Trig 4.6

Solve rational equations
Solve rational inequalities
(Defer partial fractions)

$= \quad < \quad >$.

rational
rational expression
} var. in denom

rational equation

$$\frac{5}{x} + \frac{1}{x+3} = 7$$

zeros (of a function)

excluded value

interval

test point

Equations:

1. clear denominators
2. solve
3. check solutions (why?) DQ?

$t \neq 0$

12. $\frac{12}{t} + t - 8 = 0$

$\frac{12}{6} + 6 - 8 = 0$

$2 + 6 - 8 = 0$

$\frac{12}{-2} + (-2) - 8 = 0$

$-6 + (-2) - 8 = 0$

$12 + t^2 - 8t = 0$

$t^2 - 8t + 12 = 0$

12

-6×-2

-8

$(t-6)(t-2) = 0$

$t-6=0$ $\quad t-2=0$

$t=6$ $\quad t=2$

$m \neq 0$

$2m^2$

13. $\frac{1}{m} = \frac{m-34}{2m^2}$

$2m = m - 34$

$-m \quad -m$

$m = -34$

$\frac{1}{-34} = \frac{-34+34}{2(-34)(-34)}$

$-\frac{1}{34} \stackrel{?}{=} \frac{-68}{2312}$

$=$

$y(y+2)$ $y(y+2)$ $y(y+2)$ $y \neq -2$

$y \neq 0$

14. $\frac{2}{y+2} + \frac{3}{y} = \frac{-y}{y+2}$

$2y + 3y + 6 = -y^2 - 4y$

$y^2 + 5y + 6 = 0$

6 3×2 5

$(y+3)(y+2) = 0$

$y = -3$ $y \neq -2$

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

$-2 + -1 = -3$ ✓

15. $\dfrac{10}{n^2-1}+\dfrac{(2n-5)}{(n-1)}=\dfrac{(2n+5)}{(n+1)}$

(maybe) Factor to clear denoms.

$n \neq 1$, $n \neq -1$

$(n+1)(n-1)$ $(n+1)(\text{don't})$ $(n-1)(\text{don't})$

FOIL

$6i \times 6i$

$10+(n+1)(2n-5)=(2n+5)(n-1)$

$2n-5$

$n+1$

$+2n-5$

$2n^2-5n$

$2n^2-3n-5$

$10+2n^2-3n-5=2n^2-2n+5n-5$

$10+2n^2-3n+5=2n^2+3n-5$

$-2n^2 \quad -3n \qquad -2n^2-3n+5$

$-6n+20=0$

$-6n=-20$

$\dfrac{-6n}{-6}=\dfrac{-20}{-6}$

$n=\dfrac{10}{3}$

FOIL

$$\begin{array}{r} 2x^2+3x-7 \\ \times\quad x+3 \\ \hline 2x^3+6x^2-7x-21 \end{array}$$

$$\begin{array}{r} 2x^2+3x-7 \\ \times\quad x+3 \\ \hline 6x^2+9x-21 \\ 2x^3+3x^2-7x \\ \hline \end{array}$$

2 Solve $a + \frac{a^2 - 5}{a^2 - 1} = \frac{a^2 + a + 2}{(a + 1)}$.

$(a+1)(a-1)$

4.6 13-21 odd

Solve inequalities (Zone defense)

·find excluded values (denom =0)

·find zeros (use equation)

·test intervals (pos or neg)

·Answer the question

9. $5 + \frac{1}{x} > \frac{16}{x}$

10. $1 + \frac{5}{a-1} \leq \frac{7}{6}$

29. $\dfrac{(x-3)(x-4)}{(x-5)(x-6)^2} \leq 0$