

Section 6-1: Two-Step Equations

Warmup:

Christmas is coming. You have \$30 to buy gifts. The gift you have picked out for your mom costs \$12. You have 3 siblings to buy gifts for and you want to be fair. How much can you spend on each sibling without going over \$30?

Review:

$$\begin{array}{r} x + 7 = -1 \\ -7 \quad | \quad -7 \\ \hline x = -8 \end{array}$$

$$\begin{array}{r} a - 4 = 22 \\ +4 \quad | \quad +4 \\ \hline a = 26 \end{array}$$

$$\begin{array}{r} 3y = 21 \\ \div 3 \quad | \quad \div 3 \\ \hline y = 7 \end{array}$$

$$\begin{array}{r} 5 \cdot \frac{b}{5} = 6 \cdot 5 \\ \hline b = 30 \end{array}$$

**Remember, solving an equation
is like balancing a scale.**



**What you do to one side, you
must do to the other side.**

How might you solve these?

$$4x + 10 = 42$$

~~-10~~ ~~-10~~

~~$4x = 32$~~

~~$\frac{4}{4}$~~ ~~$\frac{32}{4}$~~

$$x = 8$$

$$\frac{y}{3} - 8 = 4$$

~~+8~~ ~~+8~~

~~$\frac{y}{3} = 12 \cdot 3$~~

$$y = 36$$

Solving Two-Step Equations:

- 1. Undo the addition/subtraction by doing the opposite operation.**
- 2. Undo the multiplication/division by doing the opposite operation.**
- 3. Simplify**
- 4. Check your answer by plugging it back into the original problem.**

Ex 1:

$$7w + 2 = 30$$

$$\begin{array}{r} -2 \\ \hline 7w \end{array} = 28$$

$$\begin{array}{r} \cancel{7}w = 28 \\ \cancel{7} \end{array} \quad \begin{array}{r} /8 \\ \hline \end{array}$$

$$w = 4$$

Ex 2:

$$-2y - 8 = 4$$

$$\begin{array}{r} +8 \\ \hline -2y \end{array} = 12$$

$$\begin{array}{r} \cancel{-2}y = 12 \\ \cancel{-2} \end{array} \quad \begin{array}{r} /12 \\ \hline \end{array}$$

$$y = -6$$

Ex 3:

$$3 - x = 12$$

$$\begin{array}{r} -3 \\ \hline -x = 9 \\ \hline -1 \end{array}$$

$$x = -9$$

Ex 4:

$$0 = 18 + 6m$$

$$-18 \quad -18$$

$$\frac{-18}{6} = \frac{6m}{6}$$

$$-3 = m$$

Ex 5:

$$\frac{a}{3} - 4 = 5$$

~~+4~~ | ~~+4~~

~~3~~ ~~a~~ = 9 · 3

a = 27

Ex 6:

$$\frac{c}{-4} + 4 = -8$$

~~-4~~ | ~~-4~~

~~(-4)~~ ~~c~~ = -12(-4)

c = 48

Ex 7:

$$\frac{b}{-1} - 15 = 2$$

$$+15 \quad +15$$

$$\frac{b}{-1} = 17 \quad (-1)$$

$$b = -17$$

Ex 8:

$$\frac{d}{5} + 8 = 33$$

$$-8 \quad -8$$

$$\frac{d}{5} = 25.5$$

$$d = 125$$