

**DO NOW** – On the back of this packet

Name \_\_\_\_\_

**LO:** I can use inverse operations to solve equations with multiple steps.

(1) **Need to know**  
pencil/pen

**Inverse Operations:** When a **variable** only appears once in an equation, the value of the variable can be found by identifying the operations that have been done on the variable and reversing them in the opposite order that they occur. To keep an equation balanced, you must reverse the operations on **both sides** of the equation.

Solving equations is like unwrapping presents.

Our present is  $x$ . Describe using the order of operations, GEMDAS, how  $x$  was wrapped. For example, in the equation:  $3x - 5 = 7$ , drop the 7 for a moment and look at  $3x - 5$ . How is  $x$  “wrapped” – meaning, what operations have been done on  $x$ ?

Work to solve the equation

<u>Operations, in order, happening to <math>x</math></u> (wrapping)	<u>Steps to reverse the operations</u> (unwrapping)
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(1) _____	(1) _____
(2) _____	(2) _____

(2) **Solving equations with inverse operations** Write the operations, inverse operations and solve for each equation  
pencil/pen

Equation	Operations (wrapping)	Inverse operations (unwrapping)	Solve the equation
A $5x + 7 = 12$	_____ _____	_____ _____	
B $\frac{x + 2}{5} = 3$	_____ _____	_____ _____	
C $4(x - 9) = 20$	_____ _____	_____ _____	

(3) **Solving equations with inverse operations** Write the operations, inverse operations and solve for each equation  
pencil/pen

Equation	Operations (wrapping)	Inverse operations (unwrapping)	Solve the equation
D $3x^2 - 5 = 7$	_____ _____ _____	_____ _____ _____	
E $\frac{c-3}{2} + 7 = 23$			
F $-2(b-4) + 8 = 2$			
G $\frac{5(2y-1)}{3} - 4 = 11$			

(4) **Equations from words;** Set up equations that translate the following verbal phrases into mathematics and then solve the equations.  
pencil/pen

(a) Ten less than five times a number results in thirty five. What is the number? Carefully set up an equation, solve it, and check your answer for reasonableness. Watch out! Subtraction is involved.

(b) When three times the sum of a number and seven is increased by ten, the result is four. What is the number? Carefully set up an equation and solve it. Check for reasonableness.

(5)  
pen or  
pencil,  
square  
paper

**Variables in multiple locations** Get your variables together by distributing and combining like terms, then “unwrap” the variable with inverse operations.

**Example:**  $5(x - 3) + 2x = 4(x + 3)$

**Practice #1:**  $9 - 6(x + 1) = 2(x - 4) + 27$

**Practice #2:**  $7(x - 2) - 3(x + 3) = 5(x - 3) + x$

(6) **Exit Ticket**

ON THE LAST PAGE

 (7) **Homework**
pen or  
pencil,  
square  
paper

- In the expression  $\frac{x}{5} - 3$  which is the correct order in which operations have been done to  $x$ ?
  - $x$  was divided by 5 and the result was subtracted from 3
  - $x$  had 3 subtracted from it and the result was then divided by 5.
  - $x$  was divided by 5 and 3 was subtracted from the result
  - 5 was divided by  $x$  and then 3 was subtracted from the result.
- Which of the following is the solution to  $6x + 1 = 4$ ? Show the steps or explain how you found the solution.
 

(1) $x = \frac{7}{6}$	(3) $x = \frac{4}{3}$
(2) $x = \frac{1}{2}$	(4) $x = \frac{5}{6}$
- The solution to  $5(x - 2) - 6 = 24$  is which of the following? Show the steps in your solution process.
 

(1) $x = 7$	(3) $x = -3$
(2) $x = -12$	(4) $x = 8$

**APPLICATIONS**

- If a number is increased by five and the result is then divided by three, the result is seven. Write an equation that models this verbal description and solve the equation for the number described.
- Max and his friend Zeke are comparing their ages. They figure out that if they double Max's age from 3 years ago and add it to Zeke's current age, the sum is 26. If Zeke is currently 8 years old, determine how old Max currently is.

**CLASS SUPPLY LIST**

Pencil	Eraser	Compass	Ruler	Highlighters	Pens	Markers	Scissors
Glue	Dry Erase Marker		Sheet Protector				

Exit Ticket    Name \_\_\_\_\_ Date \_\_\_\_\_ Per \_\_\_\_\_    1.2L

(1) The LO (Learning Outcomes) are written below your name on the front of this packet. Demonstrate your achievement of these outcomes by explaining:

List the operations on  $x$ , the inverse operations needed to reverse the operations on  $x$  (unwrap), and then solve the equation:

$$4(3x + 2) = -16$$

Operations

Inverse operations

Steps/work to solve the equation

Solve by getting  $x$  on one side of the equation and then using inverse operations to “unwrap”  $x$ .

$$4(3x + 2) = -16$$

(1) You put together a gift for a friend, BUT, forgot to include the CD you made. When you put the present together you followed the “WRAP” steps. What steps must you take to “UNWRAP” the present so that you can put the CD in the CD holder (without ruining the wrapping)? Write your UNWRAP directions below

WRAP

1. Put the CD holder in the box
2. Put tissue on top
3. Put the lid on the box
4. Wrapped paper around the box
5. Taped the paper together
6. Tied a bow with ribbon

UNWRAP

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

(2) Describe why the cartoon below is supposed to make people smile.

REALLY think about it.

If you still aren't sure, describe what is happening in the cartoon.

