L07 - WORKSHEET - RATIONAL EQUATIONS - KEY

Kuta Software - Infinite Algebra 1

Name____________________________________

Solving Rational Equations 1

Date__________________ Period____

Solve each equation. Remember to check for extraneous solutions.

1) $\frac{3}{m^2} = \frac{m-4}{3m^2} + \frac{2}{3m^2}$ → $m \neq 0$

$\frac{3}{m^2}\left(\frac{3}{3}\right) = \frac{m-4}{3m^2} + \frac{2}{3m^2}$

$\frac{9}{3m^2} = \frac{m-4}{3m^2} + \frac{2}{3m^2}$

$9 = (m-4) + (2)$

$9 = m - 2$

$11 = m$

2) $\frac{1}{n} = \frac{1}{5n} - \frac{n-1}{5n}$ → $n \neq 0$

$\frac{1}{n}\left(\frac{5}{5}\right) = \frac{1}{5n} - \frac{n-1}{5n}$

$\frac{5}{5n} = \frac{1}{5n} - \frac{n-1}{5n}$

$5 = (1) - (n-1)$

$5 = -n + 2$

$3 = -n$

$n = -3$

5) $\frac{3n+15}{4n^2} = \frac{1}{n^2} - \frac{n-3}{4n^2}$ → $n \neq 0$

$\frac{3n+15}{4n^2} = \frac{1}{n^2}\left(\frac{4}{4}\right) - \frac{n-3}{4n^2}$

$\frac{3n+15}{4n^2} = \frac{4}{4n^2} - \frac{n-3}{4n^2}$

$3n+15 = (4) - (n-3)$

$3n+15 = -n+7$

$4n = -8$

$n = -2$

6) $\frac{1}{2n^2} + \frac{5}{2n} = \frac{n-2}{n^2}$ → $n \neq 0$

$\frac{1}{2n^2} + \frac{5}{2n}\left(\frac{n}{n}\right) = \frac{n-2}{n^2}\left(\frac{2}{2}\right)$

$\frac{1}{2n^2} + \frac{5n}{2n^2} = \frac{2n-4}{2n^2}$

$(1) + (5n) = 2n - 4$

$3n = -5$

$n = -5/3$

9) $\frac{6b+18}{b^2} + \frac{1}{b} = \frac{3}{b}$ → $b \neq 0$

$\frac{6b+18}{b^2} + \frac{1}{b}\left(\frac{b}{b}\right) = \frac{3}{b}\left(\frac{b}{b}\right)$

$\frac{6b+18}{b^2} + \frac{b}{b^2} = \frac{3b}{b^2}$

$(6b+18) + (b) = 3b$

$7b + 18 = 3b$

$4b = -18$

$b = -9/2$

KEY

11) $\dfrac{1}{b^2-7b+10}+\dfrac{1}{b-2}=\dfrac{2}{b^2-7b+10}$

$\dfrac{1}{(b-2)(b-5)}+\dfrac{1}{(b-2)}=\dfrac{2}{(b-2)(b-5)}$ $b \neq 2, 5$

$\dfrac{1}{(b-2)(b-5)}+\dfrac{1}{(b-2)}\left(\dfrac{b-5}{b-5}\right)=\dfrac{2}{(b-2)(b-5)}$

$(1)+(b-5)=2$

$b-4=2$

$b=6$

12) $\dfrac{1}{x^2-3x}+\dfrac{1}{x-3}=\dfrac{3}{x^2-3x}$

$\dfrac{1}{(x)(x-3)}+\dfrac{1}{(x-3)}=\dfrac{3}{(x)(x-3)} \rightarrow x \neq 0, 3$

$\dfrac{1}{(x)(x-3)}+\dfrac{1}{(x-3)}\left(\dfrac{x}{x}\right)=\dfrac{3}{(x)(x-3)}$

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

$1+x=3$

$x=2$

15) $\dfrac{1}{5k^2+2k}-\dfrac{6}{5k+2}=\dfrac{6}{5k^2+2k}$

$\dfrac{1}{(k)(5k+2)}-\dfrac{6}{(5k+2)}=\dfrac{6}{(k)(5k+2)}$

$\dfrac{1}{(k)(5k+2)}-\dfrac{6}{(5k+2)}\left(\dfrac{k}{k}\right)=\dfrac{6}{(k)(5k+2)}$

$\dfrac{1}{(k)(5k+2)}-\dfrac{6k}{(5k+2)(k)}=\dfrac{6}{(k)(5k+2)}$

$1-6k=6$

$-6k=5$

$k=-5/6$

16) $\dfrac{6}{n^2-6n+8}=\dfrac{1}{n^2-6n+8}-\dfrac{1}{n-4}$

$\dfrac{6}{(n-2)(n-4)}=\dfrac{1}{(n-2)(n-4)}-\dfrac{1}{(n-4)}\left(\dfrac{n-2}{n-2}\right)$

$\dfrac{6}{(n-2)(n-4)}=\dfrac{1}{(n-2)(n-4)}-\dfrac{n-2}{(n-2)(n-4)}$

$6=(1)-(n-2)$

$6=-n+3$

$3=-n$

$n=-3$

19) $\dfrac{v-3}{v^2+3v}=\dfrac{1}{v+3}-\dfrac{v-5}{v^2+3v}$

$\dfrac{v-3}{(v)(v+3)}=\dfrac{1}{(v+3)}-\dfrac{v-5}{(v)(v+3)}$ $v \neq 0, -3$

$\dfrac{v-3}{(v)(v+3)}=\dfrac{1}{(v+3)}\left(\dfrac{v}{v}\right)-\dfrac{v-5}{(v)(v+3)}$

$v-3=(v)-(v-5)$

$v-3=5$

$v=8$

KEY

Kuta Software - Infinite Algebra 1 Name________________

Solving Rational Equations 2

Date________________ Period____

Solve each equation. Remember to check for extraneous solutions.

1) $\frac{k+4}{4} + \frac{k-1}{4} = \frac{k+4}{4k}$ → $k \neq 0$

$\frac{k+4}{4}\left(\frac{k}{k}\right) + \frac{k-1}{4}\left(\frac{k}{k}\right) = \frac{k+4}{4k}$

$\frac{k^2+4k}{4k} + \frac{k^2-k}{4k} = \frac{k+4}{4k}$

$(k^2+4k) + (k^2-k) = k+4$

$2k^2+3k = k+4$

$2k^2+2k\ \ 4 = 0$

$2(k^2+k\ \ 2) = 0$

$2(k+2)(k-1) = 0$

$k=-2$ $k=1$

So $k = -2$ or 1

2) $\frac{1}{2m^2} = \frac{1}{m} - \frac{1}{2}$ → $m \neq 0$

$\frac{1}{2m^2} = \frac{1}{m}\left(\frac{2m}{2m}\right) - \frac{1}{2}\left(\frac{m^2}{m^2}\right)$

$\frac{1}{2m^2} = \frac{2m}{2m^2} - \frac{m^2}{2m^2}$

$1 = (2m) - (m^2)$

$m^2 - 2m + 1 = 0$

$(m-1)(m-1) = 0$

$m=1$ $m=1$

$m=1$

5) $\frac{k^2+2k-8}{3k^3} = \frac{1}{3k^2} + \frac{1}{k^2}$ → $k \neq 0$

$\frac{k^2+2k-8}{3k^3} = \frac{1}{3k^2}\left(\frac{k}{k}\right) + \frac{1}{k^2}\left(\frac{3k}{3k}\right)$

$\frac{k^2+2k-8}{3k^3} = \frac{k}{3k^3} + \frac{3k}{3k^3}$

$k^2+2k-8 = (k) + (3k)$

$k^2+2k-8 = 4k$

$k^2-2k-8 = 0$

$(k-4)(k+2) = 0$

$k=4$ $k=-2$

So $k=-2$ or 4.

6) $\frac{k}{3} - \frac{1}{3k} = \frac{1}{k}$ → $k \neq 0$

$\frac{k}{3}\left(\frac{k}{k}\right) - \frac{1}{3k} = \frac{1}{k}\left(\frac{3}{3}\right)$

$\frac{k^2}{3k} - \frac{1}{3k} = \frac{3}{3k}$

$k^2 - 1 = 3$

$k^2 = 4$

$k = -2, +2$

9) $\dfrac{1}{r+3}=\dfrac{r+4}{r-2}+\dfrac{6}{r-2}$

$\dfrac{1}{r+3}\left(\dfrac{r-2}{r-2}\right) = \dfrac{r+4}{r-2}\left(\dfrac{r+3}{r+3}\right) + \dfrac{6}{r-2}\left(\dfrac{r+3}{r+3}\right) \rightarrow r \neq -3, 2$

$\dfrac{r-2}{(r+3)(r-2)} = \dfrac{r^2+7r+12}{(r+3)(r-2)} + \dfrac{6r+18}{(r-2)(r+3)}$

$r-2 = (r^2+7r+12) + (6r+18)$

$r-2 = r^2+13r+30$

$0 = r^2+12r+32$

$0 = (r+8)(r+4)$

$r=-8 \quad r=-4$

So $r=-8$ or -4

10) $\dfrac{a^2-4a-12}{a^2-10a+25}=\dfrac{6}{a-5}+\dfrac{a-3}{a-5}$

$a \neq 5$

$\dfrac{a^2-4a-12}{(a-5)(a-5)} = \dfrac{6}{a-5}\left(\dfrac{a-5}{a-5}\right) + \dfrac{a-3}{a-5}\left(\dfrac{a-5}{a-5}\right)$

$\dfrac{a^2-4a-12}{(a-5)(a-5)} = \dfrac{6a-30}{(a-5)(a-5)} + \dfrac{a^2-8a+15}{(a-5)(a-5)}$

$a^2-4a-12 = (6a-30) + (a^2-8a+15)$

$a^2-4a-12 = a^2-2a-15$

$0 = 2a-3$

$3 = 2a$

$a = 3/2$

13) $\dfrac{1}{k}=5+\dfrac{1}{k^2+k}$

$\dfrac{1}{k} = \dfrac{5}{1} + \dfrac{1}{(k)(k+1)} \rightarrow k \neq 0, -1$

$\dfrac{1}{k}\left(\dfrac{k+1}{k+1}\right) = \dfrac{5}{1}\left(\dfrac{k}{k}\right)\left(\dfrac{k+1}{k+1}\right) + \dfrac{1}{(k)(k+1)}$

$\dfrac{k+1}{(k)(k+1)} = \dfrac{5k^2+5k}{(k)(k+1)} + \dfrac{1}{(k)(k+1)}$

$k+1 = (5k^2+5k) + (1)$

$k+1 = 5k^2+5k+1$

$0 = 5k^2+4k$

$0 = (k)(5k+4)$

$k=0 \quad k=-4/5$

Remember that $k \neq 0$. Throw this answer out!

14) $\dfrac{1}{p^2-4p}+1=\dfrac{p-6}{p}$

$\dfrac{1}{p(p-4)} + 1 = \dfrac{p-6}{p}$

$\dfrac{1}{p(p-4)} + \dfrac{1}{1}\left(\dfrac{p}{p}\right)\left(\dfrac{p-4}{p-4}\right) = \dfrac{p-6}{p}\left(\dfrac{p-4}{p-4}\right)$

$\dfrac{1}{p(p-4)} + \dfrac{p^2-4p}{p(p-4)} = \dfrac{p^2-10p+24}{p(p-4)}$

$(1) + (p^2-4p) = p^2-10p+24$

$p^2-4p+1 = p^2-10p+24$

$6p-23 = 0$

$6p = 23$

$p = 23/6$