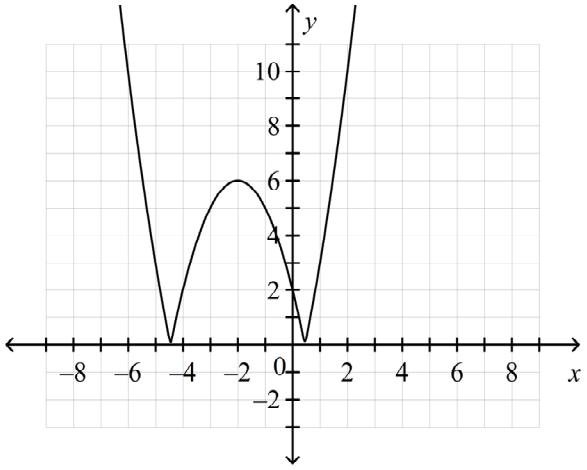
Name: _____ **Period:** _____ **Date:** _____ **ID: A**

PreCalc 11 Chp 8 Rev Pack v1

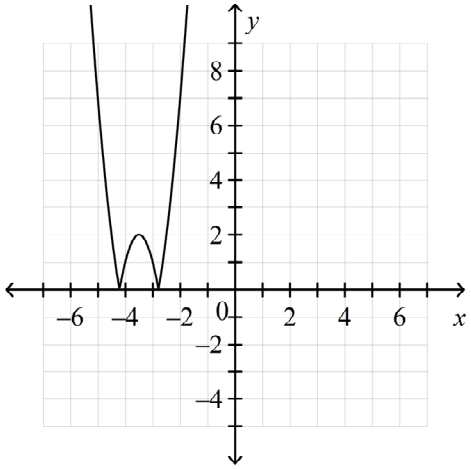
Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ **1.** This is the graph of the absolute value of a function $f(x)$. What is an equation for $f(x)$?



A. $f(x) = 2x - 6$
B. $f(x) = x^2 - 6$
C. $f(x) = (x + 2)^2 - 6$
D. $f(x) = -6x^2 + 2$

____ **2.** Which absolute value function is represented by this graph?



A. $y = \left|(-2x - 2)^2 - 7\right|$
B. $y = \left|(-2x - 7)^2 - 2x\right|$
C. $y = \left|(-2x - 7)^2 - 2\right|$
D. $y = \left|(-2x - 7)^2 + 4\right|$

____ **3.** Which absolute value function has these characteristics?

The graph of the absolute value function has x-intercept $\frac{2}{7}$ and y-intercept 2.

The domain of the function is $x \in \mathbb{R}$ and the range is $y \geq 0$.

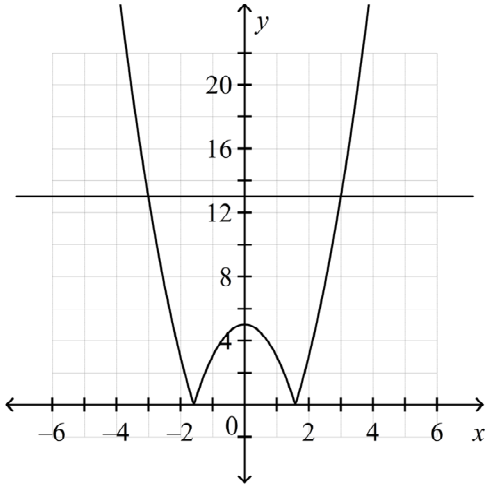
A. $y = |7x^2 - 2|$

B. $y = |-2x + 7|$

C. $y = |7x - 2|$

D. $y = |-2x^2 - 2|$

____ **4.** Solve this equation: $|2x^2 - 5| = 13$



A. $x = 3$ and $x = -3$

B. $x = 6$ and $x = -3$

C. $x = 3$ and $x = 13$

D. $x = 6$ and $x = 13$

____ **5.** How many solutions does the equation $y = |2x^2 - 2|$ have when $y = 1$?

A. 6 **B.** 4 **C.** 5 **D.** 3

____ **6.** For the function $y = \frac{1}{3x}$, write the equation of its reciprocal function.

A. $y = -3x$

B. $y = 3x$

C. $y = \frac{1}{-3x}$

D. $y = \frac{1}{3x}$

____ **7.** For the function $y = 8x + 1$, write the equation of its reciprocal function.

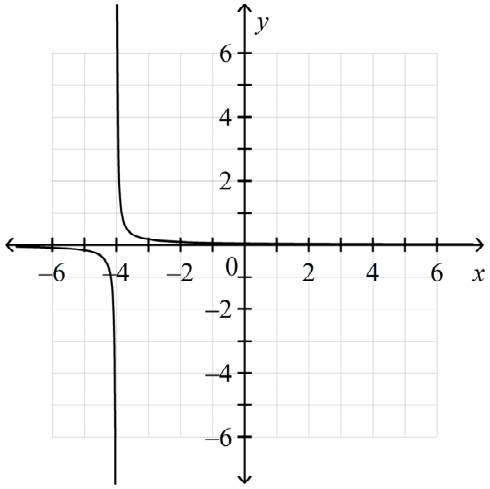
A. $y = \frac{1}{8x + 1}$

B. $y = -8x - 1$

C. $y = \frac{1}{-8x - 1}$

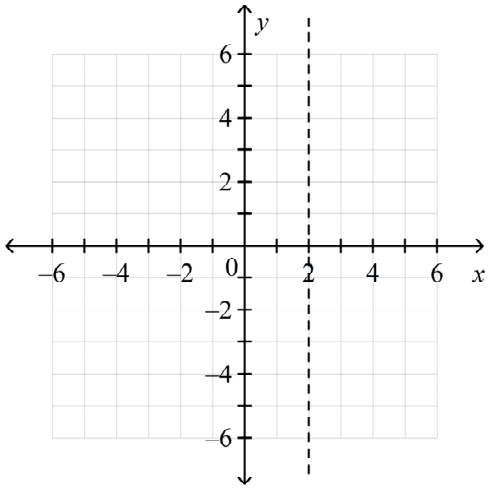
D. $y = \frac{1}{9x}$

____ **8.** What is the equation of the vertical asymptote of this graph of a reciprocal function?



A. $x = 0$
B. $x = -4$
C. $y = 0$
D. $y = -4$

____ **9.** The graph of the reciprocal of a linear function has this vertical asymptote. What is the linear function?



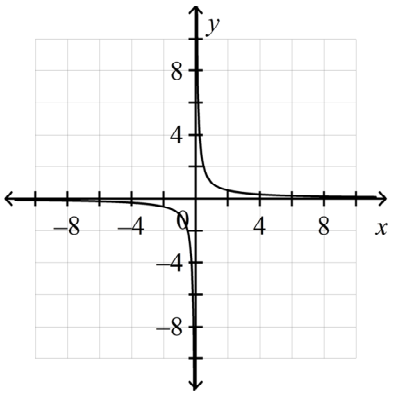
A. $y = -2x - 4$
B. $y = -2x - 3$
C. $y = -2x + 4$
D. $y = 2x - 3$

____ **10.** What is the equation of the vertical asymptote of the graph of the reciprocal function $y = \frac{1}{-2x - 6}$?

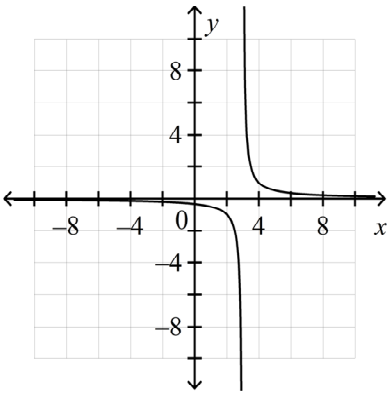
A. $y = -6$
B. $x = -3$
C. $y = -3$
D. $x = -6$

____ **11.** A linear function has a negative slope. Which graph below is a possible graph of its reciprocal function?

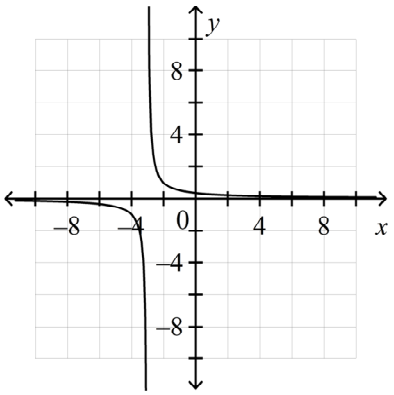
A.



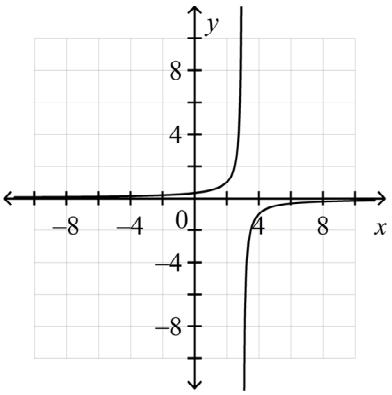
C.



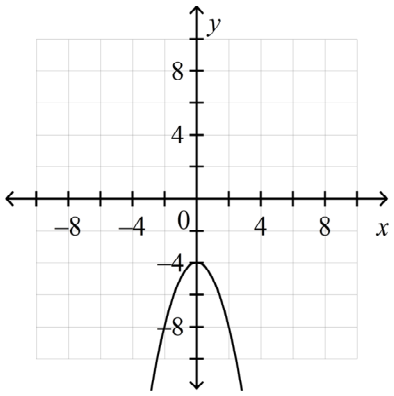
B.



D.



____ **12.** Without graphing, predict the number of vertical asymptotes of the graph of the reciprocal of this function.



A. 0
B. 1
C. 2
D. cannot be determined from this graph

____ **13.** Without graphing, predict the number of vertical asymptotes of the graph of $y = \frac{1}{9x^2 + 4}$.

A. 2
B. 1
C. 0
D. cannot be determined from the equation

____ **14.** What are the domain and range of the reciprocal function $y = \frac{1}{-4x}$?

A. domain: $x \in \mathbb{R}, x \neq 0$
range $y \in \mathbb{R}, y \neq 0$

B. domain: $x \in \mathbb{R}, x \neq \frac{1}{-4}$
range $y \in \mathbb{R}, y \neq 4$

C. domain: $x \in \mathbb{R}, x \neq \frac{1}{-4}$
range $y \in \mathbb{R}, y \neq 0$

D. domain: $x \in \mathbb{R}, x \neq 4$
range $y \in \mathbb{R}, y \neq 4$

____ **15.** Without graphing, predict the number of vertical asymptotes of the graph of $y = \frac{1}{-x^2 + 2}$.

A. 2
B. 0
C. 1
D. cannot be determined from the equation

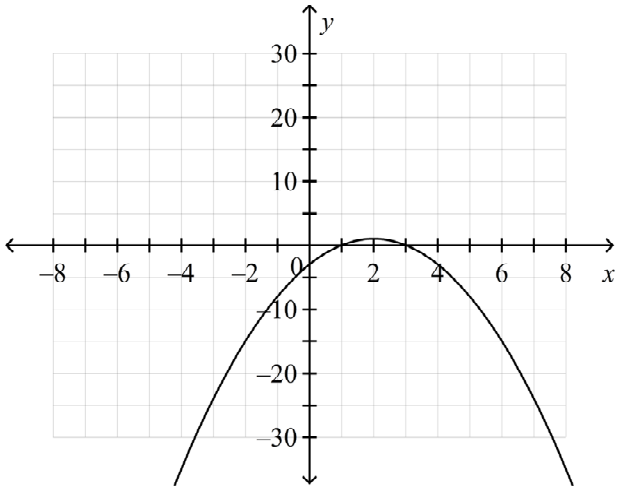
____ **16.** Without graphing, determine the equations of the vertical asymptotes of the graph of $y = \frac{1}{x^2 - 3}$.

A. $x = 3$ and $x = -3$
B. $x = \sqrt{3}$ and $x = -\sqrt{3}$
C. $x = 0$
D. no vertical asymptotes

____ **17.** Without graphing, determine the number of vertical asymptotes of the graph of $y = \frac{1}{-3(x+4)^2}$.

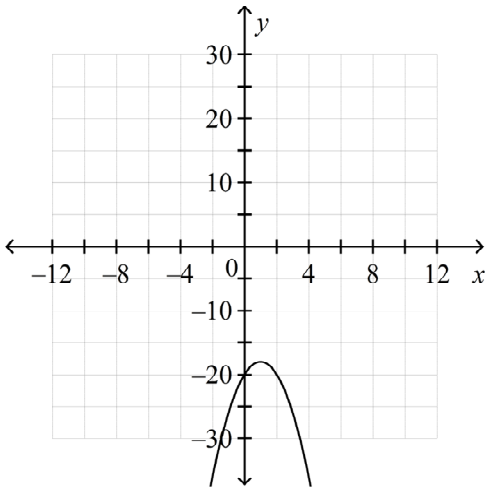
A. 2
B. 1
C. 0
D. cannot be determined from the equation

____ **18.** This is a graph of $y = -(x+2)^2 + 1$. Identify the vertical asymptotes of the graph of the reciprocal function.



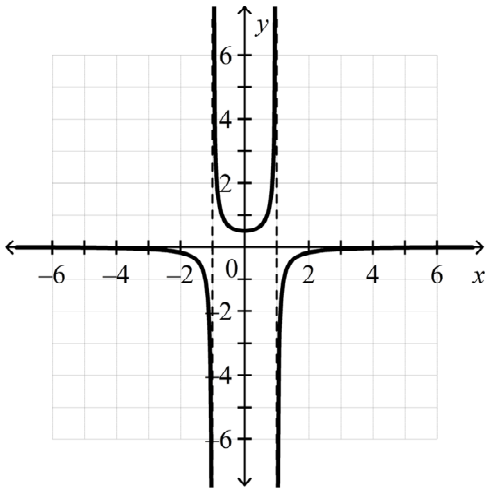
A. $y = 1$ and $y = -1$
B. $x = 1$ and $y = -1$
C. $x = 3$ and $x = 1$
D. no vertical asymptotes

____ **19.** This is a graph of $y = -2(x-1)^2 - 18$. Identify the vertical asymptotes of the graph of the reciprocal function.



A. $y = 4$ and $y = -4$
B. $x = 1$ and $x = 18$
C. $x = 4$ and $x = -2$
D. no vertical asymptotes

____ **20.** This is a graph of $y = \dfrac{1}{f(x)}$. Determine an equation of the quadratic function $y = f(x)$.



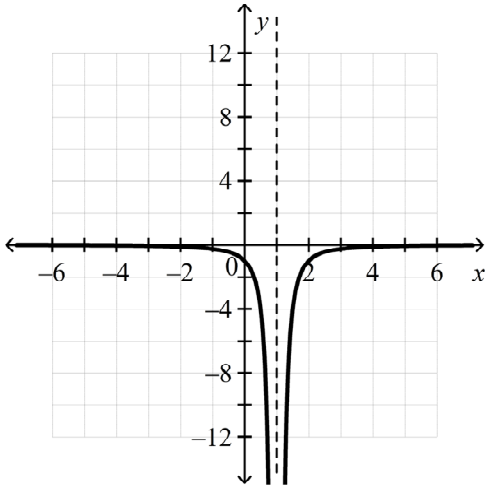
A. $y = -2(x-3)^2 - 2$
B. $y = -2x^2 + 2$
C. $y = -2(x-3)^2 + 2$
D. $y = -2(x-3)^2$

____ **21.** Identify the vertical asymptotes of the graph of the reciprocal of the quadratic function $y = -2(x-3)^2$.
A. $y = 4$ and $y = -4$
B. $x = 4$ and $x = 2$
C. $x = 3$
D. no vertical asymptotes

____ **22.** Identify the vertical asymptotes of the graph of the reciprocal of the quadratic function $y = -x^2 - 3x - 5$.

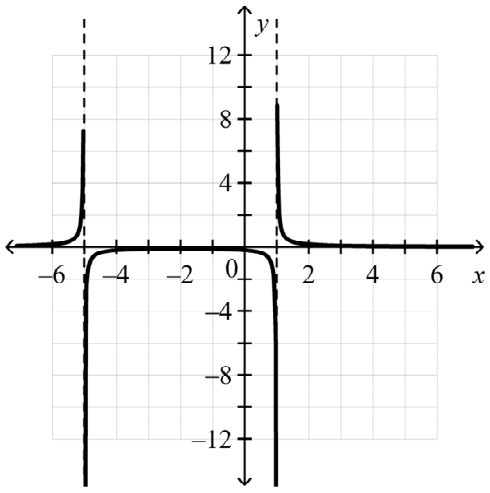
A. $x = -3$ and $x = -5$
B. $x = -1.5$
C. $y = -3$ and $y = -5$
D. no vertical asymptotes

____ **23.** This is a graph of $y = \frac{1}{f(x)}$. Determine an equation of the quadratic function $y = f(x)$.



A. $y = -(x-1)^2 - 9$
B. $y = -(x-1)^2$
C. $y = -(x-1)^2 + 9$
D. $y = -x^2 + 9$

____ **24.** This is a graph of $y = \frac{1}{f(x)}$. Determine an equation of the quadratic function $y = f(x)$.



A. $y = (x+2)^2 - 9$
B. $y = (x+2)^2$
C. $y = x^2 - 9$
D. $y = (x+2)^2 + 9$

Short Answer

25. Complete this table of values.

x	–2	–1	0	1	2	3
$y = x - 2$	–4	–3	–2	–1	0	1
$y = \|x - 2\|$						

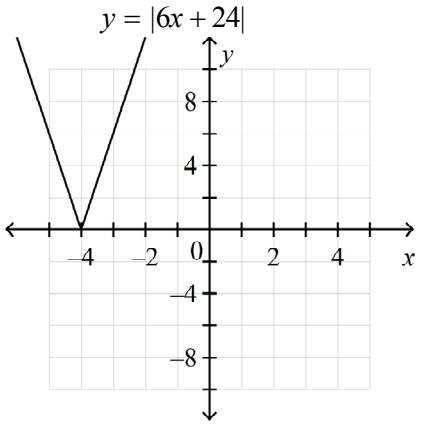
26. Complete this table of values.

x	–2	–1	0	1	2	3
$y = 2x^2 + 8x - 8$	–16	–14	–8	2	16	34
$y = \|2x^2 + 8x - 8\|$						

27. Complete this table of values.

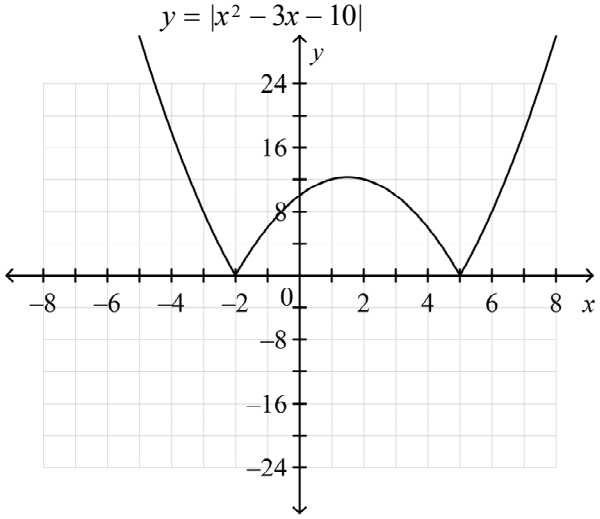
x	–2	–1	0	1	2	3
$y = 2(2x - 5)^2 - 9$	153		41		–7	–7
$y = \|2(2x - 5)^2 - 9\|$						

28. Write this absolute value function in piecewise notation.

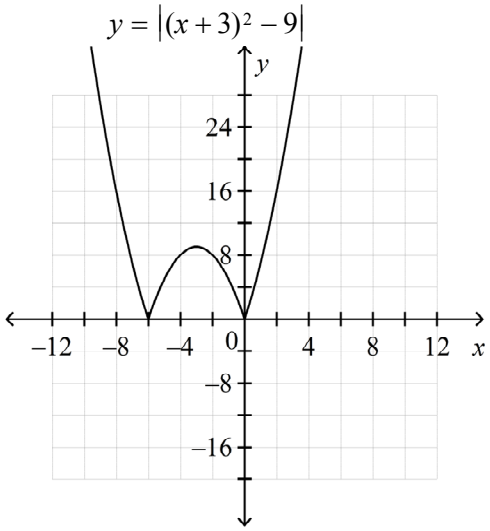


29. Solve this equation: $|x^2 - 5x - 30| = 6$

30. Write the absolute value function $y = |x^2 - 3x - 10|$ in piecewise notation.

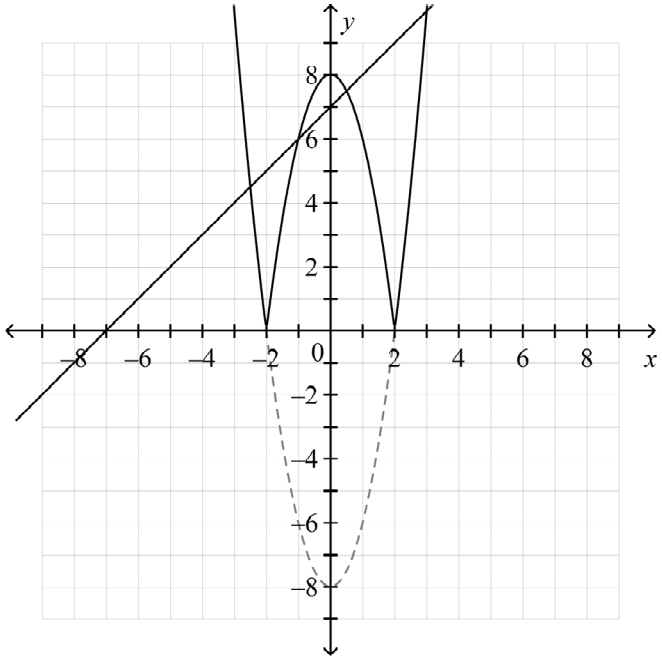


31. Write this absolute value function in piecewise notation.

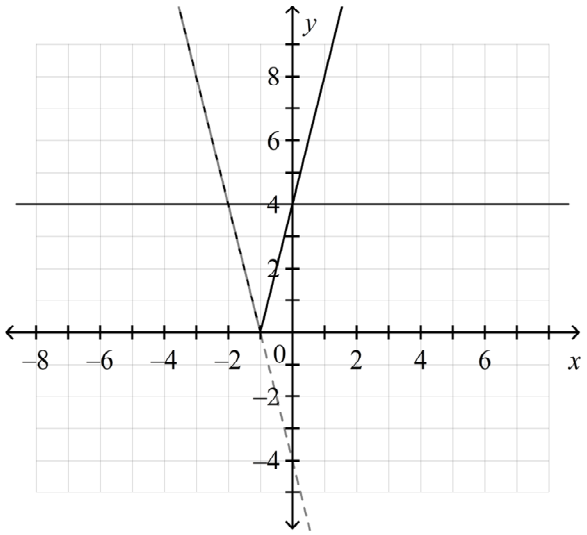


32. The function $y = f(x)$ is linear. The line $y = 9$ intersects the graph of $y = |f(x)|$ at (2, 9) and (–1, 9). The line $y = 15$ intersects the graph of $y = |f(x)|$ at (3, 15) and (–2, 15). What is an equation for the function $y = f(x)$?

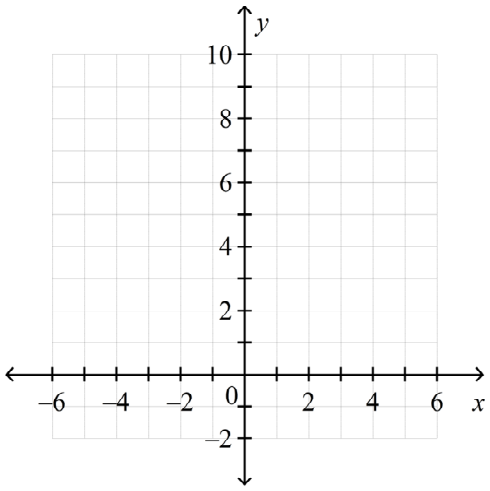
33. A student used this graph to solve an absolute value equation. What might the equation have been?



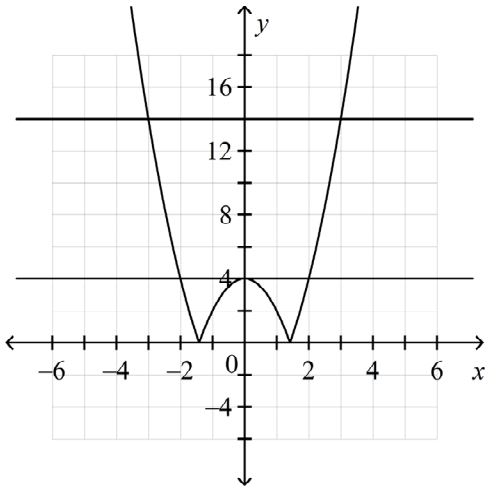
34. A student used this graph to solve an absolute value equation. What might the equation have been?



35. Solve this equation by graphing: $|5x - 2| = -2x + 5$



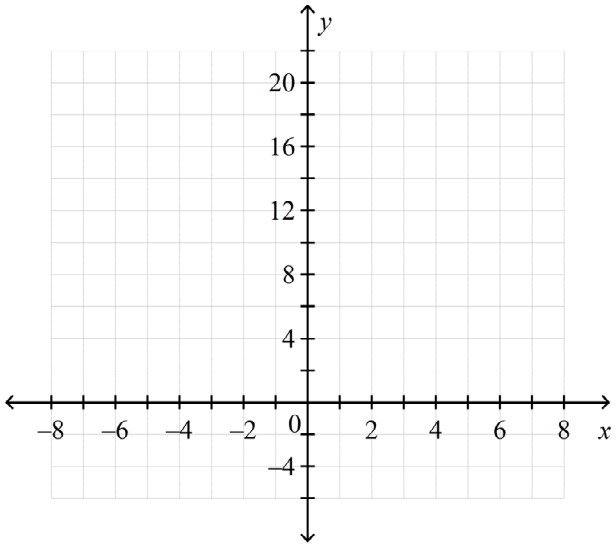
36. The function $y = f(x)$ is quadratic. The line $y = 4$ intersects the graph of $y = |f(x)|$ at three points: $(-2, 4)$, $(0, 4)$, and $(2, 4)$. The line $y = 14$ intersects the graph of $y = |f(x)|$ at two points: $(-3, 14)$ and $(3, 14)$. What is an equation for the quadratic function $y = f(x)$?



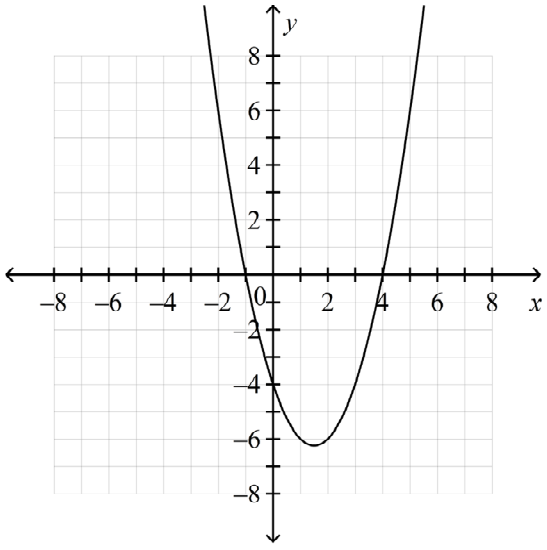
Problem

37. Solve the equation $6 - |2x^2 - 8x - 1| = -3$. Show your work.

38. The function $y = f(x)$ is linear. The line $y = 6$ intersects the graph of $y = |f(x)|$ at $x = 2$ and $x = 6$. The line $y = 3$ intersects the graph of $y = |f(x)|$ at $x = 3$ and $x = 5$. Use a graph to determine the equation for the function $y = |f(x)|$.



39. This is the graph of a quadratic function $y = f(x)$. Sketch a graph of the reciprocal function $y = \frac{1}{f(x)}$ and identify the vertical asymptotes, if they exist. Describe your strategy.



40. A motorcycle is travelling toward the Ontario-Quebec border. The motorcycle is 255 km from the border, and is travelling at an average speed of 95 km/h.

a) Write an absolute value equation to represent the distance, d kilometres, of the motorcycle from the border after t hours.

b) Determine how far the motorcycle is from the border after 1.5 h. Give distance to the nearest kilometre.

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41. The graphs of the linear functions $y = -2x - 2$ and $y = 0.5x + 3$ are perpendicular. That is, their slopes are negative reciprocals. Do the graphs of their reciprocal functions intersect? How do you know?

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42. Predict the number of vertical asymptotes of the graph of each reciprocal function. Explain your answer. Write the equation of each vertical asymptote you identify.

a) $y = \dfrac{1}{x^2 - 2}$

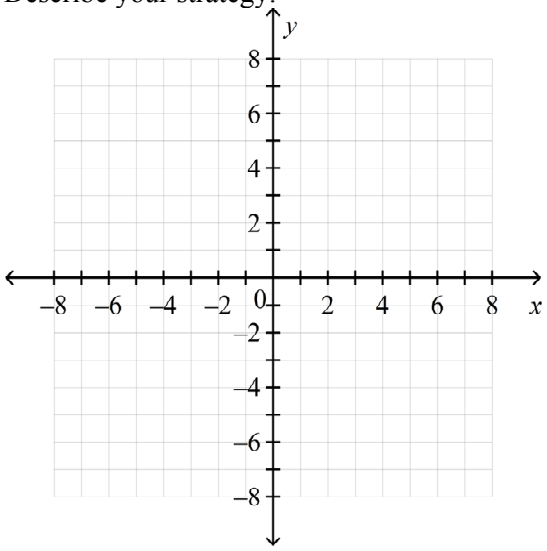
b) $y = \dfrac{1}{-2x^2 + 8}$

43. The graph of the reciprocal of a quadratic function has one vertical asymptote, $x = 1$. Points (2, 1) and $(0, 1)$ are common to the graphs of the quadratic function and its reciprocal.

a) Sketch the graphs of the quadratic function and its reciprocal on the same grid.

b) Determine the equations of both the quadratic function and its reciprocal.

Describe your strategy.



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44. Determine the values of k for which each reciprocal function has the given number of vertical asymptotes. Explain your work.

a) $y = \dfrac{1}{-x^2 + kx - 6}$; no vertical asymptotes

b) $y = \dfrac{1}{x^2 + kx + 1}$; one vertical asymptote

c) $y = \dfrac{1}{x^2 + kx + 8}$; two vertical asymptotes