Name: ____

11.Rev.3 ~ Rational Functions

Past due on: ___________ Period: _____

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

1. $\lim\limits_{x\to\infty} \dfrac{4x+3x^3}{4x^2+3x}$

2. $\lim\limits_{x\to-\infty} \dfrac{3x^2+x}{2x^2+5x^3}$

3. $\lim\limits_{x\to-\infty} \dfrac{x^3+5x^2+x+5}{x-5}$

4. $\lim\limits_{x\to-\infty} \dfrac{-x^2}{x+5}$

5. $\lim\limits_{x\to\infty} \dfrac{-2x}{x^2+2x}$

6. $\lim\limits_{x\to\infty} \dfrac{2x-4x^2}{x^2-4x+8}$

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.
$$f(x)=\frac{-4x+12}{x^2-x-6}=\frac{-4(x-3)}{(x+2)(x-3)}$$

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

8.
$$f(x)=\frac{3x^2-3x-6}{x^2-2x-3}=\frac{3(x+1)(x-2)}{(x+1)(x-3)}$$

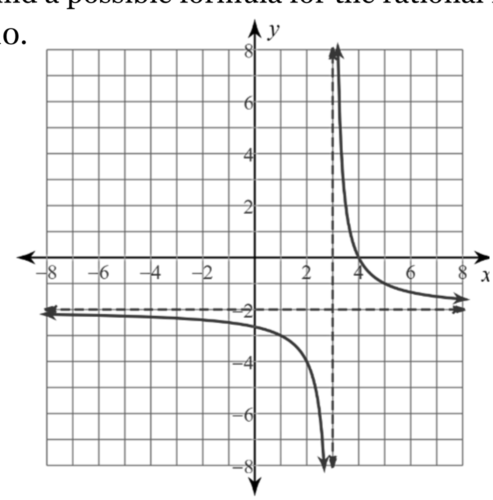
$\lim\limits_{x\to-\infty} f(x)=$	$\lim\limits_{x\to\infty} f(x)=$	Horizontal asymptote: $y=$	y-intercept:
Vertical asymptote: $x=$	x-intercept:	Hole:	Domain: $x\neq$

9.
$$f(x)=\frac{x^3-x^2-12x}{4x^2-64}=\frac{x(x+3)(x-4)}{4(x+4)(x-4)}$$

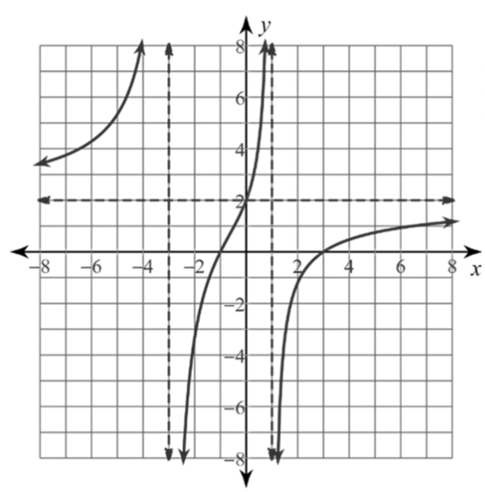
$\lim\limits_{x\to-\infty} f(x)=$	$\lim\limits_{x\to\infty} f(x)=$	Horizontal asymptote: $y=$	y-intercept:
Vertical asymptote: $x=$	x-intercept:	Hole:	Domain: $x\neq$

Find a possible formula for the rational function.

10.



11.



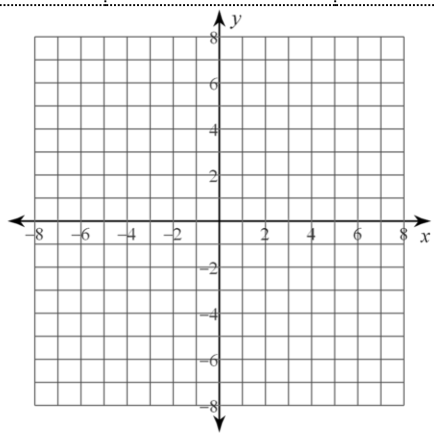
12. The graph crosses the x-axis at 2, touches the x-axis at -1; vertical asymptotes at $x = -5$ & $x = 6$; a horizontal asymptote at $y = 3$; the y-intercept is $(0, 0.04)$.

13. 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 (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.* Lastly, sketch its graph.

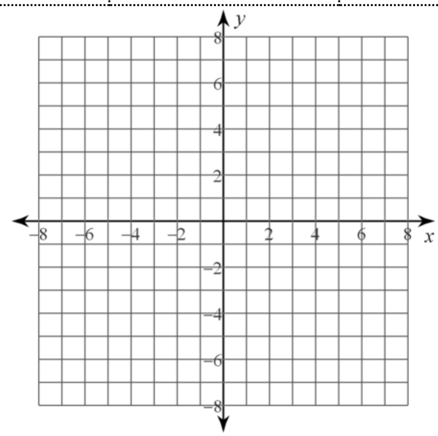
14. $f(x) = \dfrac{-2x - 2}{x - 3}$

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



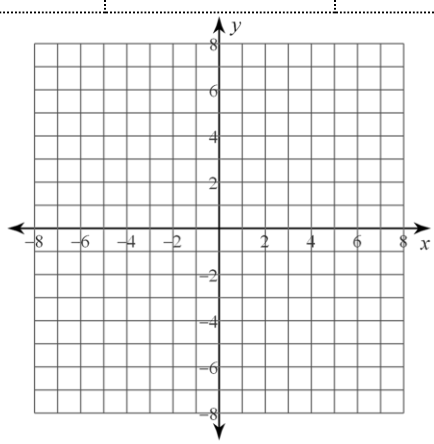
15. $f(x) = \dfrac{x^2 - 4x}{x^2 - 3x}$

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



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

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



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

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