Unit 5 Review Sheet **Name:** _____

Rational and Radical Functions

1. A rational function has a vertical asymptote at x=4 and a horizontal asymptote at y=-2. Write a possible equation for this function. Express your final answer as one fraction.

$$\frac{-2x+9}{x-4}$$

2. A rational function has a vertical asymptote at x=2 and a hole at x=-3. The function also has a horizontal asymptote at y=-3. Write a possible equation for this function. Express your final answer as one fraction.

$$\frac{-3x^2+10x+3}{x^2+x-6}$$

3. (challenge) A rational function has a vertical asymptote at x=4 and a slanted asymptote at y = 2x + 1. Write a possible equation for this function. Express your final answer as one fraction.

$$\frac{2x^2-3x-4}{x-4}$$

4. Find the domain, asymptotes, and hole(s) for the functions below.

a. $f(x)=\frac{-3x^2-10}{x^2+x-12}$

Domain: $(-\infty,-4)\cup(-4,3)\cup(3,\infty)$
VA: x=-4 and x=3
HA: y = -3
No holes

b. $g(x)=\frac{x^2-10x+25}{x+1}$

Domain: $(-\infty,-1)\cup(-1,\infty)$
VA: x=-1, no holes
HA: None
SA: y=x-11

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

Domain: $(-\infty,-7) \cup (-7,3) \cup (3,\infty)$
VA: x=-7
Hole: @ 3
HA: y=0

d. $k(x) = \frac{x^2+5x+6}{x^2-x-6}$

Domain: $(-\infty,-2) \cup (-2,3) \cup (3,\infty)$
VA: x=3
Hole @ -2
HA: y=1

e. $b(x) = \frac{3x+7}{x+2}$

Domain: $(-\infty,-2) \cup (-2,\infty)$
VA: x = -2
Hole: None
HA: y = 3

f. $c(x) = \frac{x^2+10x+21}{x^2+11x+28}$

Domain: $(-\infty,-7) \cup (-7,-4) \cup (-4,\infty)$
VA: x = -4
Hole @ -7
HA: y = 1

5. Simplify

a. $\dfrac{\frac{2}{x} - \frac{5x}{x+2}}{\frac{x-3}{x}}$

$\mathbf{\dfrac{-5x^2+2x+4}{x^2-x-6}}$

b. $\frac{x}{x+4} + 1$

$\mathbf{\frac{2x+4}{x+4}}$

c. $\frac{x^2-3x-28}{x^2+4x+3} \cdot \frac{x+2}{7-x}$

$\mathbf{\dfrac{-x^2-6x-8}{x^2+4x+3}}$

6. Solve

a. $\frac{1}{2x^2} + \frac{3}{2x} = \frac{1}{x^2}$ $x = \frac{1}{3}$

b. $\frac{1}{2n-3} + 2 = \frac{7}{2n-3}$ n=3

c. $\frac{1}{x^2-5x} = \frac{x+7}{x} - 1$ x = 36/7