Math 2200 **Chapter 7 Review** **Name:**_____

12 **Part I: Multiple Choice. Write the correct answer in the space provided at the end of this section.**

1. Determine the value of the absolute value expression $-7|-5+2|$.

   (A) -49

   (B) -21

   (C) 21

   (D) 49

$= -7|-3|$
$= -7(3)$
$= -21$

2. If $(-3,-7)$ is on the graph of $y=f(x)$, what is the corresponding point on $y=|f(x)|$?

   (A) $(-3,-7)$

   (B) $(-3,7)$

   (C) $(3,-7)$

   (D) $(3,7)$

3. What is the range of $y=|-2x+7|$?

   (A) $\{y|y \in R\}$

   (B) $\{y|y \geq -2, y \in R\}$

   (C) $\{y|y \geq 0, y \in R\}$

   (D) $\{y|y \geq 7, y \in R\}$

$y \geq 0$

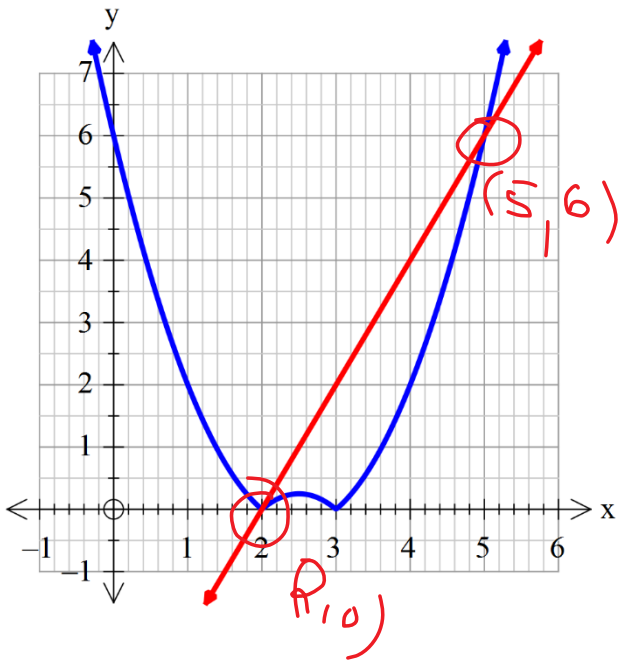
4. Which is a solution to the following?

   (A) $(0,2)$

   (B) $(0,6)$

   (C) $(5,6)$

   (D) $(6,5)$



5. Solve $|3x - 6| = 4x$

(A) ~~$x = -6$~~

(B) ~~$x = -6$~~ and $x = \frac{6}{7}$

(C) $x = \frac{6}{7}$

(D) no solution

$|3(\frac{6}{7}) - 6| = 4(\frac{6}{7}) \rightarrow \frac{24}{7} = \frac{24}{7}$

$|\frac{18}{7} - \frac{42}{7}| = \frac{24}{7}$

$|-\frac{24}{7}| = \frac{24}{7}$

6. What is the invariant point for the function $y = |2x - 6|$?

(A) -6

(B) $\frac{1}{3}$

(C) 2

(D) 3

$2x - 6 = 0$

$\frac{2x}{2} = \frac{6}{2}$

$x = 3$

7. Solve $|3x + 2| + 4 = 1$?

(A) $-\frac{5}{3}$

(B) $-\frac{5}{3}$ and $\frac{1}{3}$

(C) $\frac{1}{3}$

(D) no solution

$|3x + 2| = 1 - 4$

$|3x + 2| = -3$

8. What are the invariant points on $y = 2x + 5$ if its reciprocal, $y = \frac{1}{2x+5}$, is also graphed?

(A) $(-3, -2)$

(B) $(-2, -3)$

(C) $(-2, 1), (-3, -1)$

(D) $(1, -2), (-1, -3)$

$2x + 5 = -1$

$2x = -1 - 5$

$\frac{2x}{2} = \frac{-6}{2}$

$x = -3$

$(-3, -1)$

$2x + 5 = 1$

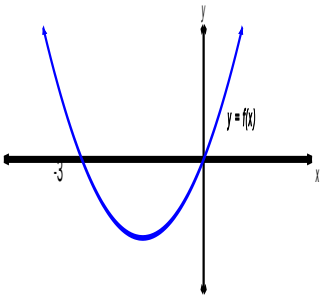
$2x = 1 - 5$

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

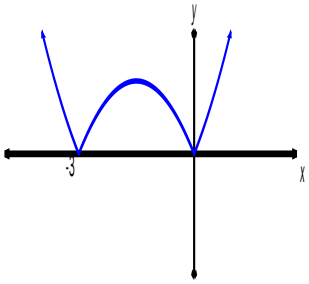
$x = -2$

$(-2, 1)$

9. Given the graph of $y = f(x)$, which graph is its reciprocal?



(A)



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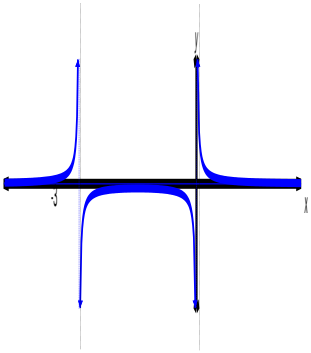

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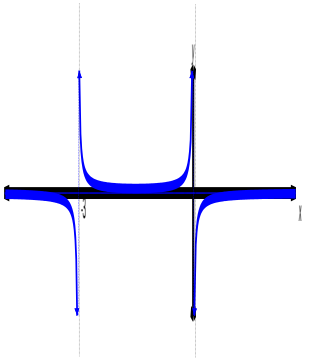

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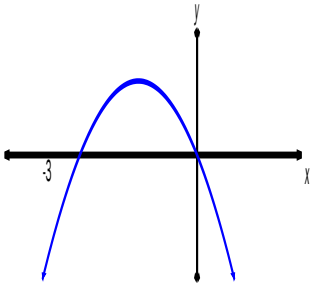


10. What is the equation of the vertical asymptote for the reciprocal of $y = -5x - 9$?

(A) $x = -\frac{9}{5}$

(B) $x = -\frac{5}{9}$

(C) $x \neq -\frac{9}{5}$

(D) $x \neq -\frac{5}{9}$

$5x - 9 \neq 0$

$-5x \neq 9$

$\frac{-5}{-5} \quad \frac{=}{-5}$

$x \neq -\frac{9}{5}$

VA

$x = -\frac{9}{5}$

11. What is the y-intercept of the reciprocal of $y = 2x^2 - 5x + 6$?

(A) 0

(B) $\frac{1}{6}$

(C) 6

(D) undefined

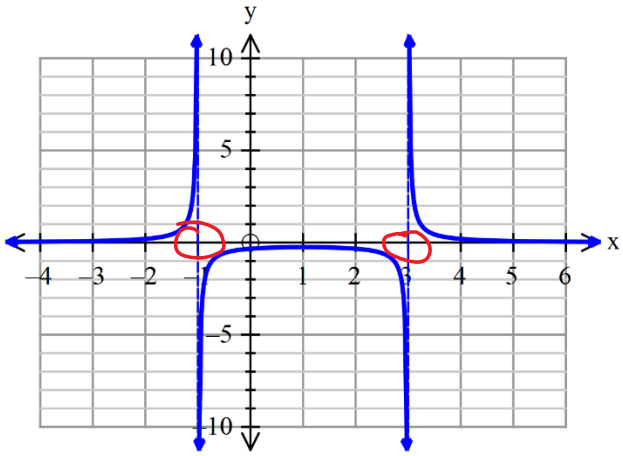
12. The graph shown represents the reciprocal of which quadratic function?

(A) $f(x) = x^2 - 4x + 3$

(B) $f(x) = x^2 - 2x - 3$

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

(D) $f(x) = x^2 + 4x + 3$



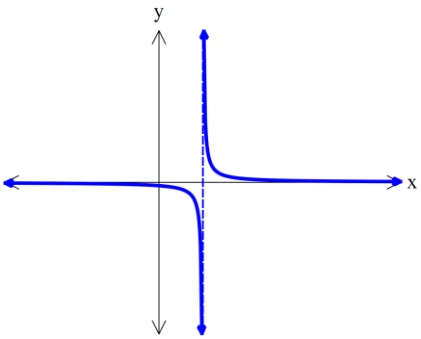
$x = -1, x = 3$

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

$x^2 - 2x - 3$

13. Which is the graph of the reciprocal of a quadratic function with discriminant 0?

(A)



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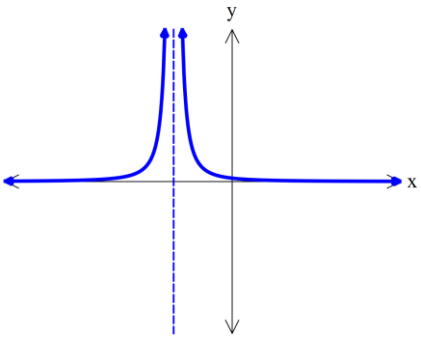

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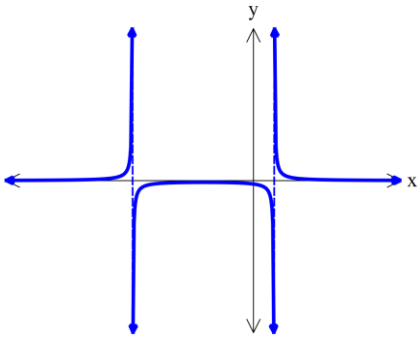
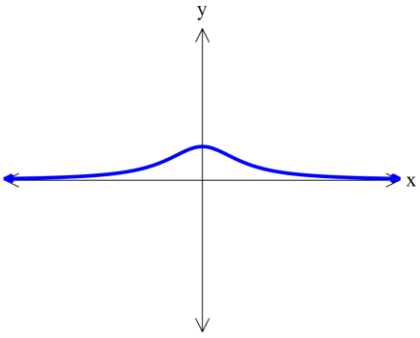


(D)



Answers to multiple choice.

1.___	**2.___**	**3.___**	**4.___**	**5.___**
6.___	**7.___**	**8.___**	**9.___**	**10.___**
11.___	**12.___**	**13.___**		

18 **Part II: Constructed Response. Answer each question in the space provided. Show all workings.**

14. Evaluate:

2 (A) $|-3| - |-7|$

$= 3 - 7$

$= -4$

2 (B) $-2 - 4|5 + (-8)|$

$= -2 - 4|-3|$

$= -2 - 4(3)$

$= -2 - 12$

$= -14$

2 (C) $|-2 - 2(2-5)^2 + 6|$

$= |-2 - 2(-3)^2 + 6|$

$= |-2 - 2(9) + 6|$

$= |-2 - 18 + 6|$

$= |-14|$

$= 14$

3 12. Express as a piecewise function: $y = |4x - 12|$

$4x-12=0$

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

$x=3$

0 | 4

3

$y=4(0)-12$

$y=-12$

—

$y=4(4)-12$

$y=16-12$

$y=4$

+

$y=\begin{cases} 4x-12, & x\geq 3 \\ -(4x-12), & x<3 \end{cases}$

4 13. Solve algebraically: $|x^2 - 4| = 3x$

Case 1:

$x^2-4=3x$

$x^2-3x-4=0$

$(x+1)(x-4)$

$x=-1$, $x=4$

Check:

$x=-1$

$|(-1)^2-4|=3(-1)$

$|1-4|\neq -3$

$x=4$

$|4^2-4|=3(4)$

$|16-4|=12$

$|12|=12$

$12=12$ ✓

Case 2:

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

$-x^2+4-3x=0$

$x^2+3x-4=0$

$(x-1)(x+4)$

$x=1$, $x=-4$

$x=1$

$|1^2-4|=3(1)$

$|1-4|=3$

$|-3|=3$

$3=3$ ✓

$|(-4)^2-4|=3(-4)$

$|16-4|\neq -12$

5 14. Algebraically determine the invariant points, equations of asymptotes, and x- and y-intercepts for the functions $f(x) = 2x + 5$ and $y = \frac{1}{f(x)}$.

Sketch both graphs on the same set of axes.

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

$2x+5 \neq 0$

$2x \neq -5$

$x \neq -5/2$

VA: $x = -5/2 = -2.5$

$2x+5 = -1$

$2x = -1-5$

$\frac{2x}{2} = \frac{-6}{2}$

$x = -3$

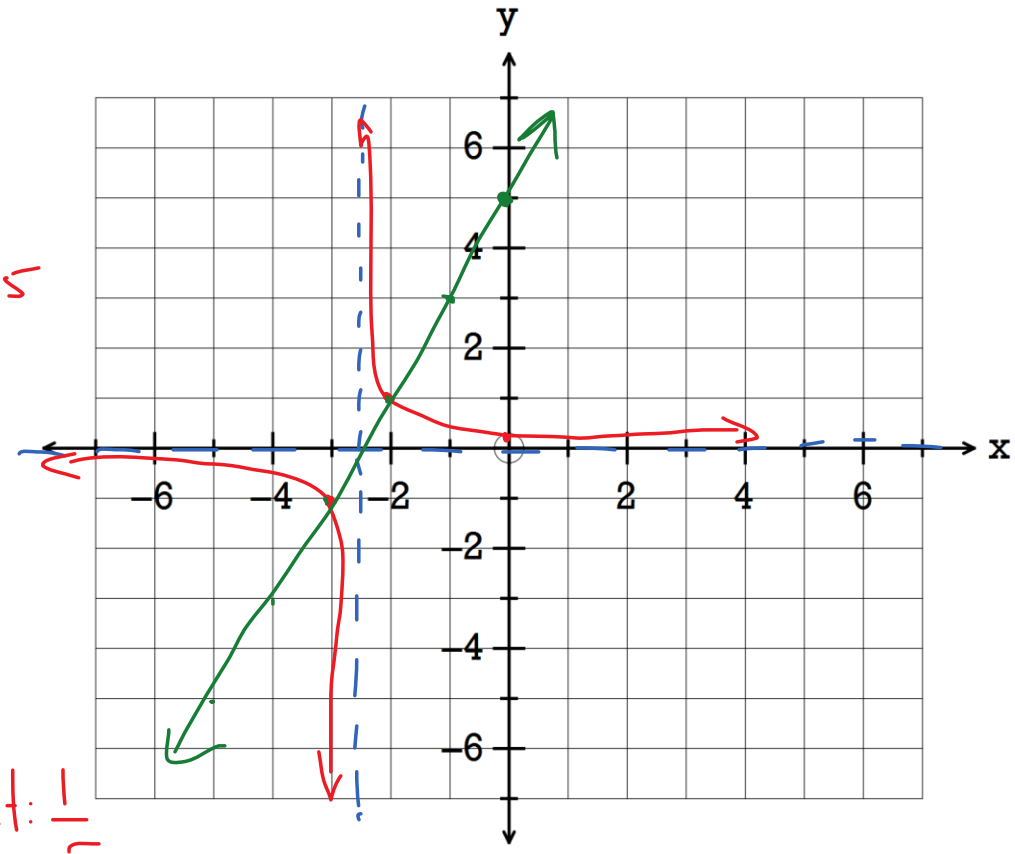
$(-3, -1)$

$2x+5 = 1$

$2x = 1-5$

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

$x = -2$ $(-2, 1)$



Y-int: $\frac{1}{5}$

15. Graph the function $f(x) = x^2 + x - 6$ and its reciprocal.

$g(x) = \frac{1}{x^2+x-6}$

$x^2+x-6 \neq 0$

$(x-2)(x+3) \neq 0$

$x \neq 2, x \neq -3$

VA: $x = 2, x = -3$

$x^2+x-6 = 1$

$x^2+x-6-1 = 0$

$x^2+x-7 = 0$

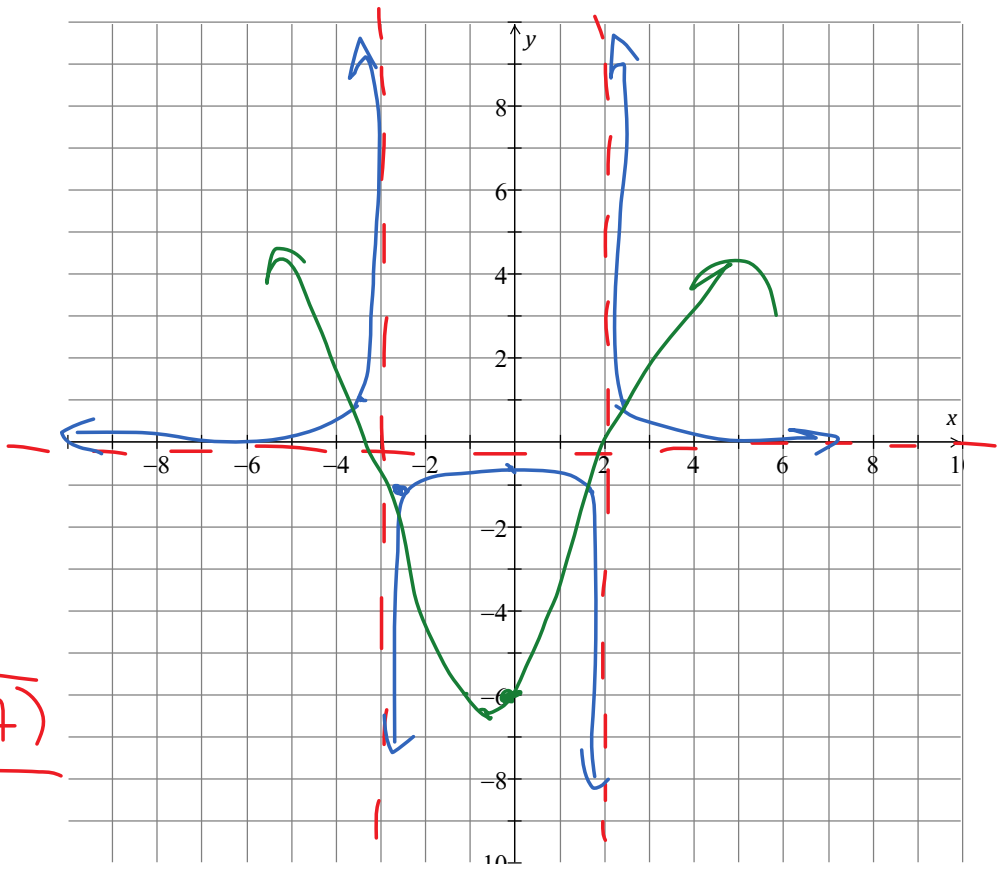
$x = \frac{-1 \pm \sqrt{(1)^2-4(1)(-7)}}{2(1)}$

$x = \frac{-1 \pm \sqrt{29}}{2}$

$x = \frac{-1 \pm 5.4}{2}$

$x = -3.2 \quad x = 2.2$

$(-3.2, 1) \quad (2.2, 1)$



$p = -\frac{b}{2a} = -\frac{1}{2(1)} = -0.5$

$q = (-0.5)^2 + (0.5) - 6 = -6.25$

$(-0.5, -5.25)$

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

$x^2+x-6+1 = 0$

$x^2+x-5 = 0$

$x = \frac{-1 \pm \sqrt{(1)^2-4(1)(-5)}}{2(1)}$

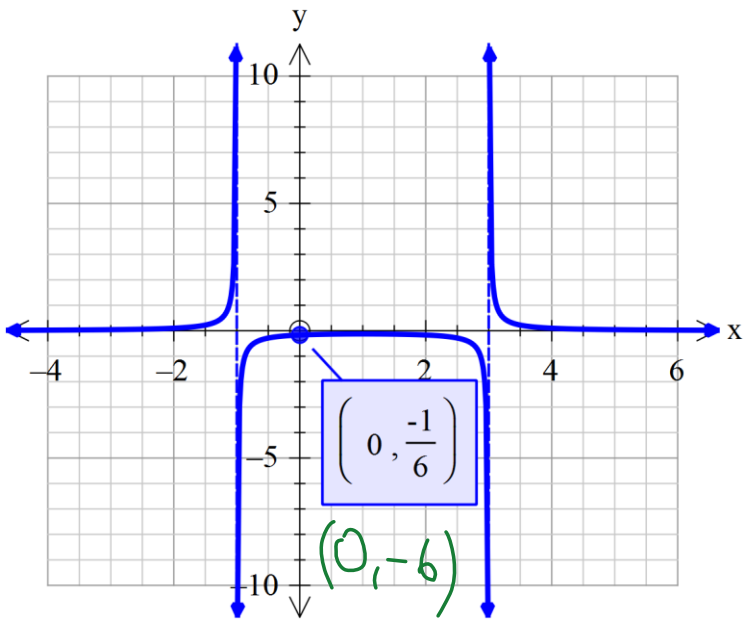
$x = \frac{-1 \pm \sqrt{21}}{2}$

$x = \frac{-1 \pm 4.6}{2}$

$x = -2.8 \quad x = 1.8$

$(-2.8, -1) \quad (1.8, -1)$

16. Given the following graph of a reciprocal function, determine the original function and sketch its graph.



$x = -1, x = 3$

$y = a(x+1)(x-3)$

$-6 = a(0+1)(0-3)$

$\frac{-6}{-3} = \frac{-3a}{-3}$

$a = 2$

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

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

$y = 2x^2 - 4x - 6$

$p = \frac{-(-4)}{2(2)} = \frac{4}{4} = 1$

$y = 2(1)^2 - 4(1) - 6 = -8$

$(1, -8)$

(0, −6)