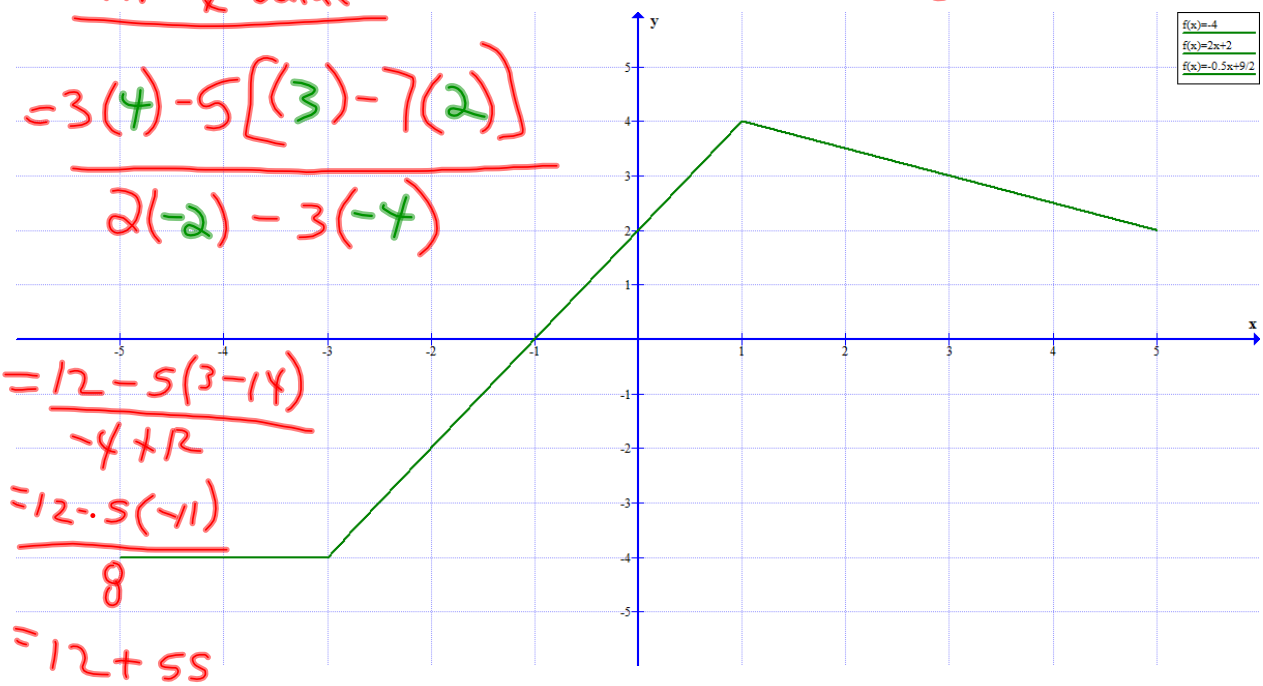
$$= \frac{3(4)-5\left[(3)-7(2)\right]}{2(-2)-3(-4)}$$

$$= \frac{12-5(3-14)}{-4+12}$$

$$= \frac{12-5(-11)}{8}$$

$$= \frac{12+55}{8}$$

$$= \frac{67}{8}$$



Unit Test: Monday

Notes

⇒ Sketch piecewise function

⇒ Function Notation

⇒ combinations: Domain (Intersection of Domains)

⇒ compositions:

⇒ Catalog of essential functions

Functions: Transformations

→ Translations, Reflections, Stretches

$$y = a\,f[b(x-h)] + k$$

- a: - Vert. stretch; - Reflect in x axis
- b: - Reflect in y-axis; - Horizontal stretch $\left(\frac{1}{b}\right)$
- h: Horizontal Translation
- k: Vertical Translation

Mapping:

$$(x, y) \to \left(\frac{1}{b}x + h,\ ay + k\right)$$

⇒ Inverse Functions

- Switch "x" & "y" (Domain & Range)
- Sketch Inverses from a given graph (Reflects in line $y=x$)
- One-one function (Horizontal line)
- Switch to inverse algebraically

i.e. $f(x) = x + 7$

$x = y + 7$

$x - 7 = y$

$f^{-1}(x) = x - 7$

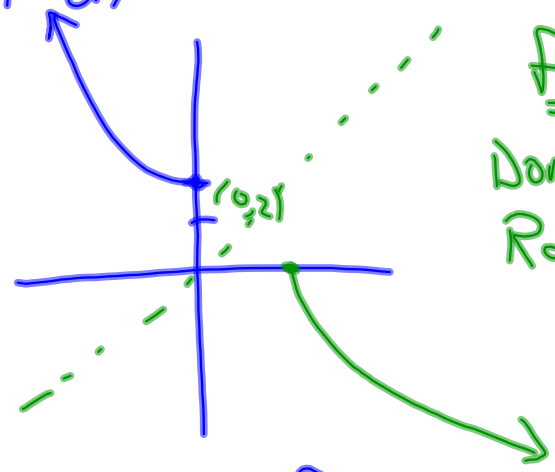
Chapter Review from textbook...

Pages 56-57
#2, 3, 6, 8, 9, 10, 11, 14, 15, 16

Practice Test
Pages 58-59
All questions

Pg. 53

7. d) $f(x) = x^2 + 2$, $x \leq 0$



$f(x)$

Domain: $x \leq 0$

Range: $y \geq 2$

$f^{-1}(x)$

Domain: $x \geq 2$

Range: $y \leq 0$

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

$x = y^2 + 2$

$y^2 = x - 2$

$y = \pm\sqrt{x-2} \Rightarrow f^{-1}(x) = -\sqrt{x-2}$

Bottom half of Parabola

Pg. 55

#20 c) $f^{-1}(a) = 1 \Rightarrow (a, 1)$ ← on inverse

"y"

and $f(x) = 2x^2 + 5x + 3$

$f(2) = 5$

$(2, 5)$

$\therefore (1, a)$ must be on $f(x)$

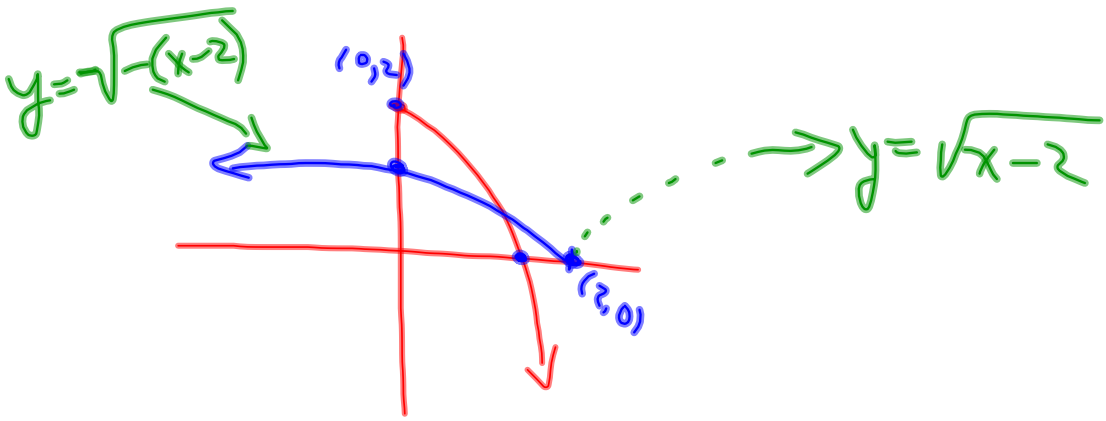
$a = 2(1)^2 + 5(1) + 3$

$a = 10$

$y = 2x^2 + 5x + 3$

$\sqrt{-x+2}$

$\sqrt{-1(1x-2)}$

$f(3x+15)$

$f(3(1x+5)$