

# CHAPTER 6:

# Equations and Inequalities

## Section 6.1: Solving Equations using Inverse Operations

## Inverse Operations:

Inverse operations "undo" or reverse each other's result.

Examples of Inverse Operations:

- Addition and Subtraction
- Multiplication and Division

Inverse operations takes us back to where we started!

For example, a.  $2 + 3 = 5$  and  $5 - 3 = 2$

b.  $2 \times 3 = 6$  and  $\frac{6}{3} = 2$

We can use inverse operations to solve many types of equations.  
To do this, we:

1. determine the operations that were applied to the variable to **build** the equation.
  2. then use the **inverse operation** to isolate the variable (get x by itself) by "undoing" the operation.

Keeping in mind that whatever we do to one side of the equation, we do to the other to keep the equation "balanced".

For example, to solve  $x + 2.4 = 6.5$

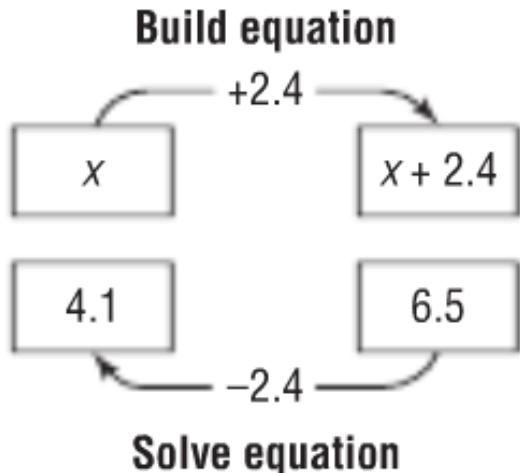
Step 1: Start with  $x$

Step 2: Identify the operation applied to produce  $x + 2.4$

add 2.4

Step 3: Apply the inverse operation to isolate  $x$ .

subtract 2.4



Algebraically,

$$x + 2.4 = 6.5$$

$$\begin{array}{r} x + 2.4 = 6.5 \\ -2.4 \quad -2.4 \\ \hline \end{array}$$

$$x = 4.1$$

We can verify our solution:

- put your answer back into the equation to show that it works.

## Math9\_U6\_Section 6.1

### Example 1:

Solve using inverse operations and algebraically:

$$x - 4.3 = -5.6 \quad \text{Operation: } \underline{\hspace{2cm}}$$

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Inverse Operation

Algebraically

### Example 2:

Solve using inverse operations and algebraically:

**Three times a number is -3.6**      Operation:  $\underline{\hspace{2cm}}$

Inverse:  $\underline{\hspace{2cm}}$

Inverse Operation

Algebraically

### Example 3:

Solve using inverse operations and algebraically:

**A number divided by 4 is 1.5**      Operation:  $\underline{\hspace{2cm}}$

Inverse:  $\underline{\hspace{2cm}}$

Inverse Operation

Algebraically

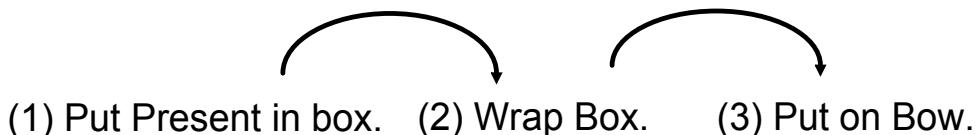
## Solving Two-Step Equations

**NOTE:** To "undo" a sequence of operations, we perform the inverse operations in the reverse order.

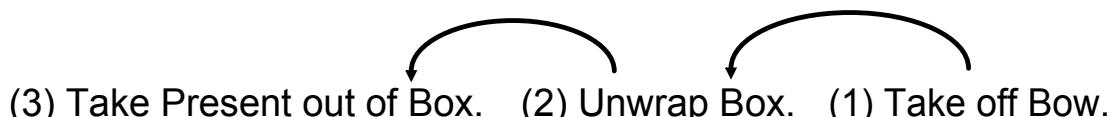
In other words, we have to "undo" the last step first!

### Example:

#### Wrapping A Present



#### Unwrapping A Present



### Example 4:

Solve:  $4.5d - 3.2 = -18.5$

#### Inverse Operation

#### Algebraically

Operation: \_\_\_\_\_

Inverse: \_\_\_\_\_

**Example 5:**

Solve:  $\frac{x}{4} + 3 = 7.2$

Inverse Operation

Algebraically

Operation: \_\_\_\_\_

Inverse: \_\_\_\_\_

**Your Turn:**

a.  $3p - 4 = 5$

b.  $1.9 + n = 6.8$

**Example 6: Using reciprocals**

Solve and verify:

Inverse Operation: \_\_\_\_\_

$$\frac{4.2}{x} = 3$$

**Example 7:**

Solve and verify:

Inverse Operation: \_\_\_\_\_

$$\frac{2}{x} = 0.5$$

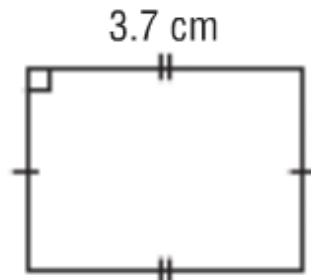
**Example 8:** Seven percent of a number is 56.7.

- Write, then solve an equation to determine the number.
- Check the solution.

**Example 9:**

A rectangle has length 3.7cm and perimeter 13.2cm.

- Write an equation that can be used to determine the width of the rectangle.
- Solve the equation.
- Verify the solution.



Inverse

Distributive Property

## Solving Equations Involving Distributive Property

### **Example 10:**

Solve:

a)  $2(3.7 + x) = 13.2$

b)  $6 = 1.5(x - 6)$

c)  $3(x - 5) = 2$