Pre-Calculus/Trig
UNIT 1: Algebra II Review – SECTION 7 WORKSHEET #1

Name: _____
Date: _____

GRAPHING RATIONAL FUNCTIONS

To Identify Types of Discontinuity:

Step 1: **HOLES (Removable Discontinuities)**
- ✓ Factor numerator & denominator
- ✓ Simplify
- ✓ If anything cancels, then there is a hole **(**More than one factor cancels → More than one hole)
- ✓ Find the ordered pair, (x, y), substitute *x* into the ***SIMPLIFIED EQUATION*** to get *y*

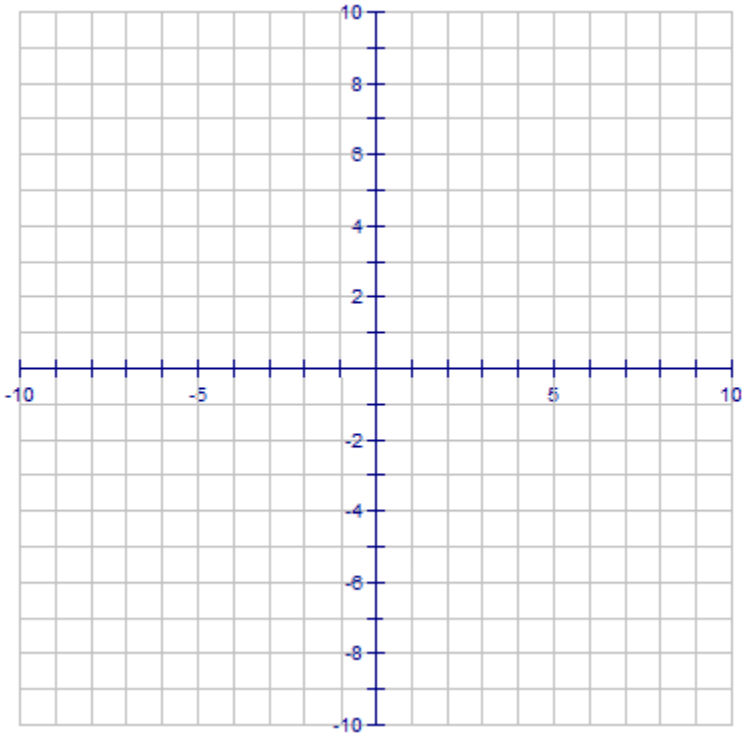
Step 2: **VERTICAL ASYMPTOTES *(USE SIMPLIFIED EQUATION)***
- ✓ Set simplified equation denominator = 0, solve for *x*

Step 3: **HORIZONTAL ASYMPTOTES – *Two Cases (USE SIMPLIFIED EQUATION)***
- ✓ Degree of Denominator = Degree of Numerator → $y =$ ratio of leading coefficients
- ✓ Degree of Denominator > Degree of Numerator → $y = 0$

Step 4: **SLANT ASYMPTOTES *(Exists only if Horizontal Asymptote is not present) (USE SIMPLIFIED EQUATION)***
- ✓ Degree of Numerator is ***ONE*** degree larger than the Degree of Denominator
- ✓ Use Long Division
- ✓ Ignore the remainder
- ✓ Answer in the form $y = mx + b$

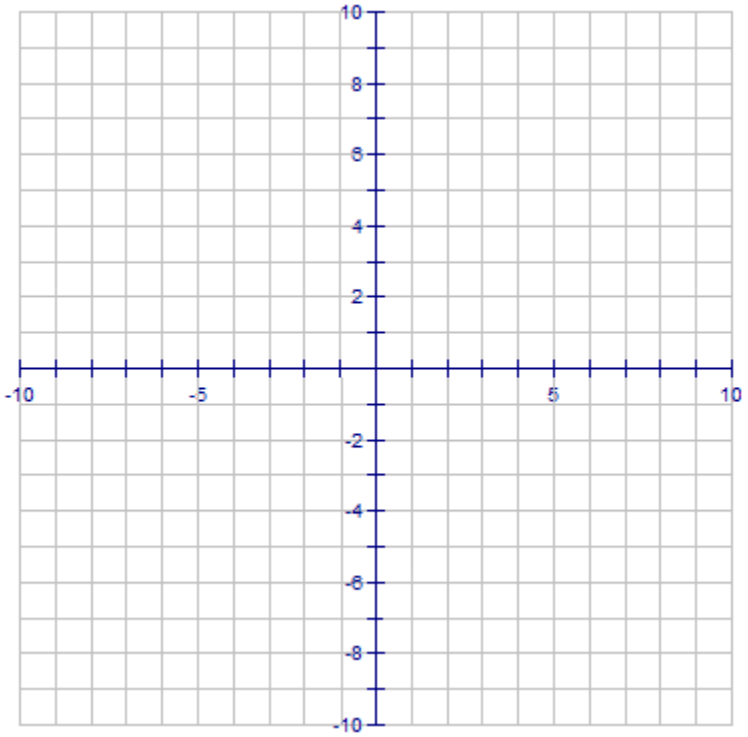
Directions: State each discontinuity, x-intercept, and y-intercept. Then sketch a graph.

1.) $f(x) = \frac{x^2-4}{x-2}$



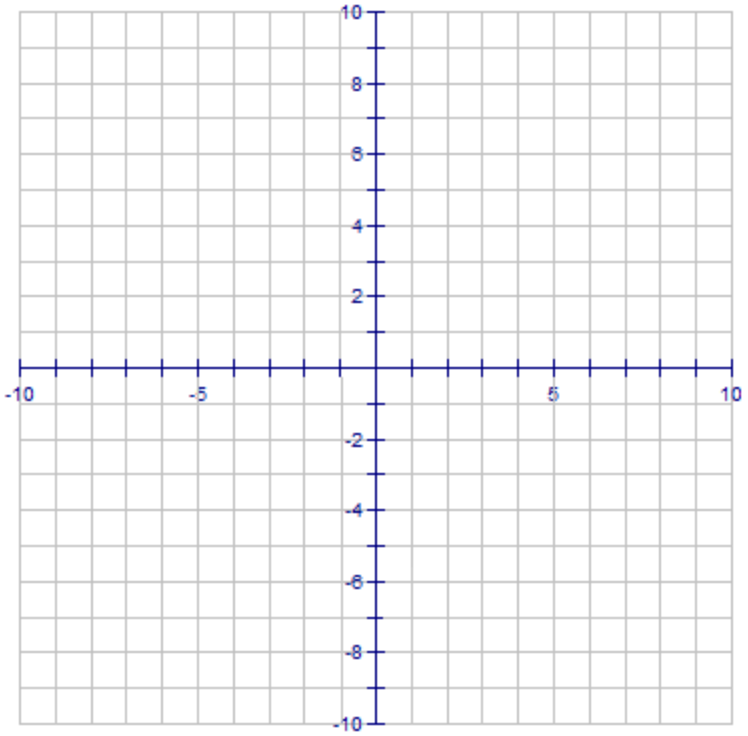
HOLE(S)	VERTICAL ASYMPTOTE(S)	HORIZONTAL ASYMPTOTE	SLANT ASYMPTOTE	x-intercept(s)	y-intercept

2.) $f(x) = \frac{-2}{(x-3)^2}$



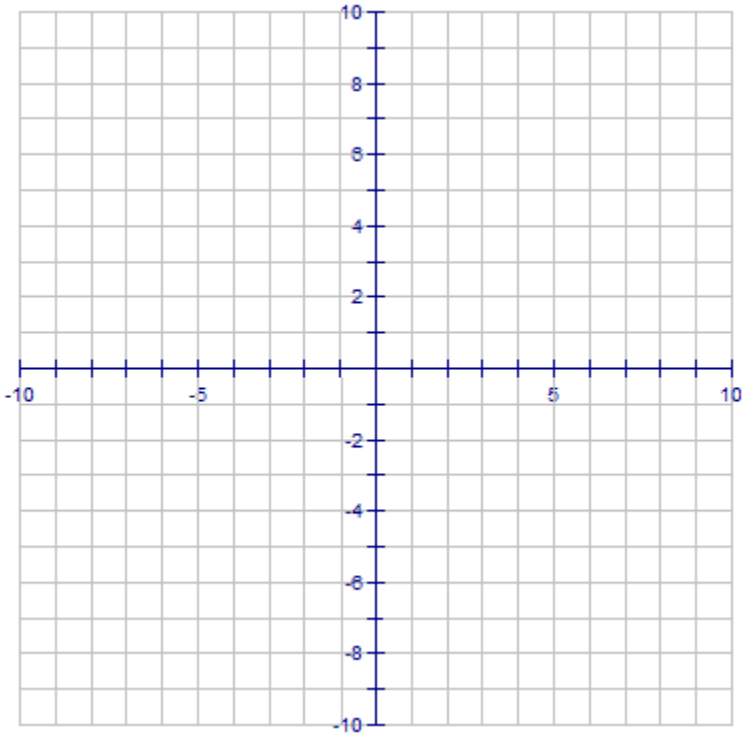
HOLE(S)	VERTICAL ASYMPTOTE(S)	HORIZONTAL ASYMPTOTE	SLANT ASYMPTOTE	x-intercept(s)	y-intercept

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



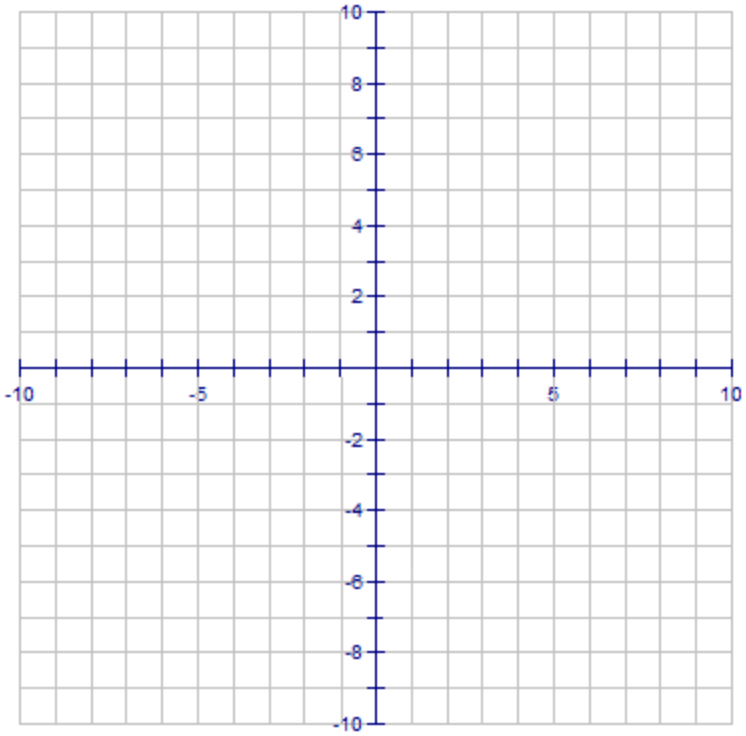
HOLE(S)	VERTICAL ASYMPTOTE(S)	HORIZONTAL ASYMPTOTE	SLANT ASYMPTOTE	x-intercept(s)	y-intercept

4.) $f(x) = \frac{x^3-9x}{x^2+4x-21}$



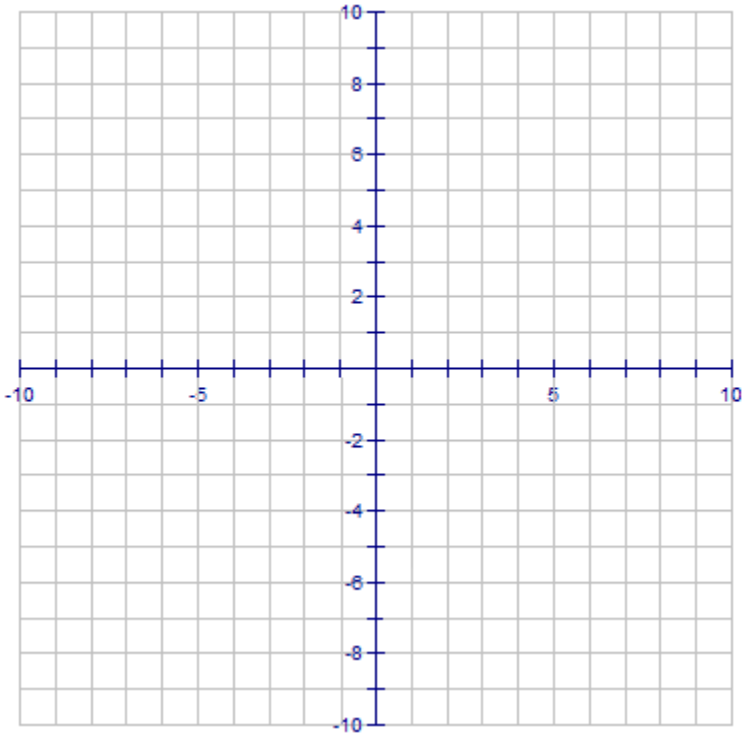
HOLE(S)	VERTICAL ASYMPTOTE(S)	HORIZONTAL ASYMPTOTE	SLANT ASYMPTOTE	x-intercept(s)	y-intercept

5.) $f(x) = \frac{x^2+5x+8}{x+3}$



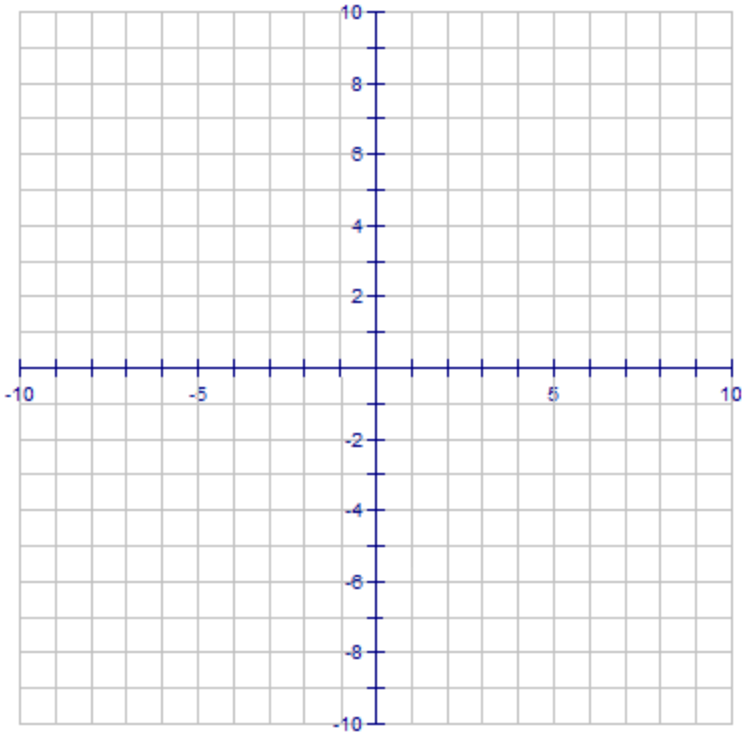
HOLE(S)	VERTICAL ASYMPTOTE(S)	HORIZONTAL ASYMPTOTE	SLANT ASYMPTOTE	x-intercept(s)	y-intercept

6.) $f(x) = \frac{x^2+x-2}{(x+2)(x^2-2x-15)}$



HOLE(S)	VERTICAL ASYMPTOTE(S)	HORIZONTAL ASYMPTOTE	SLANT ASYMPTOTE	x-intercept(s)	y-intercept

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



HOLE(S)	VERTICAL ASYMPTOTE(S)	HORIZONTAL ASYMPTOTE	SLANT ASYMPTOTE	x-intercept(s)	y-intercept