Algebra 2 Name_____

9-3 Rational Functions and Their Graphs HW

Date_____ Period____

Simplify each and state the excluded values.

1) $\frac{14p - 16}{16}$

2) $\frac{35x - 70}{14}$

3) $\frac{3v - 3}{v^2 + 6v - 7}$

4) $\frac{-x^2 + 9x - 18}{5x - 15}$

5) $\frac{9k^3 - 27k^2 + 18k}{k^2 - 6k + 8}$

6) $\frac{3b^3 + 24b^2 + 36b}{2b^2 + 8b - 24}$

7) $\frac{(p + 10)(p + 3)}{3} \cdot \frac{1}{(p + 10)(p + 3)}$

8) $\frac{3x^2(x - 3)}{3x^2} \cdot \frac{6x^2}{(x - 3)^2}$

9) $\frac{3p + 3}{3p + 27} \div \frac{p + 1}{7p - 49}$

10) $\frac{m^2 + 7m - 30}{m^2 + 10m + 24} \div \frac{30 - 7m - m^2}{3m^2}$

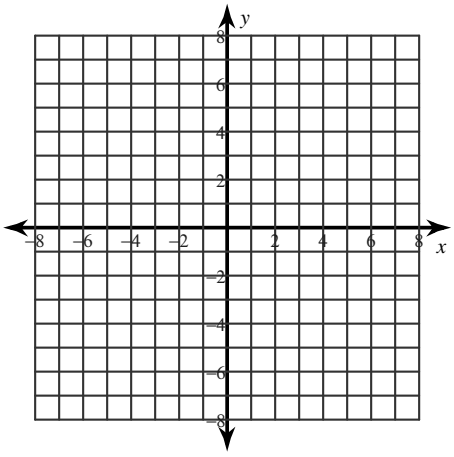
Simplify each expression.

11) $\frac{b - 5}{4b^2 + 12b} - \frac{b + 1}{4b^2 + 12b}$

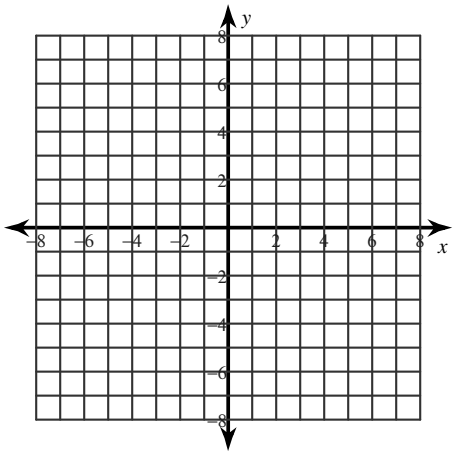
12) $\frac{4}{2m + 6} + \frac{2m}{3m}$

Graph each function.

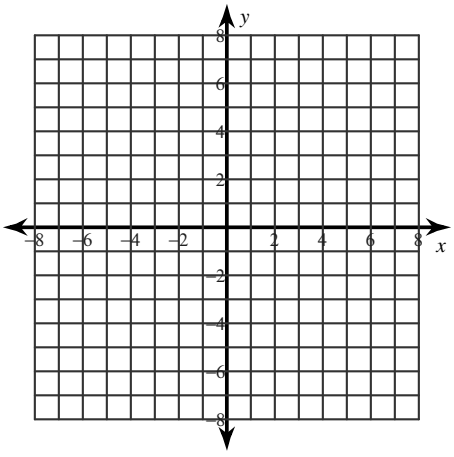
13) $f(x) = \dfrac{x^3 - 4x}{3x^2 + 9x}$



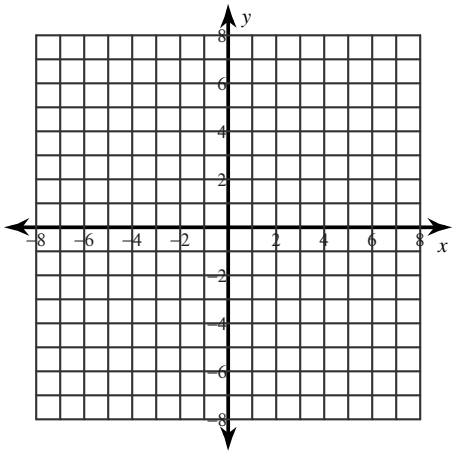
14) $f(x) = \dfrac{x^2 + 3x - 4}{-x^2 + 2x + 3}$



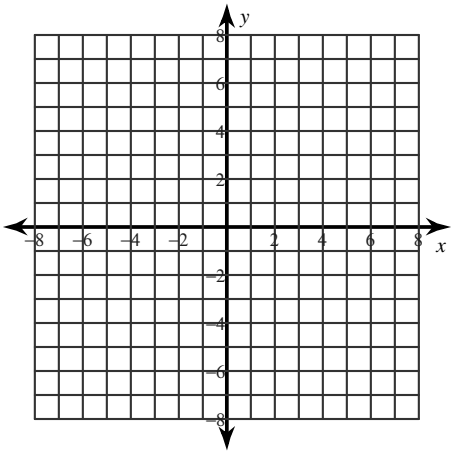
15) $f(x) = -\dfrac{2x}{x - 3}$



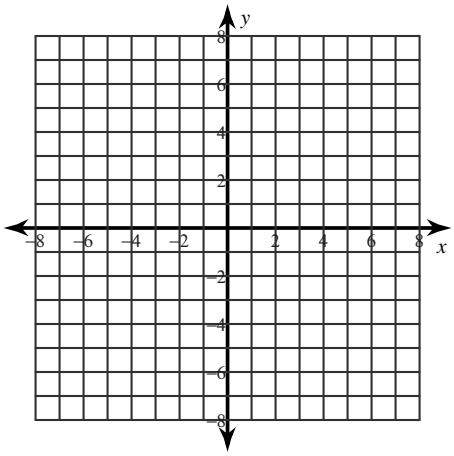
16) $f(x) = \dfrac{x^2 - 4x}{4x^2 - 16}$



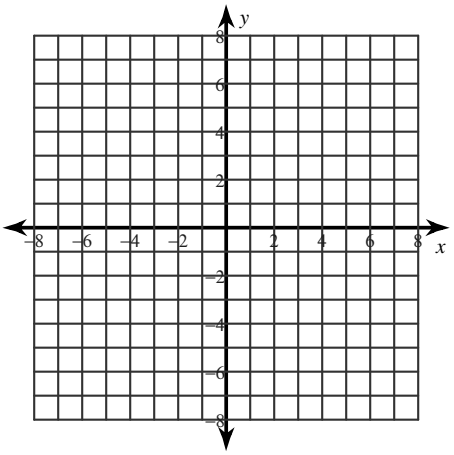
17) $f(x) = \dfrac{2}{x-3} - 3$



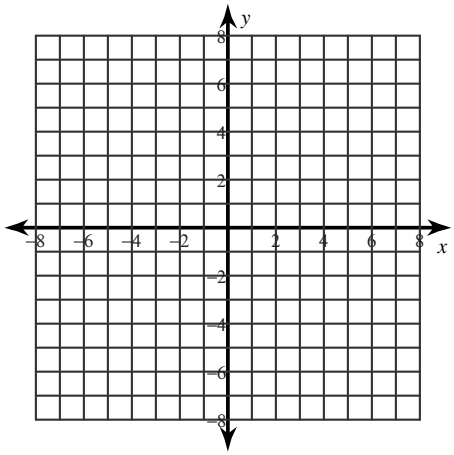
18) $f(x) = -\dfrac{3}{x-1} - 1$



19) $f(x) = -\dfrac{3}{x+2} - 2$

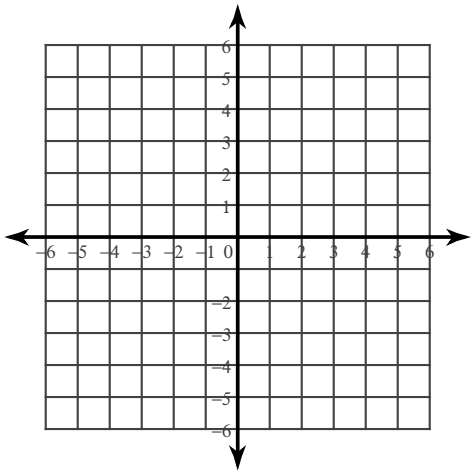


20) $f(x) = \dfrac{3}{x} - 2$

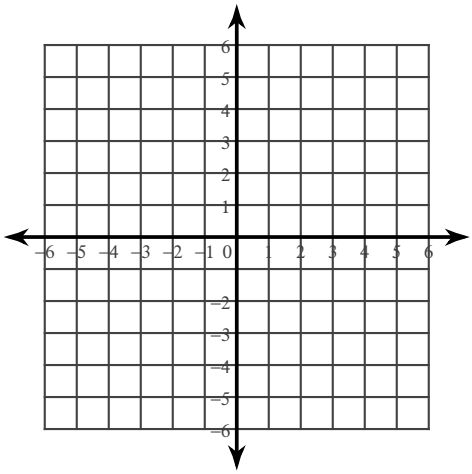


Graph each equation.

21) $y = \left|x + 2\right|$

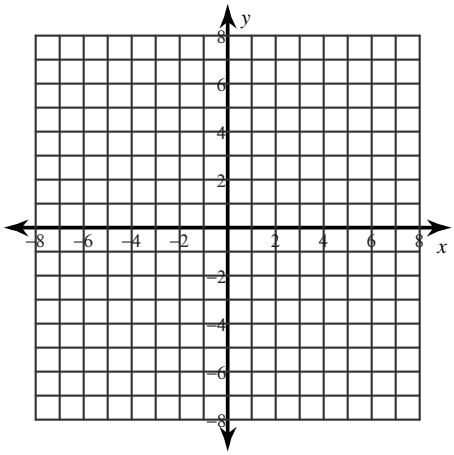


22) $y = \left|x\right| - 4$

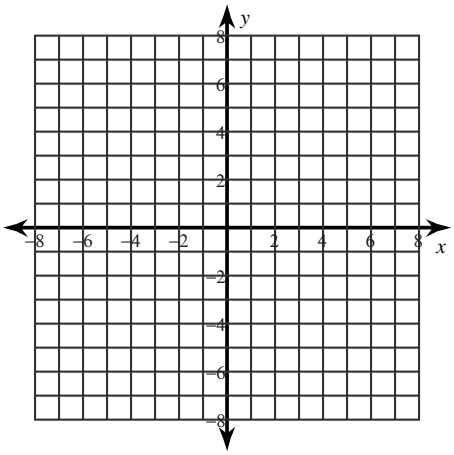


Identify the vertex of each. Then sketch the graph.

23) $y = x^2 + 6x + 12$



24) $y = x^2 + 6x + 11$



Solve each system.

25) $6x + 3y + z = -5$
$4x + 3y + 3z = 9$
$4x + y = -9$

Algebra 2 Name_____

9-3 Rational Functions and Their Graphs HW

Date_____ Period____

Simplify each and state the excluded values.

1) $\frac{14p - 16}{16}$

$\frac{7p - 8}{8}$; No excluded values.

2) $\frac{35x - 70}{14}$

$\frac{5(x - 2)}{2}$; No excluded values.

3) $\frac{3v - 3}{v^2 + 6v - 7}$

$\frac{3}{v + 7}$; $\{-7, 1\}$

4) $\frac{-x^2 + 9x - 18}{5x - 15}$

$-\frac{(x - 6)}{5}$; $\{3\}$

5) $\frac{9k^3 - 27k^2 + 18k}{k^2 - 6k + 8}$

$\frac{9k(k - 1)}{k - 4}$; $\{2, 4\}$

6) $\frac{3b^3 + 24b^2 + 36b}{2b^2 + 8b - 24}$

$\frac{3b(b + 2)}{2(b - 2)}$; $\{-6, 2\}$

7) $\frac{(p + 10)(p + 3)}{3} \cdot \frac{1}{(p + 10)(p + 3)}$

$\frac{1}{3}$

8) $\frac{3x^2(x - 3)}{3x^2} \cdot \frac{6x^2}{(x - 3)^2}$ $\frac{6x^2}{x - 3}$

9) $\frac{3p + 3}{3p + 27} \div \frac{p + 1}{7p - 49}$

$\frac{7(p - 7)}{p + 9}$; $\{-9, 7, -1\}$

10) $\frac{m^2 + 7m - 30}{m^2 + 10m + 24} \div \frac{30 - 7m - m^2}{3m^2}$ $-\frac{3m^2}{(m + 4)(m + 6)}$; $\{-4, -6$

Simplify each expression.

11) $\frac{b - 5}{4b^2 + 12b} - \frac{b + 1}{4b^2 + 12b}$

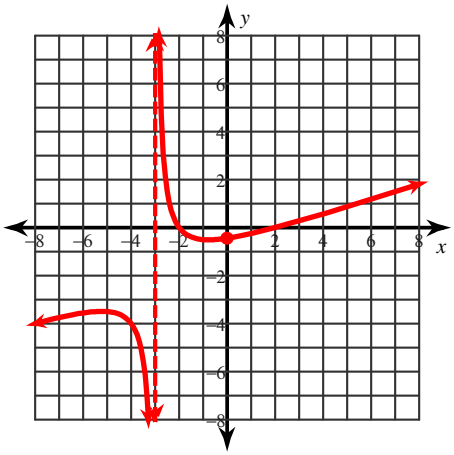
$-\frac{3}{2b^2 + 6b}$

12) $\frac{4}{2m + 6} + \frac{2m}{3m}$

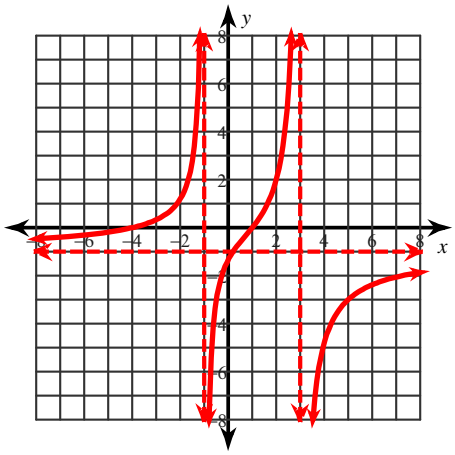
$\frac{12 + 2m}{3(m + 3)}$

Graph each function.

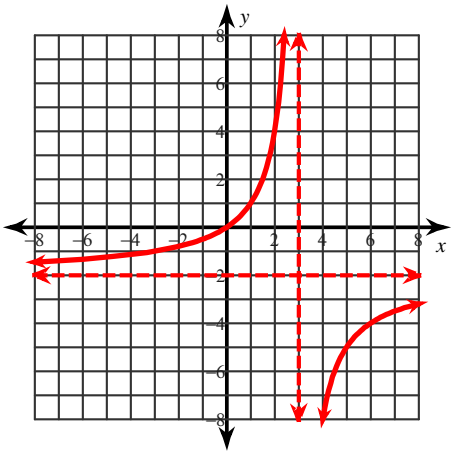
13) $f(x) = \dfrac{x^3 - 4x}{3x^2 + 9x}$



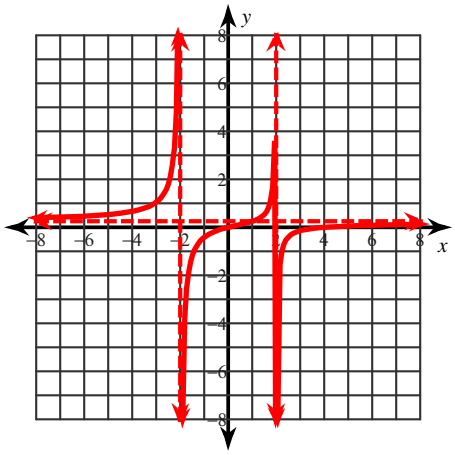
14) $f(x) = \dfrac{x^2 + 3x - 4}{-x^2 + 2x + 3}$



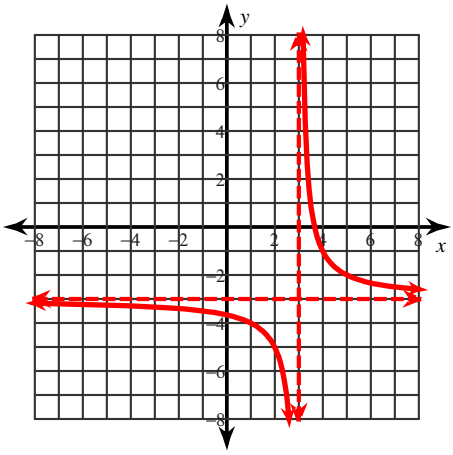
15) $f(x) = -\dfrac{2x}{x - 3}$



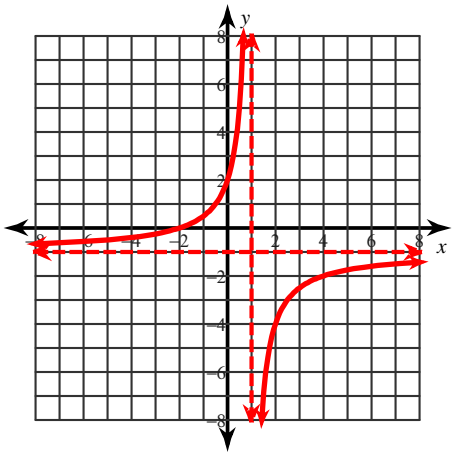
16) $f(x) = \dfrac{x^2 - 4x}{4x^2 - 16}$



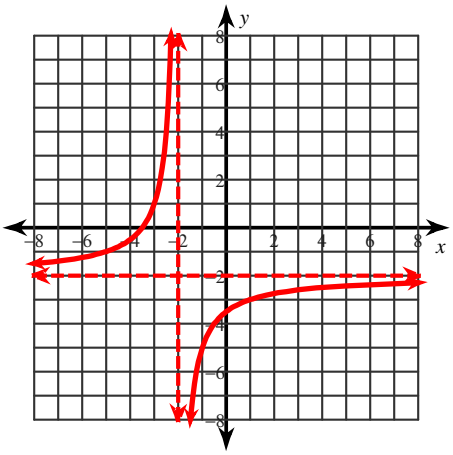
17) $f(x) = \dfrac{2}{x-3} - 3$



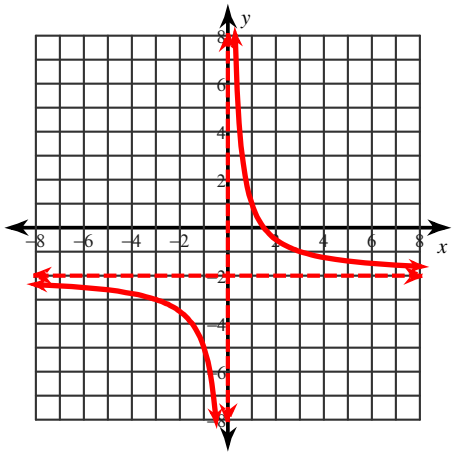
18) $f(x) = -\dfrac{3}{x-1} - 1$



19) $f(x) = -\dfrac{3}{x+2} - 2$

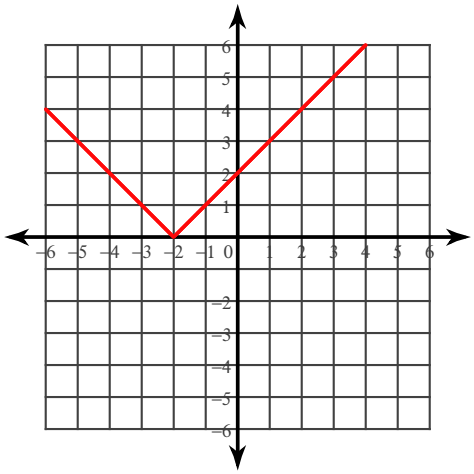


20) $f(x) = \dfrac{3}{x} - 2$

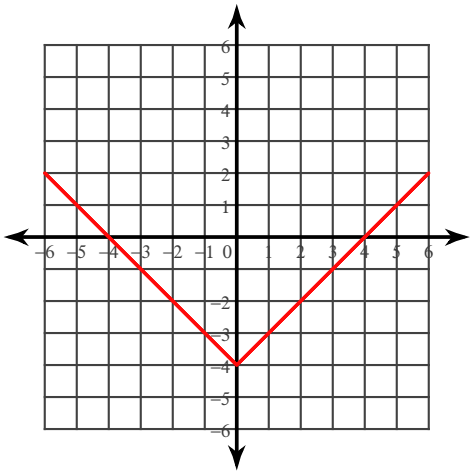


Graph each equation.

21) $y = |x + 2|$

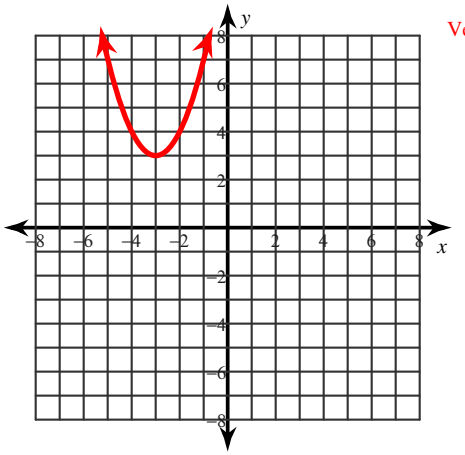


22) $y = |x| - 4$



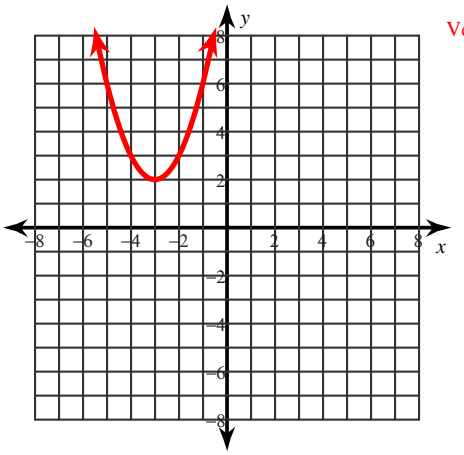
Identify the vertex of each. Then sketch the graph.

23) $y = x^2 + 6x + 12$



Vertex: (–3, 3)

24) $y = x^2 + 6x + 11$



Vertex: (–3, 2)

Solve each system.

25) $6x + 3y + z = -5$
$4x + 3y + 3z = 9$
$4x + y = -9$

(–3, 3, 4)