

6.1 Solving Rational Equations

NOTES

Write your questions here!

ex 1: $\frac{4x+7}{x-4} = 7(x-4)$

$$4x+7 = 7x-28$$

$$-3x+7 = -28$$

$$-3x = -35$$

$$x = \frac{35}{3}$$

Denom $\neq 0$

$$x-4 \neq 0$$

$$x \neq 4$$

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

$$x-3+x = x^2-2x$$

$$2x-3 = x^2-2x$$

$$0 = x^2-4x+3$$

$$0 = (x-3)(x-1)$$

$$0 = x-3 \quad \left. \begin{array}{l} 0 = x-1 \\ 3 = x \quad \left. \begin{array}{l} 1 = x \end{array} \right\} \right\}$$

Denom $\neq 0$

$$\left. \begin{array}{l} x-3 \neq 0 \\ x \neq 3 \end{array} \right\} x \neq 0$$

$$x = 1$$

ex 5: $\frac{1}{3x^2-3x-18} - \frac{x+4}{3x^2-3x-18} = \frac{1}{3x+6}$

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

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

$$1-x-4 = x-3$$

$$-x-3 = x-3$$

$$0 = 2x$$

$$0 = x$$

Denom $\neq 0$

$$3(x-3)(x+2) \neq 0$$

$$\left. \begin{array}{l} 3 \neq 0 \\ x-3 \neq 0 \\ x \neq 3 \end{array} \right\} \left. \begin{array}{l} x+2 \neq 0 \\ x \neq -2 \end{array} \right\}$$

ex 2: $\frac{n-5}{3} = \frac{4n^2+12n-10}{n-5}$

$$3n-15 = 4n^2+12n-10$$

$$0 = 4n^2+9n+5$$

$$0 = (4n^2+4n) + (5n+5)$$

$$0 = 4n(n+1) + 5(n+1)$$

$$0 = (n+1)(4n+5)$$

$$0 = n+1 \quad \left. \begin{array}{l} 4n+5=0 \\ 4n=-5 \\ n=-\frac{5}{4} \end{array} \right\}$$

denom $\neq 0$

$$\left. \begin{array}{l} n-5 \neq 0 \\ n \neq 5 \end{array} \right\}$$

$$n = -\frac{5}{4}, -1$$

ex 4: $\frac{4n(n-3)}{4n} = \frac{1}{4} + \frac{n+2}{2n}$

$$n-3 = n+2n+4$$

$$n-3 = 3n+4$$

$$-3 = 2n+4$$

$$-7 = 2n$$

$$-\frac{7}{2} = n$$

Denom $\neq 0$

$$\left. \begin{array}{l} 4n \neq 0 \\ n \neq 0 \end{array} \right\} \left. \begin{array}{l} 2n \neq 0 \\ n \neq 0 \end{array} \right\}$$

ex 6: $\frac{5}{8} + \frac{1}{2p} = \frac{1}{6p^2}$

$$10p^2 + 3p = 1$$

$$10p^2 + 3p - 1 = 0$$

$$(10p^2 + 5p) + (2p - 1) = 0$$

$$5p(2p+1) - 1(2p-1) = 0$$

$$(2p+1)(5p-1) = 0$$

$$2p+1=0 \quad \left. \begin{array}{l} 5p-1=0 \\ 2p=-1 \\ p=-\frac{1}{2} \end{array} \right\} \left. \begin{array}{l} 5p=1 \\ p=\frac{1}{5} \end{array} \right\}$$

$$p = -\frac{1}{2}, \frac{1}{5}$$

Denom $\neq 0$

$$\left. \begin{array}{l} 6p^2 \neq 0 \\ p^2 \neq 0 \\ p \neq 0 \end{array} \right\} \left. \begin{array}{l} 2p \neq 0 \\ p \neq 0 \end{array} \right\}$$

$$\text{ex 7: } \frac{1}{x-6} + \frac{x}{x-2} = \frac{4}{x^2-8x+12}$$

$$\frac{(x-6)(x-2)}{(x-6)(x-2)} \cdot \frac{1}{x-6} + \frac{(x-6)(x-2)}{(x-6)(x-2)} \cdot \frac{x}{x-2} = \frac{4(x-6)(x-2)}{(x-6)(x-2)}$$

$$x-2 + x^2-6x = 4$$

$$x^2-5x-6=0$$

$$(x-6)(x+1)=0$$

$$\left. \begin{array}{l} x-6=0 \\ x=6 \end{array} \right\} \left. \begin{array}{l} x+1=0 \\ x=-1 \end{array} \right.$$

denom $\neq 0$

$$\boxed{\begin{array}{l} x-6 \neq 0 \\ x \neq 6 \end{array} \left\} \begin{array}{l} x-2 \neq 0 \\ x \neq 2 \end{array} \right.}$$

$$x = -1$$

You try!

$$\text{ex 8: } \frac{2}{m^2+5m+6} + 5 = \frac{2}{m+2}$$

$$\frac{(m+2)(m+3)}{(m+2)(m+3)} \cdot \frac{2}{m^2+5m+6} + 5 = \frac{2(m+2)(m+3)}{m+2}$$

$$2 + 5(m^2+5m+6) = 2m+6$$

$$2 + 5m^2 + 25m + 30 = 2m + 6$$

mult 130m	add 23m	$5m^2 + 23m + 26 = 0$
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$$(5m^2 + 10m) + (13m + 26) = 0$$

$$5m(m+2) + 13(m+2) = 0$$

$$(m+2)(5m+13) = 0$$

$$m+2=0 \left\} \begin{array}{l} 5m+13=0 \\ 5m=-13 \\ m=-\frac{13}{5} \end{array} \right.$$

$$m=-2$$

Denom $\neq 0$

$$\boxed{\begin{array}{l} m+2 \neq 0 \\ m \neq -2 \end{array} \left\} \begin{array}{l} m+3=0 \\ m \neq -3 \end{array} \right.}$$

$$m = -\frac{13}{5}$$

SUMMARY:

Now,
summarize
your notes
here!

