Solving Rational Equations

Strategies:

(1) Factor numerators and denominators, looking for any common factors to remove.
(note: removed factors are restrictions on solution)

(2) Combine separate fractions using a lowest common denominator.

(3) Rearrange so one side is zero and the other has a common denominator, then solve the numerator only.

Oct 19-7:38 PM

Ex.1 Solve $\dfrac{x^2 - x - 6}{x^2 + x - 12} = 0$

$\dfrac{(x-3)(x+2)}{(x+4)(x-3)} = 0$ $\quad x \neq 3$

$\times (x-4)$ $\quad \dfrac{x+2}{x+4} = 0$, $x \neq 3$

$x + 2 = 0$, $x \neq 3$, $x \neq 4$

$x = -2$

Oct 19-7:38 PM

Ex.2 Solve $\frac{x+3}{x-4}=\frac{x-1}{x+2}$

not recommended $x\neq 4$ $x\neq -2$

$(x+3)(x+2)=(x-1)(x-4)$

$\frac{x+3}{x-4}-\frac{x-1}{x+2}=0$

$\frac{(x+3)(x+2)-(x-1)(x-4)}{(x-4)(x+2)}=0$

$\frac{(x^2+5x+6)-(x^2-5x+4)}{(x-4)(x+2)}=0$

$\frac{10x+2}{(x-4)(x+2)}=0$

$\frac{2(5x+1)}{(x-4)(x+2)}=0$, $x\neq 4, x=-2$

$2(5x+1)=0$

$\boxed{x=\frac{-1}{5}}$

Oct 20-8:52 AM

Ex.3 Solve $\frac{1}{x}+\frac{1}{x-3}=\frac{1}{2}$

$\frac{1}{x}+\frac{1}{x-3}-\frac{1}{2}=0$

$\frac{1(2)(x-3)+1(2x)-1x(x-3)}{2x(x-3)}=0$

$\frac{2x-6+2x-x^2+3x}{2x(x-3)}=0$

$\frac{-x^2+7x-6}{2x(x-3)}=0$ $[-1]$

$\frac{x^2-7x+6}{2x(x-3)}=0$

$\frac{(x-1)(x-6)}{2x(x-3)}=0$

$(x-1)(x-6)=0$, $x\neq 0, x\neq 3$

$\boxed{x=1}$ or $\boxed{x=6}$

Oct 20-8:53 AM

Assigned Work:

p.286 # 5ace, 6bcf, 10, 12, 13 (see p.278 for help on 10, 13)

Oct 19-10:42 PM