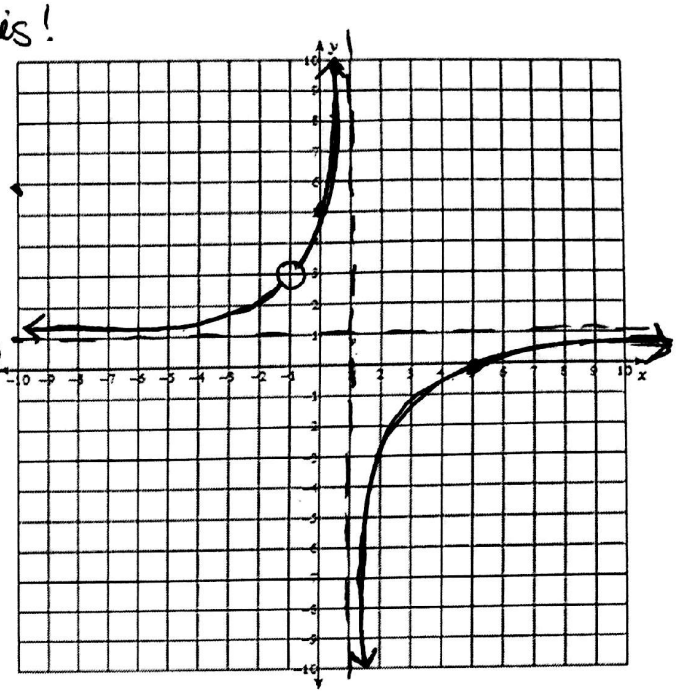
College Algebra Name: _____

Unit 2B Review – Rational Functions Period: _____ Date: _____

Sketch the following rational functions and identify all key information for the given function.

1. $h(x) = \dfrac{x^2 - 4x - 5}{x^2 - 1}$ ← you should factor this!



a. Vertical Asymptote(s): $x = 1$

b. Horizontal Asymptote: $y = 1$

c. Hole(s): $(-1, 3)$

d. Domain: $(-\infty, -1) \cup (-1, 1) \cup (1, \infty)$

e. Range: $(-\infty, 1) \cup (1, 3) \cup (3, \infty)$

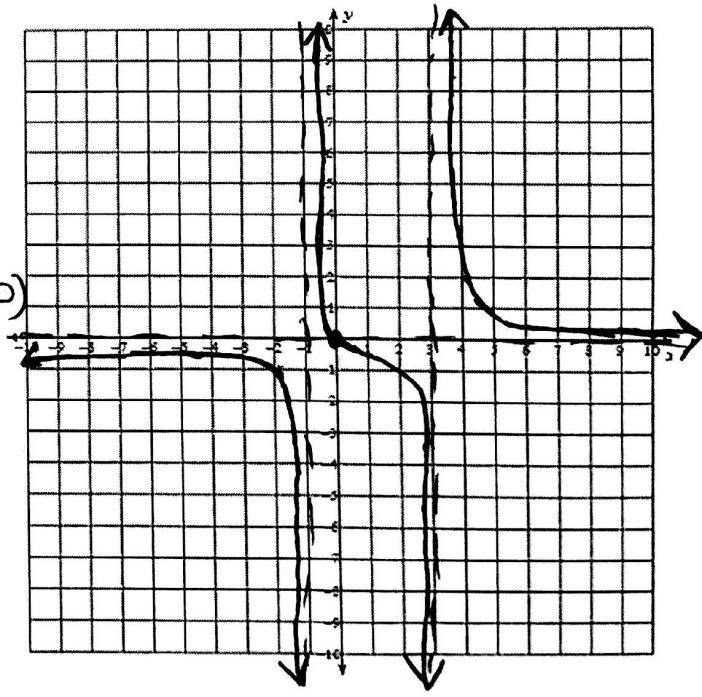
f. x-intercept(s): $x = 5$

g. y-intercept: $y = 5$

h. End behavior: As $x \to -\infty, f(x) \to$ 1

As $x \to \infty, f(x) \to$ 1

2. $h(x) = \dfrac{x}{x^2 - 2x - 3}$



a. Vertical Asymptote(s): $x = -1, 3$

b. Horizontal Asymptote: $y = 0$

c. Hole(s): none

d. Domain: $(-\infty, -1) \cup (-1, 3) \cup (3, \infty)$

e. Range: $(-\infty, \infty)$

f. x-intercept(s): $x = 0$

g. y-intercept: $y = 0$

h. End behavior: As $x \to -\infty, f(x) \to$ 0

As $x \to \infty, f(x) \to$ 0

Solve the following rational equations and identify any extraneous solutions.

3.) $\frac{1}{n-4}+\frac{n}{n-2}=\frac{2}{n^2-6n+8}$

$n=-1$

4.) $\frac{x+8}{x-6}=-4$

$x=16/5$

5.) $\frac{m-3}{m-4}+\frac{5}{m^2-3m-4}=1$

$m=-6$

6.) $\frac{2}{x}-\frac{4}{x+1}=3$

$x=1/3, -2$

7.) Circle all that apply to the function $h(x) = \dfrac{x^3 - 5x^2 + 6x}{-4x^2 - 4x + 24}$

(a.) (0, 0) is an y-intercept

(b.) (0, 0) is an x-intercept

c. (2, 0) is an x-intercept

(d.) (3, 0) is an x-intercept

e. (-3, 0) is an x-intercept

(f.) (2, 1/10) is a hole

(g.) x = -3 is a vertical asymptote

h. x = 3 is a vertical asymptote

Refer to the rational function $g(x) = \dfrac{x^2 + 7x + 12}{x^2 - 9}$ to answer problems 8 through 11.

8.) The horizontal asymptote of g(x) is _____

a. $x = 1$

(b.) $y = 1$

c. $x = 3$

d. $y = 3$

9.) A vertical asymptote(s) of g(x) is _____

a. $x = 1$

b. $y = 1$

(c.) $x = 3$

d. $y = 3$

10.) A hole of g(x) is located at _____

a. $(-3, 0)$

(b.) $\left(-3, -\frac{1}{6}\right)$

c. $(3, 0)$

d. $\left(3, -\frac{1}{6}\right)$

11.) The domain of g(x) is _____

a. $(-\infty, 3) \cup (3, \infty)$

b. $(-\infty, -3) \cup (-3, \infty)$

(c.) $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$

d. $(-\infty, \infty)$