

# ONE STEP EQUATIONS

$$m + 18 = 3$$

$$8x = -72$$

***Students will use  
inverse operations to  
solve one-step  
equations.***

$$x + 4 = 12$$

$$m - 18 = -3$$

$$3p = -27$$

$$\frac{b}{3} = -12$$

# ONE-STEP EQUATIONS



**An equation is like a balance scale because it shows that two quantities are equal.**

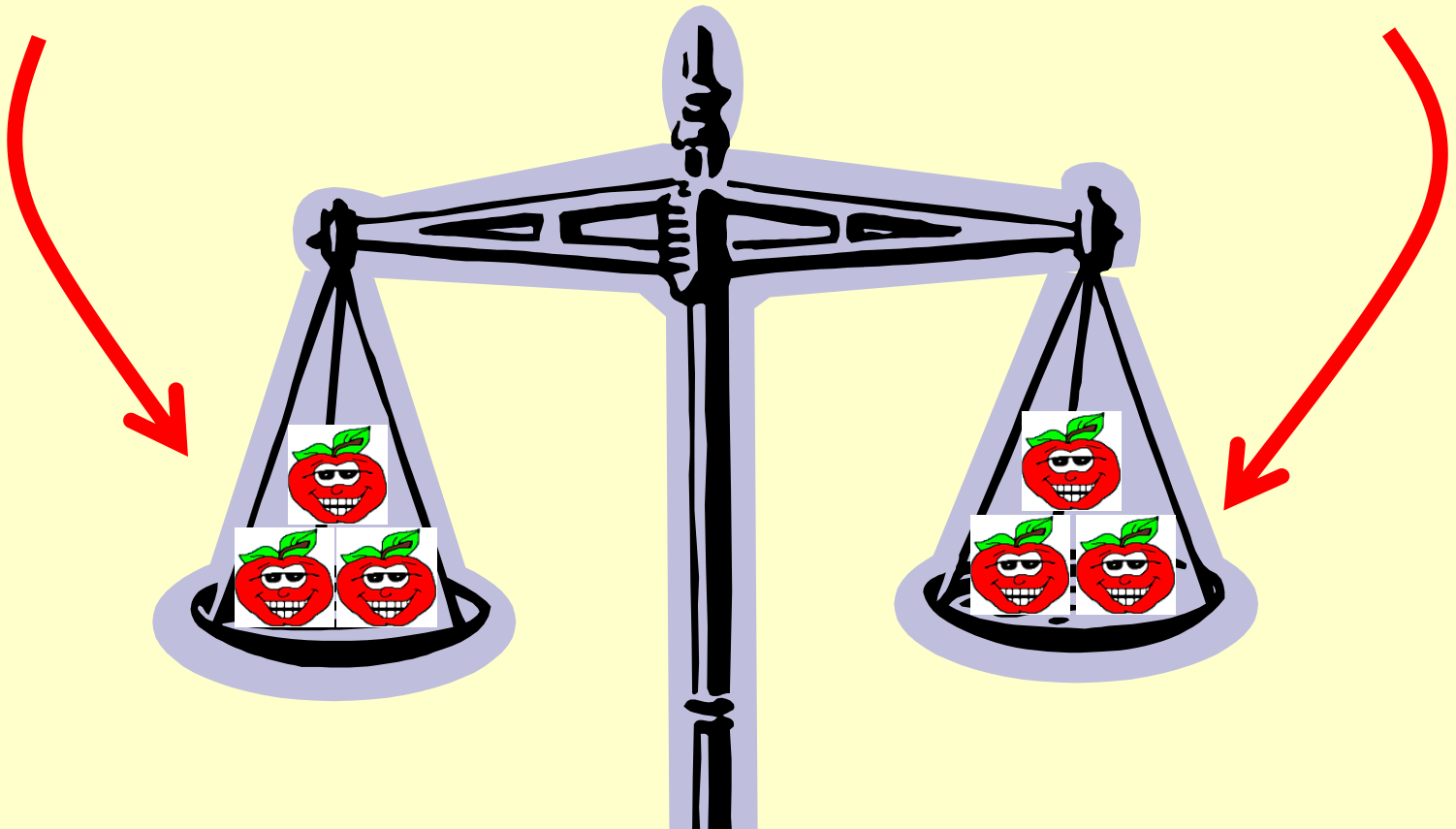


**What you do to one side of the equation must also be done to the other side to keep it balanced.**

# *Keep the scale balanced.*

If we add 3  
apples to  
this side...

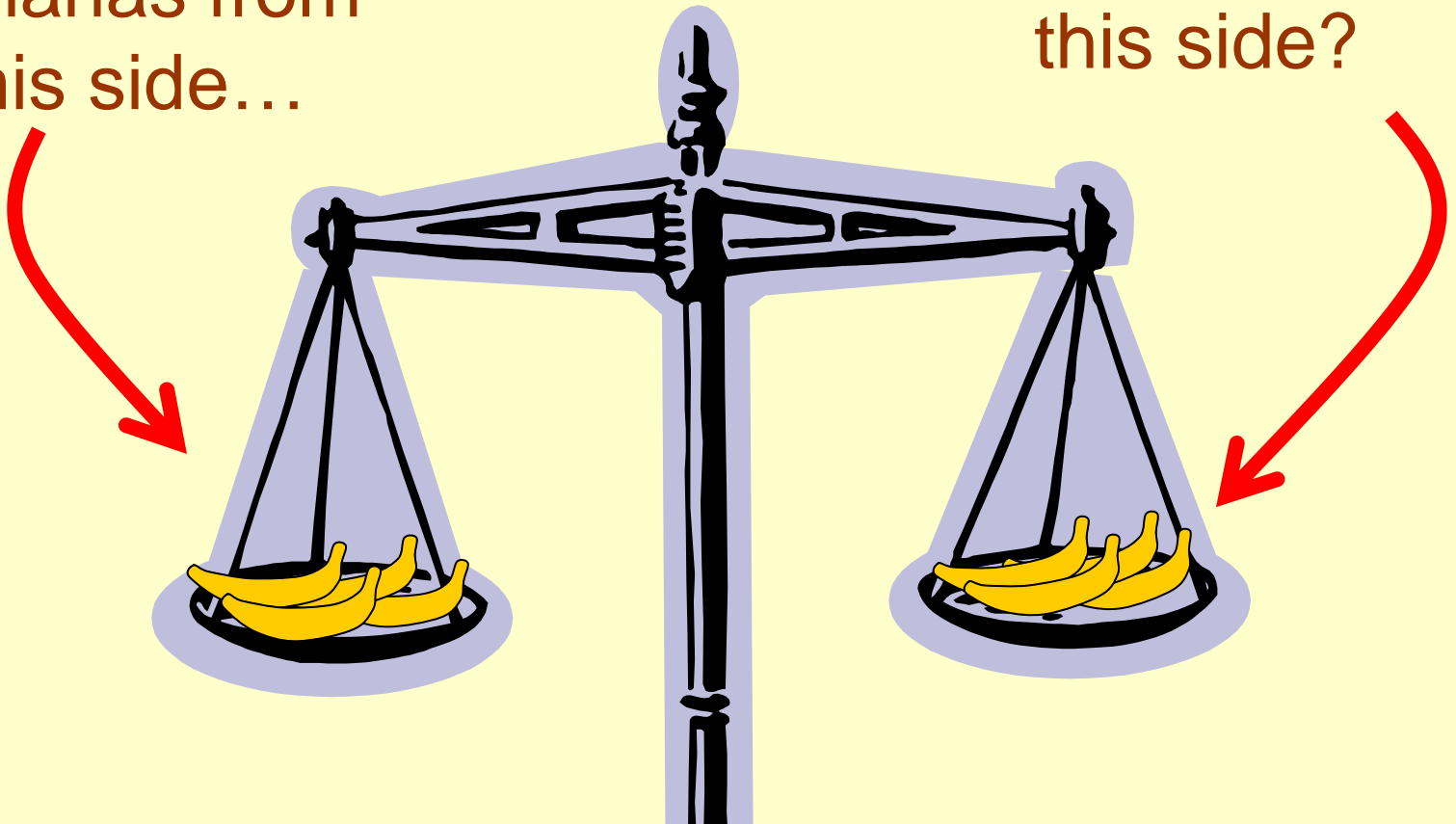
What must  
we do to  
this side?



# *Keep the scale balanced.*

If we subtract 3  
bananas from  
this side...

What must  
we do to  
this side?



# ONE STEP EQUATIONS

To solve one step equations, you need to ask three questions about the equation:

- What is the variable?
- What operation is performed on the variable?
- What is the inverse operation? (The one that will “undo” what is being done to the variable)

# INVERSE OPERATIONS

The inverse operation of addition is...

**SUBTRACTION**

The inverse operation of subtraction is...

**ADDITION**

The inverse operation of multiplication is...

**DIVISION**

The inverse operation of division is...

**MULTIPLICATION**

# 1-STEP EQUATIONS WITH

## ADDITION

Example 1 Solve  $x + 4 = 12$

What is the variable? The variable is  $x$ .

What operation is being performed on the variable? Addition.

What is the inverse operation? Subtraction.

Using the subtraction property of equality, subtract 4 from both sides of the equation.

$$x + 4 = 12$$

$$\begin{array}{r} -4 \\ -4 \end{array}$$

$$x = 8$$

The subtraction property of equality tells us to subtract the same thing on both sides to keep the equation equal.

You can check ALL answers.

Start by writing the original problem.

$$x + 4 = 12$$

Plug in your answer.

$$8 + 4 = ?$$

12

**CORRECT!**

# Practice: 1-step Equations *with addition*

1.  $m + 9 = 3$

$$\begin{array}{r} -9 \quad -9 \\ \hline \end{array}$$

$$m = -6$$

check:  $-6 + 9 = ?$

$$3 = 3 \checkmark$$

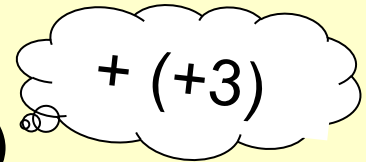
2.  $j + (-3) = 1$

$$\begin{array}{r} -(-3) \quad -(-3) \\ \hline \end{array}$$

$$j = 4$$

check:  $4 + (-3) = ?$

$$1 = 1 \checkmark$$



3.  $g + 4 = -12$

$$\begin{array}{r} -4 \quad -4 \\ \hline \end{array}$$

$$g = -16$$

check:  $-16 + 4 = ?$

$$-12 = -12 \checkmark$$

4.  $c + 5 = 0$

$$\begin{array}{r} -5 \quad -5 \\ \hline \end{array}$$

$$c = -5$$

check:  $-5 + 5 = ?$

$$0 = 0 \checkmark$$



# 1-STEP EQUATIONS WITH SUBTRACTION

Example 2 Solve  $y - 7 = -13$

What is the variable? The variable is  $y$ .

What operation is being performed on the variable? Subtraction.

What is the inverse operation? Addition.

Using the addition property of equality, add 7 to both sides of the equation.

$$y - 7 = -13$$

$$\begin{array}{r} +7 \\ +7 \end{array}$$

$$y = -6$$

Check your work!

$$y - 7 = -13$$

$$\left. \begin{array}{l} -6 - 7 = ? \\ -13 \end{array} \right\}$$

Plug in your answer.

**CORRECT!**

The addition property of equality tells us to add the same thing on both sides to keep the equation equal.

# Practice: 1-step Equations *with subtraction*

1.  $f - 3 = -5$

$$\begin{array}{r} +3 \\ \hline \end{array} \quad \begin{array}{r} +3 \\ \hline \end{array}$$

$$f = -2$$

check:  $-2 - 3 = ?$

$$-5 = -5 \checkmark$$

2.  $n - 18 = 2$

$$\begin{array}{r} +18 \\ \hline \end{array} \quad \begin{array}{r} +18 \\ \hline \end{array}$$

$$n = 20$$

check:  $20 - 18 = ?$

$$2 = 2 \checkmark$$

3.  $g - 8 = -2$

$$\begin{array}{r} +8 \\ \hline \end{array} \quad \begin{array}{r} +8 \\ \hline \end{array}$$

$$g = 6$$

check:  $6 - 8 = ?$

$$-2 = -2 \checkmark$$

4.  $m - 11 = 1$

$$\begin{array}{r} +11 \\ \hline \end{array} \quad \begin{array}{r} +11 \\ \hline \end{array}$$

$$m = 12$$

check:  $12 - 11 = ?$

$$1 = 1 \checkmark$$

# 1-STEP EQUATIONS WITH MULTIPLICATION

Example 3 Solve  $-6a = 12$

What is the variable? The variable is  $a$ .

What operation is being performed on the variable? Multiplication.

What is the inverse operation? Division

Using the **division property of equality**, divide both sides of the equation by  $-6$ .

$$\frac{-6a}{-6} = \frac{12}{-6}$$

$$a = -2$$

**The division property of equality tells us to divide the same thing on both sides to keep the equation equal.**

CHECK:

$$-6a = 12$$

$$-6(-2) = ?$$

$$12$$

REMEMBER:  
The fraction means DIVIDE!

**CORRECT!**

NOTE:  $-6 \div -6 = 1$  and "1a" means the same thing as "a".

# Practice: 1-step Equations *with multiplication*

$$1. \frac{3a}{3} = \frac{-18}{3}$$

$$a = -6$$

$$\text{Check: } 3(-6) = ?$$

$$-18 = -18 \checkmark$$

$$2. \frac{-4n}{-4} = \frac{-32}{-4}$$

$$n = 8$$

$$\text{Check: } -4(8) = ?$$

$$-32 = -32 \checkmark$$

$$3. \frac{5m}{5} = \frac{-45}{5}$$

$$m = -9$$

$$\text{Check: } 5(-9) = ?$$

$$-45 = -45 \checkmark$$

$$4. \frac{-3x}{-3} = \frac{3}{-3}$$

$$x = -1$$

$$\text{Check: } -3(-1) = ?$$

$$3 = 3 \checkmark$$

# 1-STEP EQUATIONS WITH

## *DIVISION*

Example 4 Solve  $\frac{b}{2} = -10$

What is the variable? The variable is b.

What operation is being performed on the variable? Division.

What is the inverse operation? Multiplication

Using the multiplication property of equality, multiply both sides of the equation by 2.

$$\cancel{2} \cdot \frac{b}{\cancel{2}} = -10 \cdot 2$$

$$b = -20$$

The multiplication property of equality tells us to multiply the same thing on both sides to keep the equation equal.

CHECK:

$$\frac{b}{2} = -10$$

$$\frac{-20}{2} = ?$$

-10

**Correct!**

# Practice: 1-step Equations *with division*

$$1. (3) \frac{b}{3} = 6(3)$$

$$b = 18$$

$$\text{Check: } \frac{18}{3} = ?$$

$$6 = 6 \checkmark$$

$$2. (-4) \frac{x}{-4} = 9(-4)$$

$$x = -36$$

$$\text{Check: } \frac{-36}{-4} = ?$$

$$9 = 9 \checkmark$$

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

$$x = 10$$

$$\text{Check: } \frac{10}{-5} = ?$$

$$-2 = -2 \checkmark$$

$$4. (-8) \frac{k}{-8} = 1(-8)$$

$$k = -8$$

$$\text{Check: } \frac{-8}{-8} = ?$$

$$1 = 1 \checkmark$$

## *Summary*

When solving one-step equations, always use the “inverse operation” to undo the operation that is done on the variable.

**ALWAYS CHECK YOUR WORK!**