Pre-Calculus 11 Ch# 7 Test Review Name: KEY.

Date:__________________ Block:_______

1. Evaluate.

a) $|-5|$ $= 5$

b) $\left|2\frac{3}{4}\right|$ $= 2\frac{3}{4}$

c) $|-6.7|$ $= 6.7$

2. Rearrange these numbers in order from least to greatest.

$\cancel{-4}$, $\overset{3}{\cancel{\sqrt{9}}}$, $\overset{3.5}{\cancel{|-3.5|}}$, $\cancel{-2.7}$, $\overset{4.5}{\left|-\frac{9}{2}\right|}$, $\overset{1.6}{\cancel{|-1.6|}}$, $\overset{1.5}{\cancel{\left|1\frac{1}{2}\right|}}$

$-4, -2.7, \left|1\frac{1}{2}\right|, |-1.6|, \sqrt{9}, |-3.5|, \left|-\frac{9}{2}\right|$

3. Evaluate each expression.

a) $|-7 - 2|$ $= |-9|$
$= 9$

b) $|-3 + 11 - 6|$ $= |2|$
$= 2$

c) $5|-3.75|$

$= 18.75$

d) $|5^2 - 7| + |-10 + 2^3|$

$= 18 + 2 = 20$

4. A school group travels to Mt. Robson Provincial Park in British Columbia to hike the Berg Lake Trail. From the Robson River bridge, km **0.0**, they hike to Kinney Lake, km **4.2**, where they stop for lunch. They then trek across the suspension bridge to the campground, km **10.5**. The next day they hike to the shore of Berg Lake and camp, km **19.6**. On day three, they hike to the Alberta/British Columbia border, km **21.9**, and turn around and return to the campground near Emperor Falls, km **15.0**. On the final day, they walk back out to the trailhead, km **0.0**. What total distance did the school group hike?

$\Delta d_1 = |4.2 - 0| = 4.2$ km

$\Delta d_2 = |10.5 - 4.2| = 6.3$ km

$\Delta d_3 = |19.6 - 10.5| = 9.1$ km

$\Delta d_4 = |21.9 - 19.6| = 2.3$ km

$\Delta d_5 = |15.0 - 21.9| = 6.9$ km

$\Delta d_6 = |0.0 - 15.0| = 15$ km

$d_{total} = 4.2 + 6.3 + 9.1 + 2.3 + 6.9 + 15$

$= \underline{43.8 \text{ km}}$

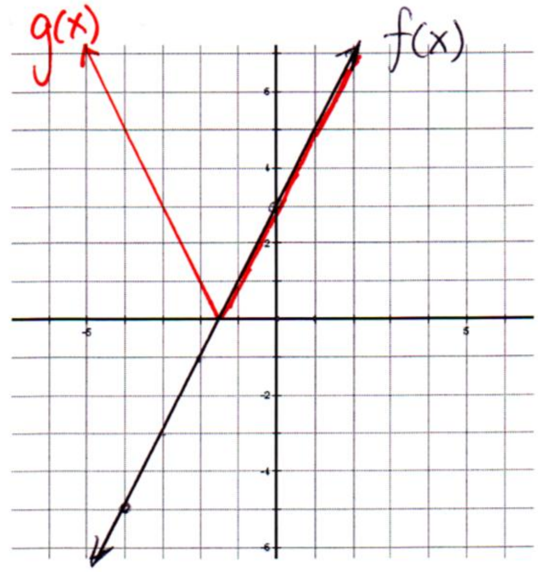
5. Consider the functions $f(x) = 2x + 3$ and $g(x) = |2x + 3|$.

a) Create a table of values for each function, using values of -4, -2, 0, 2, and 4 for x.
b) Plot the points and sketch the graphs of the functions on the same coordinate grid.
c) Determine the domain and range for both $f(x)$ and $g(x)$.
d) List the similarities and the differences between the two functions and their corresponding graphs.

a)

x	y = f(x)	y = g(x)
−4	−5	5
−2	−1	1
0	3	3
2	7	7
4	11	11

b)



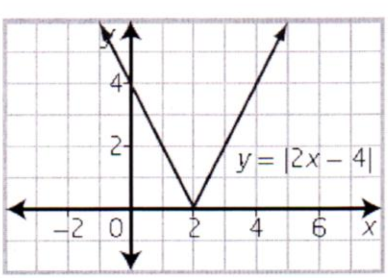
c) Domain and range for both $f(x)$ and $g(x)$.

$f(x): \{x : x \in R\}$ $\{y : y \in R\}$ || $g(x): \{x : x \in R\}$ $\{y : y \geq 0\}$

d) They are basically the same graph except the absolute value function never goes below zero: instead it reflects back over the x-axis

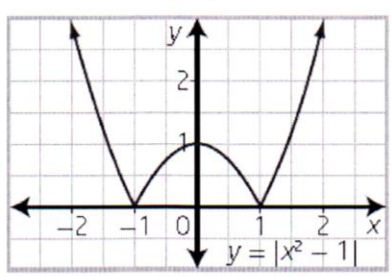
6. Write the piecewise function that represents each graph.

a)



$$\begin{cases} 2x-4 ; & x \geq 2 \\ -2x+4 ; & x < 2 \end{cases}$$

b)



$$\begin{cases} -x^2+1 ; & -1 \leq x \leq 1 \\ x^2-1 ; & x > 1 , x < -1 \end{cases}$$

7. Consider the functions $f(x) = 8 - x^2$ and $g(x) = |8 - x^2|$.

a) Create a table of values for each function, using values of -4, -2, 0, 2, and 4 for x.

b) Plot the points and sketch the graphs of the functions on the same coordinate grid.

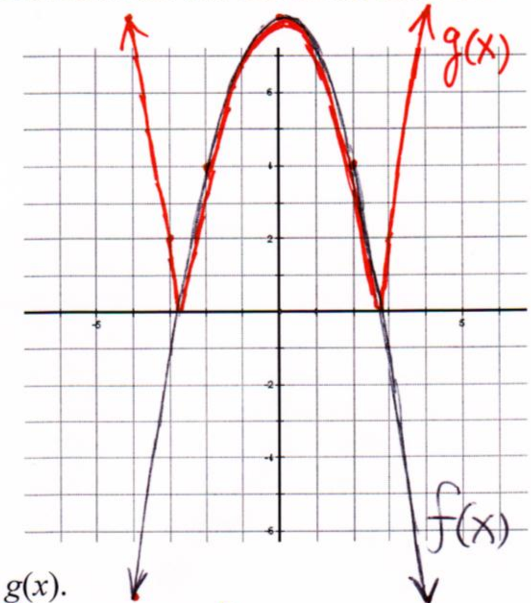
c) Determine the domain and range for both $f(x)$ and $g(x)$.

d) List the similarities and the differences between the two functions and their corresponding graphs.

a)

x	y = f(x)	y = g(x)
−4	−8	8
−2	4	4
0	8	8
2	4	4
4	−8	8

b)



c) Domain and range for both $f(x)$ and $g(x)$.

$f(x)$: $\{x: | x \in R\}$ $\{y: | y \leq 8\}$

$g(x)$: $\{x: | x \in R\}$ $\{y: | y \geq 0\}$

d) They are the same graph except the absolute value function never goes below zero; instead it reflects back over the x-axis.

8. a) Explain why the functions $f(x) = 3x^2 + 7x + 2$ and $g(x) = |3x^2 + 7x + 2|$ have different graphs.

The functions have different graphs because the original graph goes below the x-axis. The absolute value brackets reflect anything below the x-axis above the x-axis.

b) Explain why the functions $f(x) = 3x^2 + 4x + 2$ and $g(x) = |3x^2 + 4x + 2|$ have identical graphs.

The functions have the same graph because the original function is always positive.

9. Solve each absolute value equation. Express answers to the nearest tenth, when necessary.

a) $|2x - 2| = 9$

Case I
$2x-2=9$
$2x=11$
$x=\frac{11}{2}$

Case II
$2x-2=-9$
$2x=-7$
$x=\frac{-7}{2}$

check
$|2\cdot\frac{11}{2}-2|=9$ ✓
$|2(\frac{-7}{2})-2|\overset{?}{=}9$ ✓

b) $|7 + 3x| = x - 1$

Case I
$7+3x=x-1$
$2x=-8$
$\cancel{x=-4}$ ✗

Case II
$7+3x=-x+1$
$4x=-6$
$\cancel{x=\frac{-3}{2}}$ ✗

Check
$|7+-12| \neq -4-1$
$|7+3(\frac{-3}{2})| \neq \frac{-3}{2}-1$

NO solution.

c) $|x^2 - 6| = 3$

Case I
check
$x^2-6=3$
$x^2=9$
$x=\pm 3$ ✓

Case II
$x^2-6=-3$
$x^2=3$
$x=\pm\sqrt{3}$ ✓
$\approx \pm 1.7$

d) $|m^2 - 4m| = 5$

Case I
$m^2-4m-5=0$
$(m+1)(m-5)=0$
✓ $m=1$ or $m=5$ ✓
Check

Case II
$m^2-4m+5=0$
Discriminant $= b^2-4ac$
$= 16-4(1)(5)$
$= -ve$
No real solution.

10. In coastal communities, the depth, d, in metres, of water in the harbour varies during the day according to the tides. The maximum depth of the water occurs at high tide and the minimum occurs at low tide. Two low tides and two high tides will generally occur over a 24-h period. On one particular day in Prince Rupert, British Columbia, the depth of the first high tide and the first low tide can be determined using the equation $|d - 4.075| = 1.665$.

a) Find the depth of the water, in metres, at the first high tide and the first low tide in Prince Rupert on this day.

high tide: (max)
$d-4.075=1.665$
$d=\underline{5.74\ m}$

low tide: (mini)
$d-4.075=-1.665$
$d=\underline{2.41\ m}$

b) Suppose the low tide and high tide depths for Prince Rupert on the next day are 2.94 m, 5.71 m, 2.28 m, and 4.58 m. Determine the total change in water depth that day.

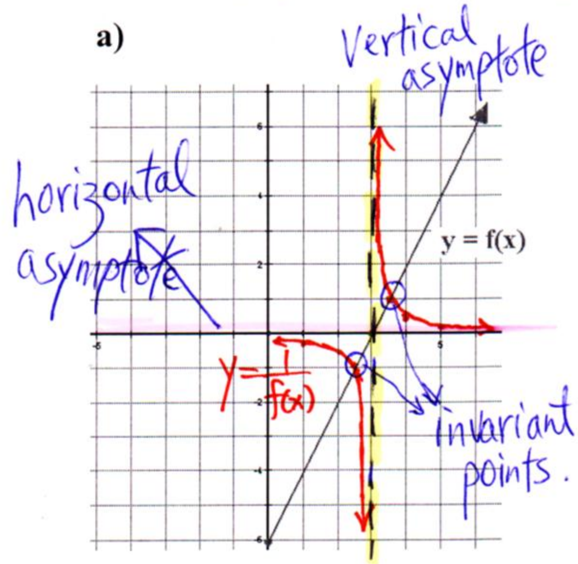
$\Delta C_1 = |2.94-5.71| = 2.77\,m$
$\Delta C_2 = |5.71-2.28| = 3.43\,m$
$\Delta C_3 = |2.28-4.58| = 2.3\,m$

total change:
$(2.77+3.43+2.3)\,m$
$= \underline{8.5\,m}$

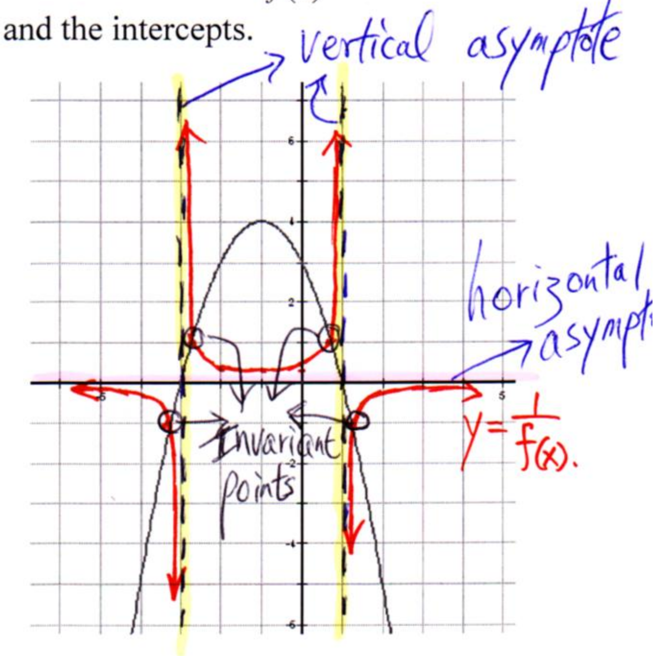
11. Sketch the graph of the corresponding reciprocal function, $y = \dfrac{1}{f(x)}$ on the same grid.

Label the asymptotes, the invariant points, and the intercepts.

a)



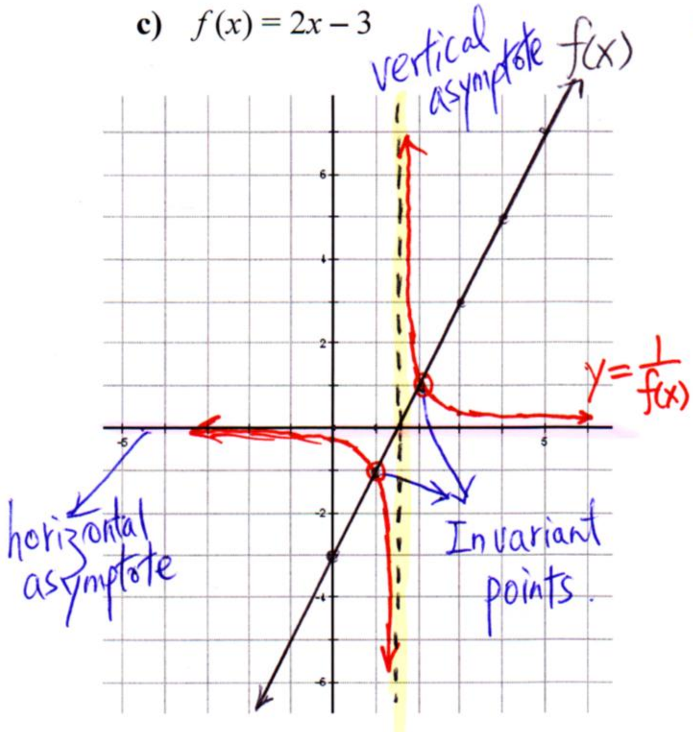
b)



Sketch the graphs of $y = f(x)$ and $y = \dfrac{1}{f(x)}$ on the same set of axes. Label the asymptotes, the invariant points, and the intercepts.

$0=(x-5)(x-1)$

c) $f(x) = 2x - 3$



d) $f(x) = x^2 - 6x + 5$