12-7 SOLVING RATIONAL EQUATIONS

DO YOU REMBER THIS FROM CH. 2 ? ...

Zap Me!

$$10\left(\frac{1}{2}x + \frac{3}{10}\right) = \left(\frac{1}{5}\right)10$$

$$5x + 3 = 2$$

$$5x = -1$$

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

LOOK MA!
NO DENOMINATOR!

The same method used on rational numbers...
can be used on rational expressions.

$$\frac{1}{2x} + \frac{3}{10} = \frac{1}{5x}$$

$$10x\left(\frac{1}{2x} + \frac{3}{10}\right) = \left(\frac{1}{5x}\right)10x$$

$$5 + 3x = 2$$

$$3x = -3$$

$$x = -1$$

Now you try:

$$\frac{4}{c} = \frac{3}{2c} - \frac{1}{5}$$

$$10c\left(\frac{4}{c}\right) = \left(\frac{3}{2c} - \frac{1}{5}\right)10c$$

$$40 = 15 - 2c$$

$$25 = -2c$$

$$c = \frac{-25}{2}$$

You may need to finish by factoring...

$$x^2\left(\frac{5}{x^2}\right) = \left(\frac{6}{x} - 1\right)x^2$$

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

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

$$(x-5)(x-1) = 0$$

$$x = 5 \text{ or } 1$$

Now you try:

$$m^2\left(\frac{5}{m}\right)=\left(\frac{2}{m^2}+2\right)m^2$$

$$5m = 2 + 2m^2$$

$$2m^2 - 5m + 2 = 0$$

$$(2m-1)(m-2)=0$$

$$m=\frac{1}{2} \text{ or } 2$$

Now you try:

Ken can wash the dishes in 20 min.
Kim can wash the dishes in 18 min.
How fast can they wash them together?

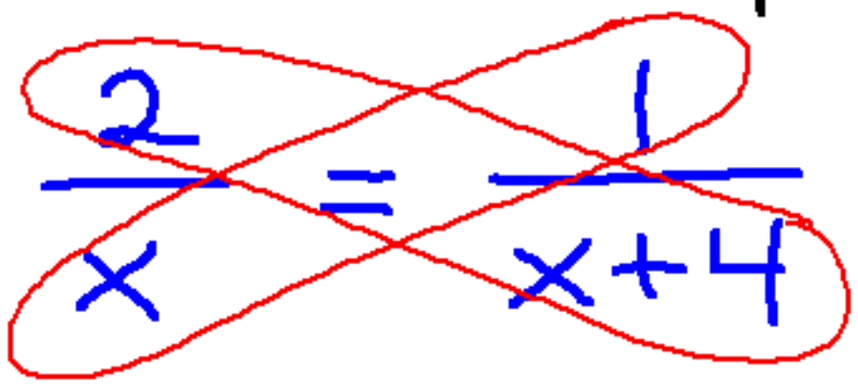
$$180t\left(\frac{1}{20}+\frac{1}{18}\right)=\left(\frac{1}{t}\right)180t$$

$$9t+10t=180$$

$$19t=180$$

$$t=\frac{180}{19}\doteq 9.5\ \text{min}$$

Rational Proportions...
Cross Multiplying ☺



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

$$2x + 8 = x$$

$$x = -8$$

LAST ONE... You try: (be careful!)

$$\frac{-2}{x-2} = \frac{x-4}{x^2-4}$$

Cross Multiply...

$$-2(x^2-4) = (x-2)(x-4)$$

$$-2x^2+8 = x^2-6x+8$$

$$3x^2-6x = 0$$

$$3x(x-2) = 0$$

$$x = 0 \text{ or } \cancel{2} \qquad x \neq 2$$

Reteaching 12-7

1. $\frac{12}{35}$ **2.** $\frac{25}{24}$ **3.** $\frac{15}{16}$ **4.** $-\frac{2}{7}$ **5.** -2 **6.** 5 **7.** 2 **8.** $0, 4$ **9.** 2

10. 4 **11.** No solution **12.** 2 **13.** $\frac{1}{9}$ **14.** $\frac{5}{17}$ **15.** $\frac{1}{4}$

16. $-\frac{3}{2}$ **17.** 8 **18.** $\frac{3}{5}$ **19.** -4 **20.** $-\frac{3}{2}$ **21.** 15

Practice 12-7

1. 9 **2.** -6 **3.** $-1, 1$ **4.** No solution **5.** $-1, 4$ **6.** 4

7. $0, 12$ **8.** $-6, -1$ **9.** -2 **10.** $-6, 3$ **11.** $-2, 0.5$

12. No solution **13.** no solution **14.** No solution **15.** 3

16. No solution **17.** $-5, 5$ **18.** 2 **19.** $4, -1$ **20.** -1 **21.** -8

22. 1.71 days **23.** Machine X, 30 min; Machine Y, 60 min

24. 3.75 h **25.** Joseph, 10 km/h; Vincent, 22 km/h **26.** 90 min