Name:_____ Date:_____

Math 10/11 Enriched: Section 5.1 Solving Rational Functions

1. Indicate which of the following are rational functions. If not, explain why:

a) $y=\frac{x+2}{x-3}$	b) $y=x^3-x^2$	c) $y=\frac{2^{x-3}}{x}$	d) $y=\frac{\sqrt{x}}{x}$
e) $y=x^{-3}+\sqrt{2}x^{-2}$	f) $y=\frac{12}{x}$	g) $y=\lvert x^3+x^2+x\rvert$	h) x^2+y^2+xy

2. Solve each of the following equations. Indicate any extraneous roots if any:

a) $\frac{4}{x}+\frac{3}{x+2}=5$	b) $\frac{-2}{x+3}-\frac{5}{x}=2$
c) $\frac{x^2+6}{3}-\frac{7}{2}=\frac{x+15}{2}$	d) $\frac{5}{3x-1}-\frac{9}{6x-1}=2$
e) $\frac{3x}{x-2}+\frac{x}{x+2}=\frac{2x+3}{x+2}$	f) $\frac{2x+3}{x+2}-\frac{x+2}{x-1}=\frac{3x}{x-1}$
g) $\frac{3x^2}{x^2-4}-\frac{3x^2}{x^2+5x+6}=\frac{4}{x+3}$	h) $\frac{3x+1}{x^2-2+x}=\frac{2x-3}{x^2-x-6}-\frac{5}{x^2-4x+3}$

3. Solve each of the following equations. Indicate any extraneous roots if any:

a) $\frac{3}{x+2}-\frac{2}{x-1}=5$	b) $\frac{2}{x+2}+\frac{1}{x}=1$
c) $\frac{2}{y}=\frac{3}{y^2+2}$	d) $\frac{x-2}{x-3}+\frac{x-3}{x-2}=\frac{2x^2}{x^2-5x+6}$
e) $x+\frac{30}{x+8}=3$	f) $\frac{5}{x+1}+\frac{4}{3}=\frac{x+1}{x-1}$
g) $\frac{2x-1}{2x+1}+\frac{x+1}{x+3}=\frac{3x-1}{2x+1}+\frac{1}{6}$	h) $\frac{2x-3}{x-1}-\frac{x-1}{x+2}=\frac{2x-5}{x+2}+\frac{2-x}{1-x}$

4. For which value of "x" will $\frac{3+x}{4+x}$ and $\frac{6+x}{8+x}$ be equal?

5. The rational expression $\frac{2x^2+1}{x^2-3}$ may be written as $2+\frac{A}{x^2-3}$, where "A" is an integer. What is the value of "A"?

6. Sovle for "k" $\frac{3}{x-1}+\frac{k}{x}+\frac{7}{x+1}=\frac{5x^2-4x+5}{x^3-x}$

7. Solve for "x": $1+\frac{1}{1+\frac{1}{x}+\frac{1}{2x}}=\frac{7}{5}$

8. For what value(s) of "x" is the equation true? $\frac{8}{9}=\frac{x}{x+\frac{x}{x+x}}$

9. Express "k" as a common fraction in terms of "n" $\frac{k(n-2)!}{(n+1)!}=\frac{(n-1)!}{(n+2)!}$

10. What is the greatest integer "n" for which $\frac{24n}{n-4}$ is an integer? MC Coop2012

11. Solve the following function for "k": $\dfrac{1}{1-\dfrac{1}{1-\dfrac{1}{1-\dfrac{1}{x}}}} = x^k$

12. For all values other than $x=-1$ and $x=2$, what is the value of $\dfrac{2x^2-x}{x^2-x-2} - \dfrac{4+x}{(x+1)(x-2)}$? AHSME1954

13. Evaluate: $\displaystyle\sum_{x=1}^{2003} \frac{1}{x^2+7x+12}$

14. If "a" and "b" are positive integers such that $\dfrac{1}{a}+\dfrac{1}{2a}+\dfrac{1}{3a} = \dfrac{1}{b^2-2b}$, then which of the following is the smallest possible value of $a+b$?

    a) 8 b) 6 c) 96 d) 10 e) 50

15. Challenge: Given that "n" is an integer, for how many values of "n" is $\dfrac{2n^2-10n-4}{n^2-4n+3}$ an integer? Fermat 2004#25