p 152-153

1-10 match: name + describe shifts, end behavior

11-15 11-15 find domain + range

25+26 25+26 graph + state inc + dec intervals

33, 33 relative extrema

41-44 inverses

1) $f(x) = x^2 - 1$ [D]

quadratic
down 1
$x \to \infty$ $f(x) \to \infty$
$x \to -\infty$ $f(x) \to \infty$

2) $f(x) = |x-2|$ [F]

absolute value
right 2
$x \to \infty$ $f(x) \to \infty$
$x \to -\infty$ $f(x) \to \infty$

3) $f(x) = e^x - 1$ [I]

exponential
down 1
$x \to \infty$ $f(x) = \infty$
$x \to -\infty$ $f(x) = -1$

4) $f(x) = -\sin x$ [H]

trigometric
flipped
$x \to \infty$ $f(x) \to$ ∅
$x \to -\infty$ $f(x) \to$

5) $f(x) = x^2 + 1$ [B]

quadratic
up 1
$x \to \infty$ $f(x) \to \infty$
$x \to -\infty$ $f(x) \to \infty$

6) $1 + \cos x$ [J]

Trigometric
up 1
$x \to \infty$ $f(x) \to$ ∅
$x \to -\infty$

7) $f(x) = |x+2|$ [G]

absolute value
← left 2
$x \to \infty$ $f(x) \to \infty$
$x \to -\infty$ $f(x) \to \infty$

8) $(x-2)^2$ [C]

quadratic
right 2
$x \to \infty$ $f(x) \to \infty$
$x \to -\infty$ $f(x) \to \infty$

9) $f(x) = x^2 - 1$ [A]

quadratic
down 1
$x \to \infty$ $f(x) \to \infty$
$x \to -\infty$ $f(x) \to \infty$

10) $f(x) = \frac{x-1}{2}$ [E] → $\frac{1}{2}x - \frac{1}{2}$

linear
down 1/2
slope 1/2 (↑1 → 2)
$x \to \infty$ $f(x) \to \infty$
$x \to -\infty$ $f(x) \to -\infty$

$y + (x+1)^2$

11.) D: $(-\infty, \infty)$
R: $(-\infty, \infty)$

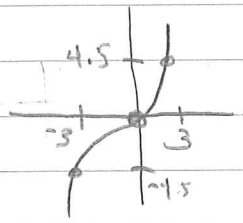
12) D: $(-\infty, \infty)$
R: $(-\infty, \infty)$

13) D: $(-\infty, \infty)$
R: $[0, \infty)$

14) D: $(-\infty, \infty)$
R: $[5, \infty)$

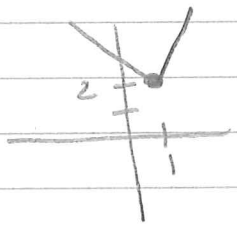
15) D: $(-\infty, \infty)$
R: $[8, \infty)$

25.) $y = \frac{x^3}{6}$ $\frac{1}{6}x^3$



Increasing $(-\infty, \infty)$
Decreasing: none

26) $y = |x-1| + 2$ (→1, ↑2)



inc: $(1, \infty)$
dec: $(-\infty, 1)$

33.) min $(-1, -7)$

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

42) $y = \sqrt[3]{x-8}$
$x = \sqrt[3]{y-8}$
$x^3 = y - 8$
$x^3 + 8 = y$

43) $y = \frac{2}{x}$
$x = \frac{2}{y}$
$xy = 2$
$y = 2/x$

44) $y = \frac{6}{x+4}$
$x = \frac{6}{y+4}$
$x(y+4) = 6$
$xy + 4x = 6$
$xy = 6 - 4x$
$y = \frac{6-4x}{x}$
$y = \frac{6}{x} - 4$

College Algebra

Name: Key

Unit 1 Review

Date: _____ Period: _____

From your book: pgs. 152-153

#1-10: match, name the function, and describe the shifts and end behavior
#11-15: find the domain and range of each function
#25-26: graph and state the intervals on which the function is increasing and decreasing
#33: state the relative extrema
#41-44: find the inverse

Graph each piecewise function and then state the domain and range.

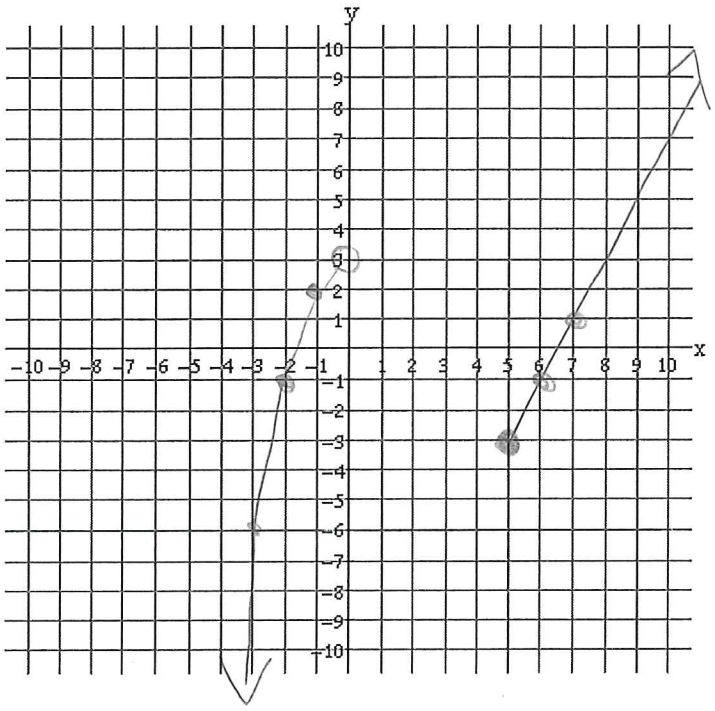
1.) $f(x)=\begin{cases}2x-13 & x\geq 5\\ 3-x^2 & x<0\end{cases}$

closed

x	y
5	-3
4	-1
7	1

open

x	y
0	3
-1	2
-2	-1
-3	-6



Domain: $(-\infty, 0) \cup [5, \infty)$

Range: $(-\infty, \infty)$

2.) $f(x)=\begin{cases}(x-3)^2 & 0<x<3\\ \sqrt{x-1}-5 & x\geq 1\\ 9 & -7<x<-3\end{cases}$

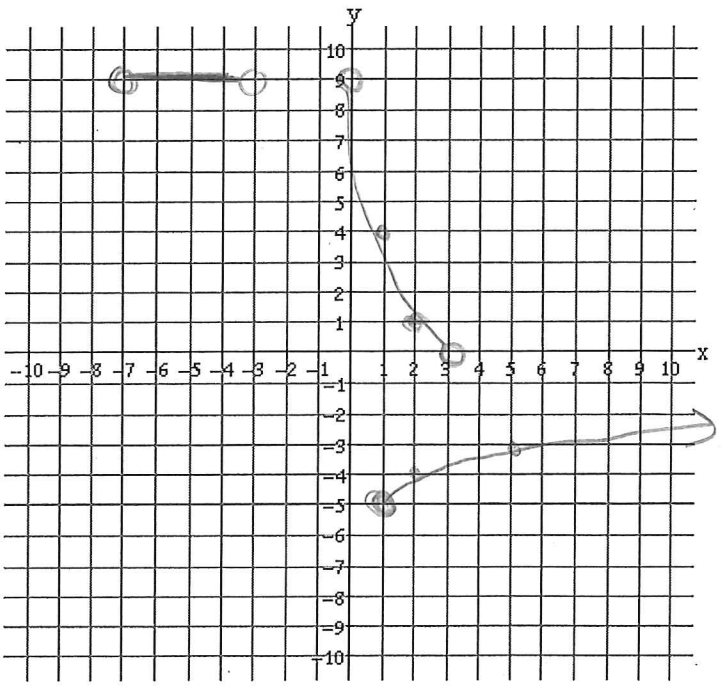
open

x	y
0	9
1	4
2	1
3	0

open open

closed

x	y
1	-5
2	-4
3	
4	
5	-3



Domain: $(-7, -3) \cup (0, \infty)$

Range: $[-5, \infty)$

Let $f(x) = 2x - 1$, $g(x) = 3x$, and $h(x) = 2x^2 - 3x + 1$. Compute the following:

3.) $f(g(-3))$

$3(-3)$

$f(-9)$

$2(-9) - 1$

-19

4.) $f(h(x))$

$2(2x^2 - 3x + 1) - 1$

$4x^2 - 6x + 2 - 1$

$4x^2 - 6x + 1$

5.) $g(h(3))$

$2(3)^2 - 3(3) + 1$

$18 - 9 + 1$

$g(10)$

$3(10)$

30

Find the inverse for each function. Determine if the inverse is a function.

6.) $f(x) = \frac{3}{4}x - 2$

$x = \frac{3}{4}y - 2$

$\frac{4}{3}(x + 2) = \frac{3}{4}y\left(\frac{4}{3}\right)$

$\frac{4}{3}x + \frac{8}{3} = y$

$\frac{4}{3}x + \frac{8}{3} = f^{-1}(x)$

yes, inverse is a function

7.) $f(x) = (x - 2)^2 + 3$

$x = (y - 2)^2 + 3$

$x - 3 = (y - 2)^2$

$\pm\sqrt{x - 3} = y - 2$

$\pm\sqrt{x - 3} + 2 = y$

$\pm\sqrt{x - 3} + 2 = f^{-1}(x)$ no, inverse is not a function

8.) $f(x) = \sqrt[3]{2x + 1} - 4$

$x = \sqrt[3]{2y + 1} - 4$

$x + 4 = \sqrt[3]{2y + 1}$

$(x + 4)^3 = 2y + 1$

$(x + 4)^3 - 1 = 2y$

$\frac{(x + 4)^3 - 1}{2} = y$

$\frac{(x + 4)^3 - 1}{2} = f^{-1}(x)$ yes inverse is a function

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Verify if the following functions are inverses of each other.

9.) $f(x) = 2x - 5$ *and* $g(x) = \frac{1}{2}x + \frac{5}{2}$

$f(g(x)) = 2\left(\frac{1}{2}x + \frac{5}{2}\right) - 5$

$x + 5 - 5$

x

$g(f(x)) = \frac{1}{2}(2x - 5) + \frac{5}{2}$

$x - \frac{5}{2} + \frac{5}{2}$

x

both = x so they are inverses!

Given $f(x) = 3x - 2$ and $g(x) = x^2 - 4x + 4$, find each function.

10.) (f-g)(x)

$(3x - 2) - (x^2 - 4x + 4)$

$3x - 2 - x^2 + 4x - 4$

$-x^2 + 7x - 6$

11.) (fg)(x)

$(3x - 2)(x^2 - 4x + 4)$

$3x^3 - 12x^2 + 12x$

$-2x^2 + 8x - 8$

$3x^3 - 14x^2 + 20x - 8$