Name: _____

5.REV.4 – Rational Functions

Past due on: _____ Period: _____

For each rational function, compare the degrees of the numerator and denominator and then find the end behavior and the horizontal asymptote.

1. $f(x) = \dfrac{4x + 3x^3}{4x^2 + 3x}$

$\lim_{x\to-\infty} f(x) =$ $\lim_{x\to\infty} f(x) =$ Horizontal asymptote: $y =$

2. $f(x) = \dfrac{3x^2 + x}{2x^2 + 5x^3}$

$\lim_{x\to-\infty} f(x) =$ $\lim_{x\to\infty} f(x) =$ Horizontal asymptote: $y =$

3. $f(x) = \dfrac{x^3 + 5x^2 + x + 5}{x - 5}$

$\lim_{x\to-\infty} f(x) =$ $\lim_{x\to\infty} f(x) =$ Horizontal asymptote: $y =$

4. $f(x) = \dfrac{-x^2}{x + 5}$

$\lim_{x\to-\infty} f(x) =$ $\lim_{x\to\infty} f(x) =$ Horizontal asymptote: $y =$

5. $f(x) = \dfrac{-2x}{x^2 + 2x}$

$\lim_{x\to-\infty} f(x) =$ $\lim_{x\to\infty} f(x) =$ Horizontal asymptote: $y =$

6. $f(x) = \dfrac{2x - 4x^2}{x^2 - 4x + 8}$

$\lim_{x\to-\infty} f(x) =$ $\lim_{x\to\infty} f(x) =$ Horizontal asymptote: $y =$

Write the rational function in its factored form. Analyze each rational function for its long-run behavior (end behavior and horizontal asymptote) and its short-run behavior (intercepts, vertical asymptote, and holes). *Write DNE if the function doesn't have a particular property.*

7. $f(x) = \dfrac{-4x + 12}{x^2 - x - 6}$

$\lim_{x\to-\infty} f(x) =$	$\lim_{x\to\infty} f(x) =$	Horizontal asymptote: $y =$	y-intercept:
Vertical asymptote: $x =$	x-intercept:	Hole:	Domain: $x \neq$

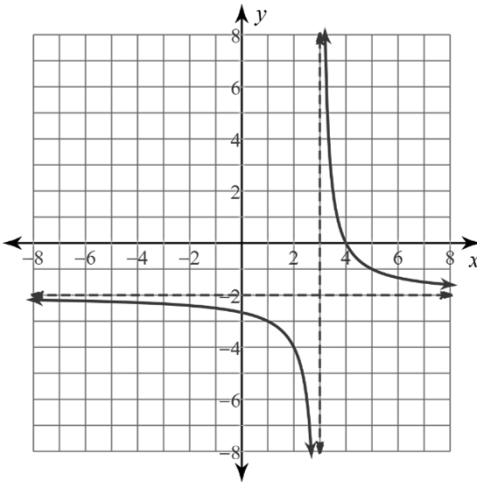
---

8. $f(x) = \dfrac{3x^2 - 3x - 6}{x^2 - 2x - 3}$

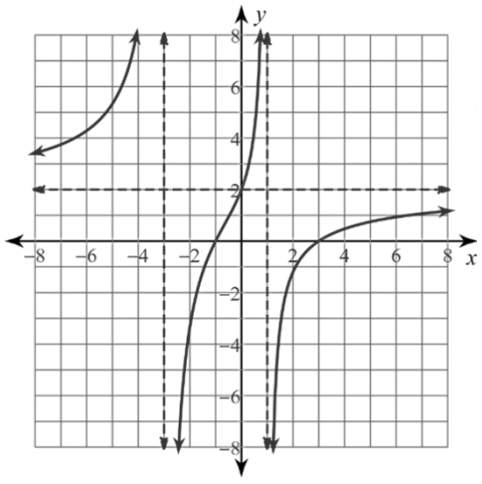
$\lim_{x\to-\infty} f(x) =$	$\lim_{x\to\infty} f(x) =$	Horizontal asymptote: $y =$	y-intercept:
Vertical asymptote: $x =$	x-intercept:	Hole:	Domain: $x \neq$

Find a possible formula for the rational function.

9.



10.



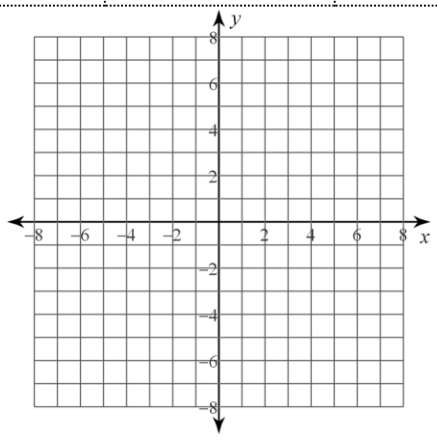
11. The graph crosses the x-axis at 2, touches the x-axis at -1; vertical asymptotes at $x = -5$ & $x = 6$; a horizontal asymptote at $y = 3$; the y-intercept is $(0, 0.04)$.

12. There is a hole at $x = 2$, a zero at $x = 3$, a vertical asymptote at $x = -1$, and a horizontal asymptote at $y = 1$.

Write the rational function in its factored form. Then analyze the rational function for its long-run behavior (horizontal asymptote) and its short-run behavior (intercepts, vertical asymptote, and holes). *Write DNE if the function doesn't have a particular property*. Lastly, sketch its graph.

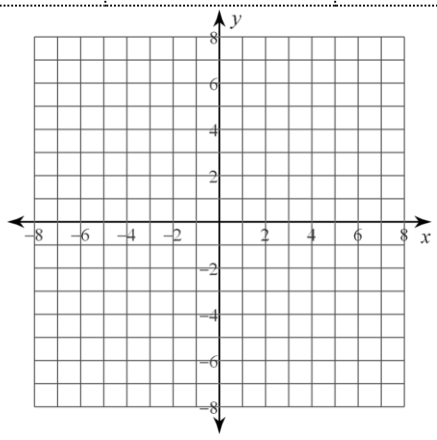
13. $f(x) = \dfrac{-2x - 2}{x - 3}$

Horizontal asymptote $y =$	y-intercept:	Domain: $x \neq$
Hole:	x-intercept(s):	Vertical asymptote: $x =$



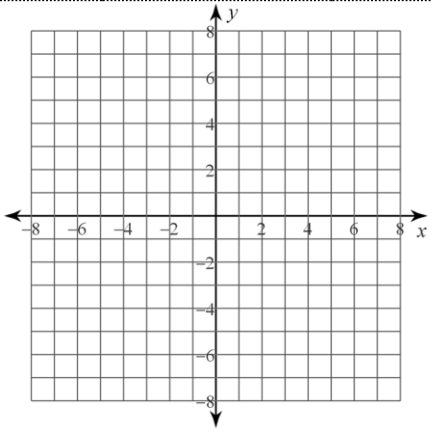
14. $f(x) = \dfrac{x^2 - 4x}{x^2 - 3x}$

Horizontal asymptote $y =$	y-intercept:	Domain: $x \neq$
Hole:	x-intercept(s):	Vertical asymptote: $x =$



15. $f(x) = \dfrac{3x^2 + 6x - 24}{3x^2 - 9x + 6}$

Horizontal asymptote $y =$	y-intercept:	Domain: $x \neq$
Hole:	x-intercept(s):	Vertical asymptote: $x =$



16. $f(x) = \dfrac{2x^3 - 18x}{x^3 + x^2 - 6x}$

Horizontal asymptote $y =$	y-intercept:	Domain: $x \neq$
Hole:	x-intercept(s):	Vertical asymptote: $x =$