

Important Concepts . . .

Preview Review



Mathematics Grade 7
**W2 - Lesson 3: Algebra and Verifying
Linear Equations**

Important Concepts of Grade 7 Mathematics

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W1 - Lesson 2	Decimal Numbers
W1 - Lesson 3	Fractions
W1 - Lesson 4	Improper Fractions, Mixed Numbers, Percents, and Decimals
W1 - Lesson 5	Integers, Number Lines, and Sequencing
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Materials Required

Math Set
Calculator

**No Textbook
Required**

**This is a stand-
alone course.**

Mathematics Grade 7

Version 6

Preview/Review W2 - Lesson 3

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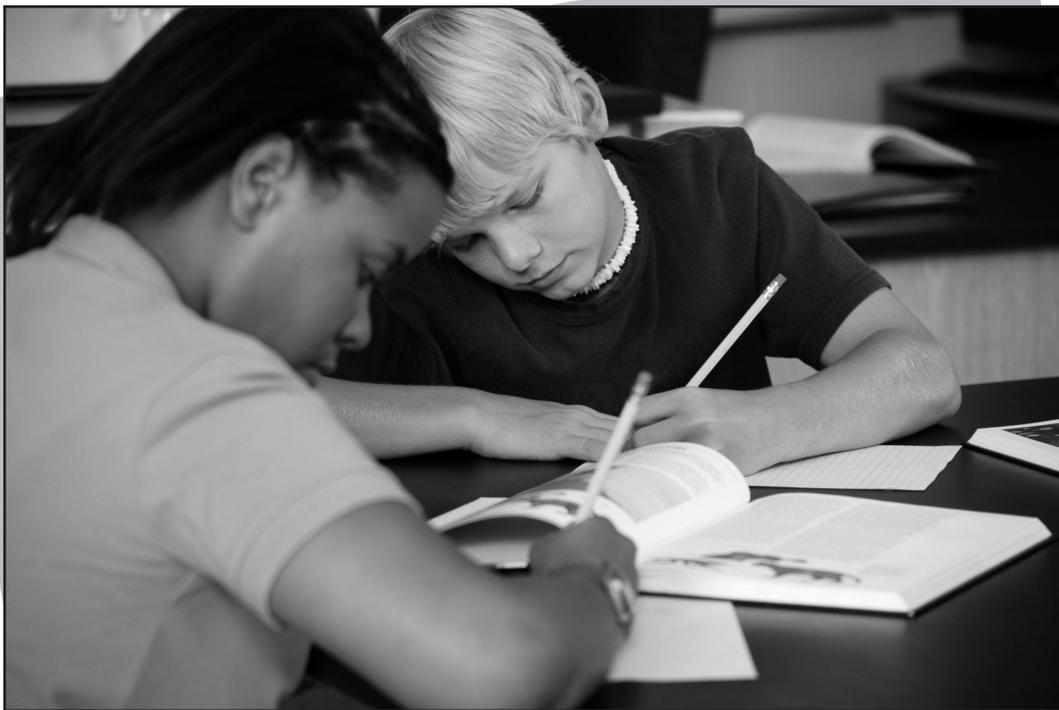
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Preview/Review Concepts for Grade Seven Mathematics



W2 - Lesson 3:

*Algebra and Verifying Linear
Equations*

W2 - Lesson 3: Algebra and Verifying Linear Equations

Objective:

- I can solve and verify the solution to a linear equation.

Solving equations using algebra

To solve an equation, isolate the variable by "undoing" the operations surrounding the variable

Do	Un-do
+	-
-	+
×	÷
÷	×

Example: $2x + 9 = 13$

Undo addition: subtract 9 from both sides of the equal sign.

$$2x + 9 - 9 = 13 - 9$$

$$2x = 4$$

Undo multiplication: divide both sides by 2.

$$\frac{2x}{2} = \frac{4}{2}$$

$$x = 2$$

Example 2: $\frac{x}{3} - 4 = 2$

Undo subtraction: add 4 to both sides.

$$\frac{x}{3} - 4 + 4 = 2 + 4$$

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

Undo division: multiply both sides by 3.

$$\frac{x}{3} \times 3 = 6 \times 3$$

$$x = 18$$

Remember: whatever you do to one side, you do to the other side too.

Practice:

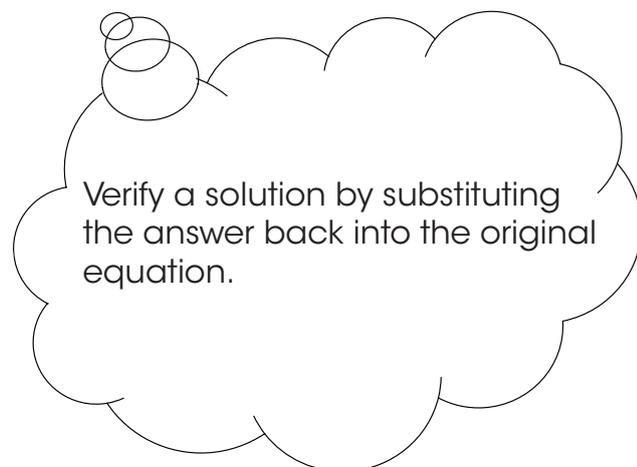
Solve each equation, showing each algebra step.

a. $4x - 2 = 14$

b. $3n + 5 = 11$

c. $w + 45 = 50$

d. $2d - 6 = 2$

Verifying a solution**Example:** $2x + 9 = 13$ Our solution was $x = 2$.

Verify: Left side: $2(2) + 9$ Right side: 13
 $4 + 9$
 13

Since the left side of the equal sign ends up being the same as the right side, we know the solution is correct.

Example 2: $x/3 - 4 = 2$ Our solution was $x = 18$.

Verify: Left side: $(18)/3 - 4$
 $6 - 4$
 2

Right side: 2

Practice:

Verify if the given solution is correct. Show all steps. **Note: Some will be incorrect**

a. $2x - 7 = 11, x = 9$

b. $\frac{y}{3} - 5 = 1, y = 18$

c. $\frac{n}{2} + 3 = 8, n = 6$

d. $2d + 7 = 17, d = 7$

e. $\frac{g}{4} + 6 = 11, g = 20$

f. $6d - 11 = 13, d = 2$

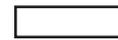
Objective:

- *I can verify the solution to a linear equation using manipulatives.*

Unit tile: represented by a single tile. Each one tile represents +1.



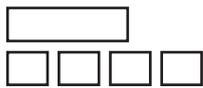
Variable tile: represented by a long rectangular tile. Each tile represents one unit of a variable.



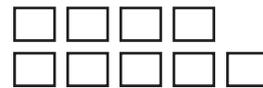
Verifying equations with algebra tiles

Solve: $x + 4 = 9$

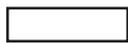
Left side:



Right side



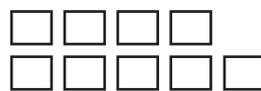
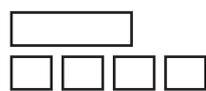
Remove 4 unit tiles from each side to isolate the x -tile



Each x -tile equals 5 unit tiles ($x = 5$)

Verify: $x + 4 = 9, x = 5$

Left side



Right side



Since the left side has the same number of tiles as the right side, we know the solution is correct.

Practice:

Verify each given solution using Algebra tiles.

Verify: $x - 2 = 3$, $x = 5$

Left side

Right side

Verify: $2x + 1 = 3$, $x = 1$

Left side

Right side

Verify: $3x - 3 = 6$, $x = 3$

Left side

Right side

Objective:

- *I can use equations to solve word problems.*

Writing and solving equations from word problems**Example:**

At the bakery loaves of bread cost \$2.00 per loaf.
How many loaves can be bought with \$10.00?

- a. Write the equation representing the solution.

$$2b = 10$$

- b. Solve the equation, verify the equation.

$$2b = 10$$

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

$$b = 5$$

$$\text{Left side: } 2b \rightarrow 2(5) \rightarrow 10$$

$$\text{Right side: } 10$$

LS = RS, therefore the solution is correct

Summary and Practice:

- *I can use equations to solve word problems.*

1. Fill in the blanks.

→ A variable, x , has 4 added to it, we need to _____ from both sides to isolate x .

→ A variable, n , has 6 subtracted from it; we need to _____ to both sides to isolate n .

→ A variable, g , is multiplied by 3, to isolate g we need to _____ by _____ on both sides.

→ A variable, w , is divided by 2; to isolate w we need to _____ by _____ on both sides.

2. Solve and verify, showing all steps.

a. $5x - 7 = 18$

b. $4n + 8 = 20$

3. Solve. Verify your solution using Algebra tiles.

a. $w + 4 = 11$

b. $2y + 6 = 16$

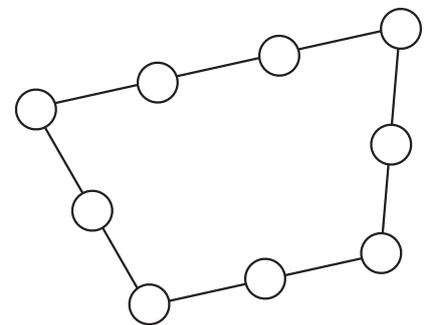
c. $\frac{h}{2} + 3 = 6$

4. Sarah invited some friends over to play video games. Three friends left after one game, but seven friends stayed to play more. How many friends did Sarah have over?

a. Write an equation

b. Solve the equation, verify the solution.

5. Peter wants to build a fence around his garden. He needs 3 cross pieces between each fence post, except the gate which needs 5 pieces. Before going to the lumber store, Peter determines he will need $3p + 5$ pieces of wood, where p is the number of posts.



a. If Peter’s garden has 9 fence posts, he decides he’ll need 32 pieces of wood. Is Peter correct? Why or why not?

b. How many pieces of wood does Peter actually need?

7. Warren has 15 songs downloaded to his MP3 player. He downloads 8 new songs each month. After how many months will Warren have 71 songs?



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