

Accelerated Math Notes

Section 8-4

More Two-step Equations

Form of  $p(x + q) = r$

First Step: Use the distributive property to clear the parentheses

Ex.  $5(x + 7) = -12$

$$\begin{array}{r} 5x + 35 = -12 \\ -35 \quad -35 \\ \hline 5x = -47 \end{array}$$

$$5x = -47$$

$$\frac{5x}{5} = \frac{-47}{5}$$

$$x = -9\frac{2}{5}$$

Check:  $5(x+7) = -12$

$$5(-9\frac{2}{5} + 7) \stackrel{?}{=} -12$$

$$5(-2\frac{2}{5}) \stackrel{?}{=} -12$$

$$\frac{8}{1} \cdot \frac{-12}{5} \stackrel{?}{=} -12$$

$$-12 = -12 \checkmark$$

If we can easily see that p is a factor of r in the equation  $p(x + q) = r$ , then we can solve the equation like this:

$$4(x + 5) = -12$$

$$-6(x - 4) = 30$$

$$\frac{4(x+5)}{4} = \frac{-12}{4}$$

$$\frac{-6(x-4)}{-6} = \frac{30}{-6}$$

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

$$\frac{x-4}{+4} = \frac{-5}{+4}$$

$$x = -8$$

$$x = -1$$

$$-12 = -1\frac{1}{3} = \frac{-4}{3}$$

$$\frac{-6}{5}(b-6) = 7$$

Solve and check:

$$\frac{3}{5}(n-6) = -9$$

$$\frac{3}{5}n - \frac{18}{5} = -9$$

$$+\frac{18}{5} \quad +\frac{18}{5}$$

$$\frac{3}{5}n = -5\frac{2}{5}$$

$$\frac{5}{3} \cdot \frac{3}{5}n = 5\frac{2}{5} \cdot \frac{5}{3}$$

$$n = -9$$

$$-9 + \frac{18}{5}$$

$$-9 + 3\frac{3}{5}$$

$$-\frac{3}{5} \cdot \frac{5}{5}$$

$$\frac{-3}{5} \cdot \frac{5}{5}$$

$$\frac{-3}{5} \cdot \frac{5}{5}$$

$$5\frac{2}{5} \cdot \frac{5}{3}$$

$$\frac{-9}{3} \cdot \frac{5}{3}$$

$$-\frac{9}{3} \cdot \frac{5}{3}$$

Solve and check:

$$-1.2(b-6) = 7$$

$$-1.2(b-6) = 7$$

$$\frac{-1.2b + 7.2}{-7.2} = \frac{7}{-7.2}$$

$$\frac{7.2}{-7.2} = \frac{7}{-7.2}$$

$$-1.2b = -0.2$$

$$\frac{-1.2b}{-1.2} = \frac{-0.2}{-1.2}$$

$$1.2 \overline{) 1.2}$$

$$12 \overline{) 2.00}$$

$$b = \frac{1}{6}$$

$$\text{or } .1\bar{6}$$

$$\frac{.2}{1.2} = \frac{2}{12} = \frac{1}{6}$$

Solve and check:

$$\frac{2}{3}(y-5) = -10$$

$$\frac{3}{2} \cdot \frac{2}{3}(y-5) = -10 \cdot \frac{3}{2}$$

$$y-5 = -15$$

$$+5 \quad +5$$

$$y = -10$$

Solve and check:

$$3.5(a-10) - 3a = 24$$

$$3.5a - 35 - 3a = 24$$

$$0.5a - 35 = 24$$

$$+35 \quad +35$$

$$0.5a = 59$$

$$\frac{2}{1} \cdot \frac{1}{2}a = 59 \cdot \frac{2}{1}$$

$$a = 118$$

Solve and check:

$$\frac{2}{3}(9x-2) = -5$$

$$6x - \frac{4}{3} = -5$$

$$+ \frac{4}{3} \quad + \frac{4}{3}$$

$$6x = -\frac{11}{3}$$

$$\frac{1}{6} \cdot 6x = -\frac{11}{3} \cdot \frac{1}{6}$$

$$x = -\frac{11}{18}$$

$$-5 + \frac{4}{3}$$

$$-\frac{15}{3} + \frac{4}{3}$$

OK

$$\frac{2}{3}(9x-2) = -5$$

$$\frac{2}{3}\left(4 \cdot \frac{-11}{18} - 2\right) = -5$$

$$\frac{2}{3}\left(-\frac{11}{2} - 2\right) = -5$$

$$\frac{2}{3} \cdot \frac{-15}{3} = -5$$

$$-5 = -5 \checkmark$$

Solve a word problem by using an equation that has one variable:

- Define the variable
- Write a word model
- Translate into an equation
- Solve the equation
- Check and label

Tony buys 4 shirts at a clearance sale. Each shirt is discounted \$3.50 off the regular price. The total cost is \$65. What is the regular price of the shirt?

Let  $n$  = regular price of shirt

$$4(\text{cost of one shirt}) = \text{total cost}$$

$$4(n - 3.50) = 65$$

Solve  
this