

**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)  $49$

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

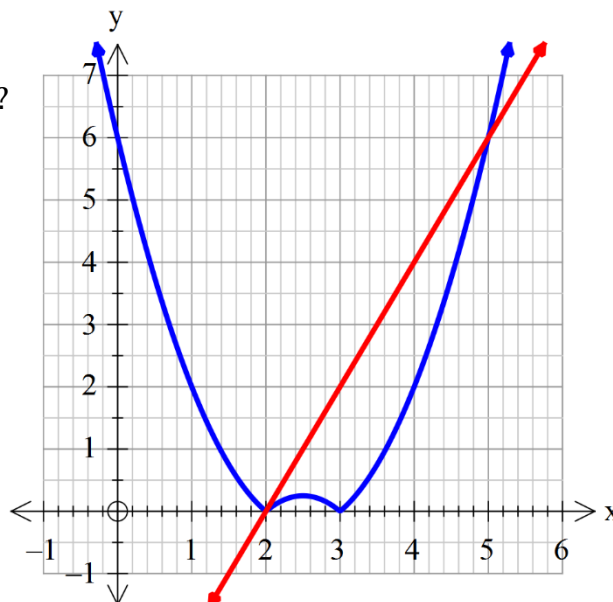
- (A)  $(-3, -7)$
- (B)  $(-3, 7)$
- (C)  $(3, -7)$
- (D)  $(3, 7)$

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

4. Which is a solution for the following graphs?

- (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

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

(A)  $-6$

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

(C)  $2$

(D)  $3$

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

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

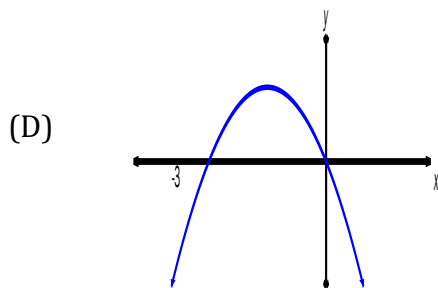
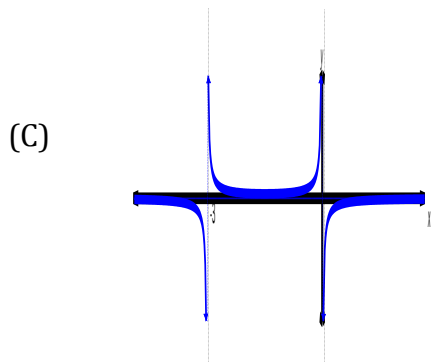
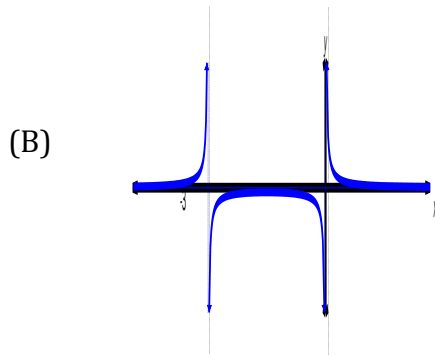
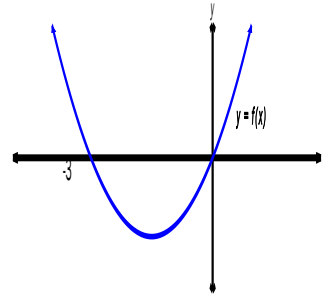
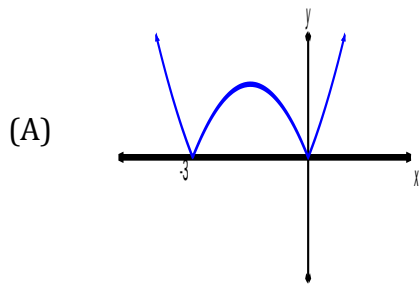
(A)  $(-3, -2)$

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

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

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

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



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

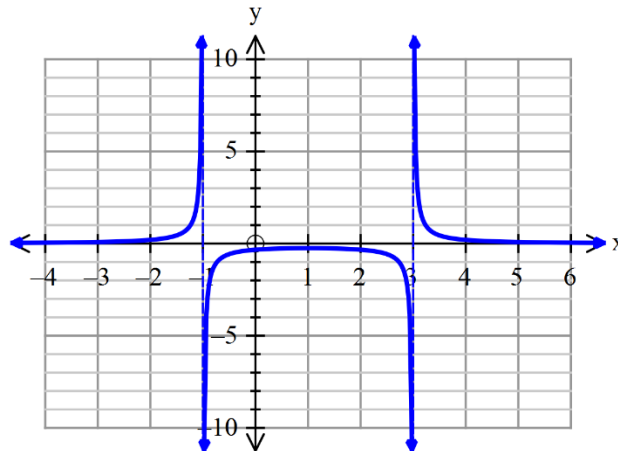
- (A)  $x = -\frac{9}{5}$
- (B)  $x = -\frac{5}{9}$
- (C)  $x \neq -\frac{9}{5}$
- (D)  $x \neq -\frac{5}{9}$

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



**Answers to multiple choice.**

1.\_\_\_\_ 2.\_\_\_\_ 3.\_\_\_\_ 4.\_\_\_\_ 5.\_\_\_\_

6.\_\_\_\_ 7.\_\_\_\_ 8.\_\_\_\_ 9.\_\_\_\_ 10.\_\_\_\_

11.\_\_\_\_ 12.\_\_\_\_

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

11. Evaluate:

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

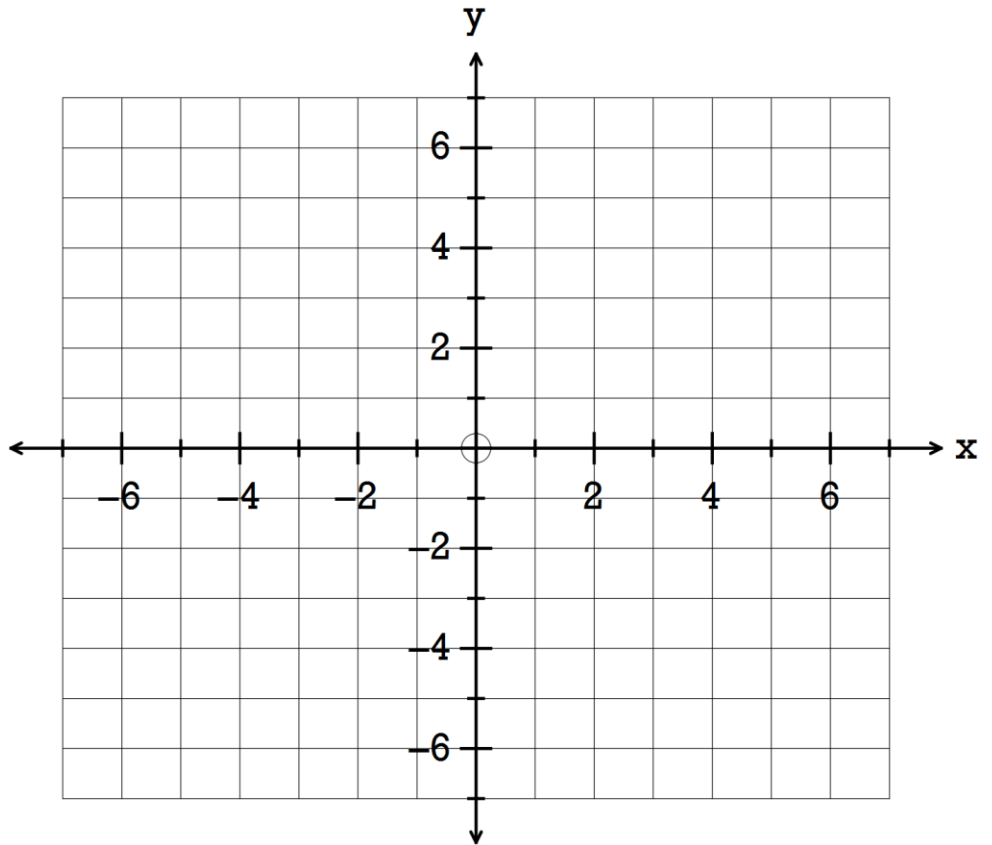
$$(B) -2 - 4|5 + (-8)|$$

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

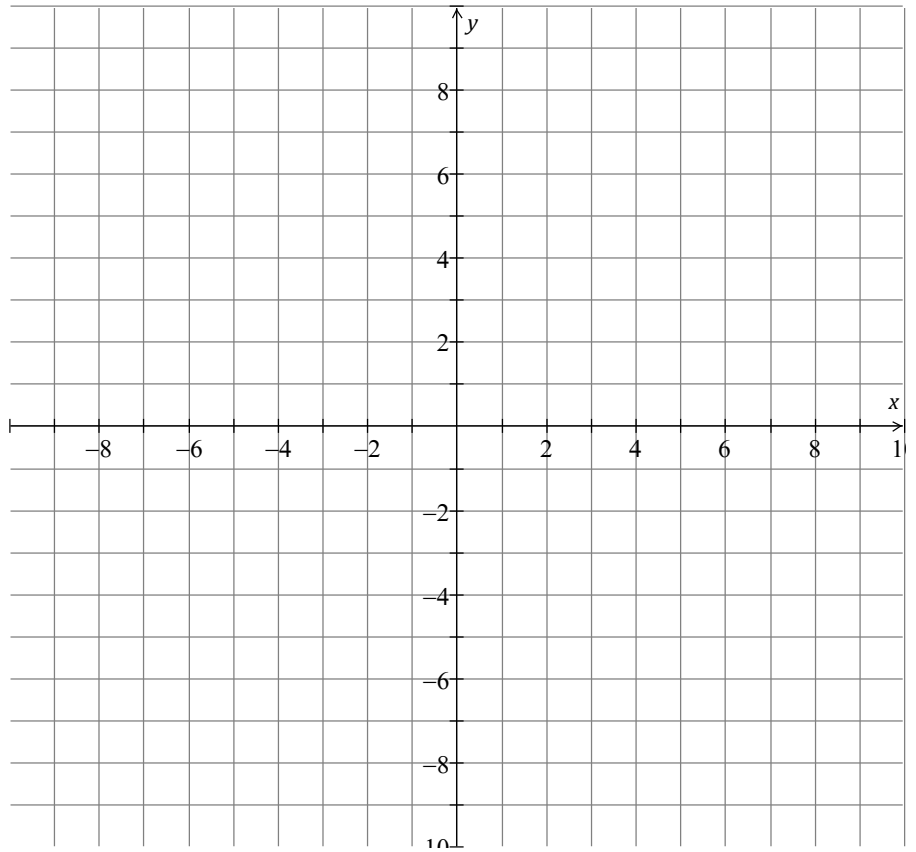
12. Express as a piecewise function:  $y = |4x - 12|$

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

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.



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





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

