Math 4 #4 "$2 \cdot x^2$" Name Key

Unit 3 Review Date______

1. Use limit notation to describe the behavior of $j(x)$ near its vertical and horizontal asymptotes. It would also be nice if you could draw a sketch of the function as well.

$$j(x)=\frac{2x+5}{x-3}$$

Vertical

$\lim_{x\to 3^+} j(x)=\infty$

$\lim_{x\to 3^-} j(x)=-\infty$

Horizontal

$\lim_{x\to \infty} j(x)=2$

$\lim_{x\to -\infty} j(x)=2$

2. Add, subtract, multiply or divide the rational expressions below. Simplify your answer.

a. $\frac{x^2-x-6}{2x^2+9x+4}\cdot\frac{x^2-16}{2x^2-7x-4}$

$\frac{(x-3)(x+2)}{(2x+1)\cancel{(x+4)}}\cdot\frac{\cancel{(x+4)}\cancel{(x-4)}}{(2x+1)\cancel{(x-4)}}$

$$\boxed{\frac{(x-3)(x+2)}{(2x+1)^2}}$$

b. $\frac{3x-4}{2x^2+3x+1}+\frac{5}{2x+1}$

$\frac{3x-4}{(2x+1)(x+1)}+\frac{5}{2x+1}\left(\frac{x+1}{x+1}\right)$

$$\boxed{\frac{8x+1}{(2x+1)(x+1)}}$$

c. $\frac{2(x+3)^2}{x-3}\div\frac{4}{x^2-9}$

$\frac{\cancel{2}(x+3)^2}{\cancel{x-3}}\cdot\frac{(x+3)\cancel{(x-3)}}{\cancel{4}\,2}$

$$\boxed{\frac{(x+3)^3}{2}}$$

d. $\frac{6x+5}{2x+3}-\frac{2x-1}{2x+3}$

$\frac{(6x+5)-(2x-1)}{2x+3}$

$\frac{4x+6}{2x+3}$

$\frac{2(2x+3)}{2x+3}=\boxed{2}$

*****Redo all the problems from the 3-4 and 3-5 practice worksheets. You should**

ok

Determine the values of the properties below. Write "none" if one does not exist.

3. $f(x) = \dfrac{(2x-3)\cancel{(x+5)}}{x^2+6x+5}$

$(x+1)\cancel{(x+5)}$

Domain: $x \neq -1, -5$

x-intercept(s): $\left(\frac{3}{2}, 0\right)$

y-intercept: $(0, -3)$

horizontal asymptote(s): $y = 2$

vertical asymptote(s): $x = -1,\ x = -5$

oblique asymptote: None

hole: $\left(-5, \frac{13}{4}\right)$

$\dfrac{2(-5)-3}{-5+1} = \dfrac{-13}{-4} = \dfrac{13}{4}$

4. $w(x) = \dfrac{2x^2-13x-45}{3x^3+28x^2+9x}$

$= \dfrac{(2x+5)(x-9)}{x(3x+1)(x+9)}$

Domain: $x \neq 0, -\frac{1}{3}, -9$

x-intercept(s): $\left(-\frac{5}{2}, 0\right)\ (9, 0)$

y-intercept: None

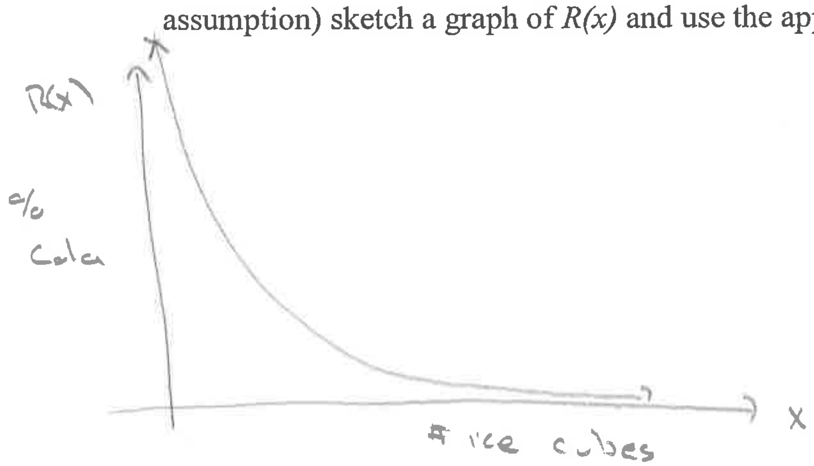
horizontal asymptote(s): $y = 0$

vertical asymptote(s): $x = 0,\ x = -\frac{1}{3},\ x = -9$

oblique asymptote: None

hole: None

5. The function *R(x)* models the percentage of RC Cola in a glass as a function of the number of ice cubes in the glass. Assuming you can put an infinite number of ice cubes in the glass (bad assumption) sketch a graph of *R(x)* and use the appropriate limit notation to describe your graph.



$\lim_{x \to 0^+} R(x) = 100$

$\lim_{x \to \infty} R(x) = 0$

6. On the graph below, sketch a possible graph of the function *f(x)* with the following characteristics:

$\lim_{x\to\infty} f(x) = 4, \lim_{x\to-\infty} f(x) = 4$

$\lim_{x\to 1^-} f(x) = -\infty, \lim_{x\to 1^+} f(x) = \infty$

$f(-1) = 0, f(0) = -1$