***Pre-Calculus 11***

***Unit 7: Rational Expressions and Equations***

***Worksheet 7.5—Solving Rational Equations***

1. State the value of the variable for which each equation is undefined, then solve it.

a) $\frac{2}{a}=4$ b) $-15=\frac{-3m}{2}$ c) $\frac{90}{x}=\frac{2x}{5}$

d) $\frac{2}{x}-\frac{7}{2x}=6$ e) $\frac{x}{4}-\frac{7}{4}=\frac{2}{x}$ f) $\frac{2x}{7}-\frac{5}{7}=\frac{1}{x}$

2. Solve.

1. $\frac{3x-2}{2}+4=\frac{13}{x}-\frac{1-6x}{4}$ b) $\frac{2x-3}{3x-4}=\frac{2x+7}{3x+4}$ c) $\frac{3-x}{x-2}=1-\frac{2x-5}{x+2}$
2. $\frac{2\left(x-1\right)}{x-3}=\frac{x-4}{x-5}+1$ e) $1-\frac{x-5}{5x-1}=\frac{4\left(x-3\right)}{5x-2}$ f) $\frac{x}{x-3}+\frac{2}{x+3}=0$
3. $\frac{x^{2}}{x^{2}-4}=\frac{2x}{x+2}$ h) $\frac{3x^{2}}{x^{2}-1}=\frac{x}{x+1}+\frac{x}{1-x}$ i) $\frac{9x^{2}}{x^{2}-25}=\frac{4x}{x-5}+\frac{x}{x+5}$

3. Solve.

1. $\frac{5}{x+1}+\frac{4}{3}=\frac{x+1}{x-1}$ b) $\frac{2m+3}{m+3}+\frac{1}{2}=\frac{m+1}{m-1}$ c) $\frac{a}{a+1}=\frac{1}{3}+\frac{a-1}{a+3}$
2. $\frac{3x+2}{2x+1}=\frac{3x+1}{x-1}-\frac{1}{3}$ e) $\frac{2x-1}{2x+1}+\frac{x+1}{x+3}=\frac{3x-1}{2x+1}+\frac{1}{6}$ f) $\frac{2x-3}{x-1}-\frac{x-1}{x+2}=\frac{2x-5}{x+2}+\frac{2-x}{1-x}$

4. If $b=\frac{1}{a}$ and $\frac{\frac{1}{a}-\frac{1}{b}}{\frac{1}{a}+\frac{1}{b}}=\frac{4}{5}$, solve for $a$.

5. Sometimes it is helpful to solve for a specidic variable in a formula. For example, if you

 solve for $x$ in the equation $\frac{1}{x}-\frac{1}{y}=a$, the answer is $x=\frac{y}{ay+1}$.

1. Show algebraically how you could get this answer.
2. In the formula $d=v\_{0}t+\frac{1}{2}gt^{2}$, solve for $v\_{0}$. Simplify your answer.
3. Solve for $n$ in the formula $I=\frac{E}{R+\frac{r}{n}}$ .

***Solutions***

1. a) $a=\frac{1}{2}, a\ne 0$ b) $m=10 , x\in R$ c) $x=\pm 15 , x\ne 0$

 d) $x=\frac{-1}{4}, x\ne 0$ e) $x=8, x=-1, x\ne 0$

 f) $x=\frac{7}{2}, x=-1, x\ne 0$

2. a) $x=4$ b) $x=\frac{8}{7}$ c) $x=\frac{5}{2}$

 d) $x=\frac{17}{3}$ e) $x=\frac{5}{19}$ f) $x=-6 , 1$

 g) $x=0, 4$ h) $x=0, \frac{-2}{3}$ i) $x=0, \frac{15}{4}$

3. a) $x=-11, 2, x\ne -1, 1$ b) $m=3, -\frac{5}{3}, m\ne -3 , 1$ c) $x= 4, 1, x\ne 1, -2$

4. a) $a=0$ b) $x=0, 8$ c) $x=-4$ d) $x=\frac{3}{4}$

5. $a=\pm \frac{1}{3}$

6. a) $x=\frac{y}{ay+1}, a\ne 0, x\ne 0, y\ne 0$ b) $v\_{0}=\frac{2d-gt^{2}}{2t}, t\ne 0$

 c) $n=\frac{Ir}{E-IR}, n\ne 0, R\ne -\frac{r}{n}, E\ne Ir$