Name:_____ Date:_____

Math 12 Honors: HW 1.4 Simplifying Rational Expressions and Finding NPV's

1. What is the definition of a rational expression?

2. Indicate which expressions are rational expressions. Explain why or why not:

a) $y=\frac{x+2}{x-3}$	b) $y=\frac{12}{x}$	c) $y=\frac{\sqrt{x}}{x}$
d) $y=\frac{2^x+\sqrt{7}}{x^3+10x}$	e) $y=x^{-3}+12x^{-2}$	f) $y=\frac{\sqrt{8}x^3+2x^2+3}{x^2-3}$
g) $y=\frac{\sqrt{x^3}+2x^2+3}{x^2-3}$	h) $y=16x$	i) $y=12$

3. Given each rational expression, find the non-permissible values

a) $\frac{2x}{(x-1)(x+4)}$	b) $\frac{x-1}{x(x-1)(2x+5)}$	c) $\frac{2x}{(x-3)(2x+7)}$
d) $\frac{5x}{(2x-3)+(3x-7)}$	e) $\frac{2x}{2x(4x+3)-3(4x+3)}$	f) $\frac{6x}{x^2-2x-24}$
g) $\frac{5-2x}{3x^2-11x+6}$	h) $\frac{2x^2-3x}{12x^2-53x+56}$	i) $\frac{8-2x}{2x^3+5x^2-12x}$
j) $\frac{3}{(x^2-16)(x^2+1)}$	k) $\frac{5}{x(x^3-8)(x^2+2)}$	L) $\frac{2}{x^3+3x^2+3x+1}$
m) $\frac{2x-3}{x+2}\div\frac{3x+4}{x^2-9}$ NPV:	n) $\frac{x+14}{x^2-16}\div\frac{x^2-5x+14}{x^2-2x+8}$ NPV:	O) $\frac{\frac{2}{x}-\frac{3}{x+2}}{\frac{1}{x-2}-\frac{x}{x-1}}$ NPV:

4. Simplify by Multiplying or Dividing. Indicate all NPV's

a) $\frac{(2x)^2}{5y} \times \frac{10x}{8y} \div \frac{15x}{(4y)^2}$	b) $\frac{15x^8y^{12}}{2x^2+10x+12} \div \frac{10x^6(-y)^3}{3x^2+15x+18}$
c) $\frac{(x+1)^2}{1-x^2} \times \frac{4-x^2}{x^2+3x+2}$	d) $\frac{x^2+5x+6}{x^2-5x+6} \div \frac{x^3+3x^2+3x+1}{x^3+x^2-9x-9}$
e) $\frac{x^2-16y^2}{x^2+xy+y^2} \div \frac{x^2+xy-20y^2}{x^3-y^3}$	f) $\frac{m^2-9mn+14n^2}{m^2+7mn+12n^2} \div \frac{3m^2-21mn}{4m^3+16m^2n}$
g) $\frac{x+2y}{x-3y} \times \frac{x^2-9y^2}{x^2-4y^2} \div \frac{x+3y}{x-2y}$	h) $\frac{(3a+7b)^2}{2a-5b} \times \frac{4a^2-25b^2}{9a^2-49b^2} \div \frac{2a+5b}{3a-7b}$

5. For what values of "k" will the expression not have any NPV's

$$\frac{2x^3-4x+12k}{3x^2+8x+k}$$

6. Find the LCD and then Add or Subtract each of the following expressions below. State all the NPV's

a) $\frac{5x}{3x+9}-\frac{9x+1}{2x+6}$	b) $\frac{3x}{x^2-1}-\frac{2}{2-x-x^2}$
c) $\frac{2}{x-2}+\frac{2x}{2-x}+\frac{x+2}{x-2}$	d) $\frac{1}{x^2+3x+2}+\frac{1}{x^2+5x+6}$
e) $\frac{2}{x^2-6x+8}+\frac{2}{x^2-10x+24}$	f) $\frac{6x^2+x-12}{10x^2+x-21}+\frac{49x^2-1}{35x^2-44x-7}$
g) $\frac{a}{a+b}-\frac{b}{b-a}+\frac{2ab}{a^2-b^2}$	h) $\frac{18x^2-127x+65}{63x^2-26x-5}-\frac{18x^2-3x-28}{21x^2-31x+4}$

7. Simplify the equation: $\left(1+x^2+x^4+x^6+x^8+x^{10}\right)\times\dfrac{x+1}{x^9+x^8+x^7+x^6+x^5+x^4+x^3+x^2+x^1+1}$

8. Given the equation, find all the possible Non-Permissible Values:

$$\frac{1}{x+\dfrac{2}{x+3}}$$

9. Simplify: $\dfrac{\dfrac{x-2}{2x}+\dfrac{1}{x+2}}{\dfrac{3}{2}-\dfrac{6}{x^2+2x}}$

10. How many ordered pairs (a,b), where "a" and "b" are positive integers and a>b, satisfy the equation: $\frac{1}{a}+\frac{1}{b}=\frac{1}{8}$?

11. How many pairs of positive integers (p,q), with $p+q \le 100$, satisfies the equation:

$$\frac{p+\frac{1}{q}}{\frac{1}{p}+q}=17$$

12. Given that $\frac{\frac{a}{c}+\frac{a}{b}+1}{\frac{b}{a}+\frac{b}{c}+1}=11$, where "a", "b", and "c" are all positive integers. What is the number of different ordered triples (a,b,c) such that $a+2b+c \le 40$?