

6.7: Solving Quadratic Eqns (cont'd)

6.7.4

Note Title

4/2/2018

Ex: Solve. $6x^2 - 7x - 5 = 0$

signs are opposite
wanna difference of 7x

$$(2x + 1)(3x - 5) = 0$$

$$2x + 1 = 0$$

$$2x = -1$$

$$\frac{2x}{2} = \frac{-1}{2}$$

$$x = -\frac{1}{2}$$

$$\text{OR } 3x - 5 = 0$$

$$3x = 5$$

$$\frac{3x}{3} = \frac{5}{3}$$

$$x = \frac{5}{3}$$

$$\text{Sol'n Set: } \left\{ -\frac{1}{2}, \frac{5}{3} \right\}$$

$$\begin{array}{r} 6x^2 \\ \wedge \\ 6x \cdot x \\ 2x \cdot 3x \end{array} \quad \begin{array}{r} 5 \\ \wedge \\ 1 \cdot 5 \end{array}$$

3x
10x

$$\text{Check: } (2x+1)(3x-5)$$

$$6x^2 - 10x + 3x - 5$$

$$6x^2 - 7x - 5 \checkmark$$

Ex: Solve.

$$x^2 - 19x + 60 = 0$$

$$x^2 - 19x + 60 = 0$$

$$(x - 4)(x - 15) = 0 \quad \text{check it!}$$

$$x - 4 = 0$$

$$x = 4$$

$$\text{OR } x - 15 = 0$$

$$x = 15$$

$$\text{Sol'n Set: } \{4, 15\}$$

$$\begin{array}{r} x^2 \\ \wedge \\ x \cdot x \end{array} \quad \begin{array}{r} 60 \\ \wedge \\ 1 \cdot 60 \\ 2 \cdot 30 \\ 3 \cdot 20 \\ 4 \cdot 15 \\ 5 \cdot 12 \\ 6 \cdot 10 \end{array}$$

15x
4x

Ex.: Solve $x^2 = 25$
 $-25 \quad -25$

$$x^2 - 25 = 0$$

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

$$x+5=0 \mid x-5=0$$

$$x=-5 \mid x=5$$

Sol'n Set: $\{-5, 5\}$

or $\{\pm 5\}$

Ex.: $4x + 70 = 2x^2$
 $-2x^2 \quad -2x^2$

$$-2x^2 + 4x + 70 = 0$$

$$-2(x^2 - 2x - 35) = 0$$

$$-2(x-7)(x+5) = 0$$

$$-2=0 \mid x-7=0 \mid x+5=0$$

never true $x=7 \mid x=-5$

Sol'n Set: $\{7, -5\}$

Ex.: $x^3 = 6x^2 - 9x$
 $-x^3 \quad -x^3$

$$0 = -x^3 + 6x^2 - 9x$$

$$0 = -x(x^2 - 6x + 9)$$

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

$$-x=0 \mid x-3=0 \mid x-3=0$$

$$-1x=0 \mid x=3 \mid x=3$$

$$\frac{-1x}{-1} = \frac{0}{-1}$$

$$x=0$$

Check: $(x-3)(x-3)$
 $= x^2 - 3x - 3x + 9$
 $= x^2 - 6x + 9 \checkmark$

Sol'n Set: $\{0, 3\}$

(don't list duplicates twice)

7.7: Applications of Rational Equations and Proportions 7.7.1

Example: A cookie recipe requires 6 cups of flour for 4 dozen cookies. How many cups of flour are needed for 10 dozen cookies?

$$\frac{6 \text{ cups}}{4 \text{ dozen}} = \frac{?}{10 \text{ dozen}}$$

Let x = the missing number

$$\frac{6}{4} = \frac{x}{10}$$

$$\overset{(10)}{\cancel{1}} \frac{6}{4} = \frac{x}{\cancel{10}} \overset{(10)}{\cancel{1}}$$

[multiply both sides by 10]

$$\frac{60}{4} = x$$

$$x = \frac{60}{4} = 15$$

So 15 cups of flour are needed.

Cross-multiplication

$$\text{If } \frac{a}{b} = \frac{c}{d}, \text{ then } ad = bc$$

Ex: Solve. $\frac{y+2}{8} = \frac{2y}{5}$

$$\frac{5}{40} (y+2) = \frac{2y}{5} (40)$$

LCD: $8 \cdot 5 = 40$

$$5(y+2) = 2y(8)$$

$$5y + 10 = 16y$$

$$\begin{array}{r} -5y \\ 10 = 11y \end{array}$$

$$\frac{10}{11} = \frac{11y}{11}$$

$$y = \frac{10}{11}$$