Name:_____ Date:_____

Math 10/11 Enriched: Section 5.2 Solving Rational Functions

1. Define what a rational expression is? What is a rational function? How are they different?

2. What does it mean to "SOLVE' an equation? What is the difference between "Solving" and "Simplifying"?

3. What is an extraneous root when solving a rational equation? Explain:

4. 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) $x^2+y^2+xy=2$

5. 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) $\frac{3x+1}{x^2-2+x}=\frac{2x-3}{x^2-x-6}-\frac{5}{x^2-4x+3}$

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

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

8. 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"?

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

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

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

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

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

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

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

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

17. If “a” and “b” are positive integers such that $\frac{1}{a}+\frac{1}{2a}+\frac{1}{3a}=\frac{1}{b^2-2b}$, find the smallest possible value of $a+b$:

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

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

19. Solve for “x” $\left(1+\frac{1}{x}\right)\left(1+\frac{1}{x+1}\right)\left(1+\frac{1}{x+2}\right)\left(1+\frac{1}{x+3}\right)=\frac{51}{49}$

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

21. if $\frac{\left(\frac{a}{c}+\frac{a}{b}+1\right)}{\left(\frac{b}{a}+\frac{b}{c}+1\right)}=11$, where “a”, “b”, and “c” are positive integers, how many different ordered triples of (a,b,c) are there such that $a+2b+c\le 40$?