Vocabulary

● Review

Write T for *true* or F for *false*.

_____ **1.** To indicate the *absolute value* of -8, you write $|-8|$.

_____ **2.** The *absolute value* of -8 is -8, since -8 is 8 units to the left of 0 on the number line.

_____ **3.** The *absolute value* of -8 is 8, since -8 is 8 units away from 0 on the number line.

_____ **4.** According to the definition of absolute value, if $|r| = 3$, then $r = 3$ or $r = -3$.

● Vocabulary Builder

> **numerical expression**
> $18 \div (6 + 3)$
>
> **algebraic expression**
> $4k - 7$

expression (noun) **ek SPRESH un**

Related Words: express (verb), phrase (noun)

Main Idea: An **expression** is a word or phrase that communicates an idea. A mathematical **expression** is a mathematical phrase. A mathematical **expression** may be *numerical* or *algebraic*.

● Use Your Vocabulary

Write an *expression* for each word phrase.

5. m increased by 8

m ☐ ☐

6. y divided by 9

y ☐ ☐

7. u more than 7

☐ ☐ u

8. Cross out the *expression* that is NOT algebraic.

| $3y - 12$ | $4 + 18 - 3$ | $12 + x$ |

9. Cross out the *expression* that is NOT numeric.

| $3 - 12$ | $4 + 18q - 3$ | $12 + 5$ |

Problem 1　Solving an Absolute Value Equation

Got It? What are the solutions of $|n| - 5 = -2$? Graph and check the solutions.

10. Circle what you should do to solve $|n| - 5 = -2$.
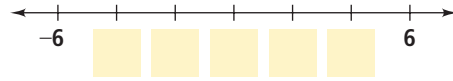
Change −2 to 2.	Isolate the variable.

11. Complete the equation to solve for n.

$$|n| - 5 + \boxed{} = -2 + \boxed{}$$
$$|n| = \boxed{}$$
$$n = \boxed{} \quad \text{or } n = \boxed{}$$

12. Graph the solutions.

−6　□ □ □ □ □　6

13. Check the solutions of the equation.

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take note

Key Concept　Solving Absolute Value Equations

To solve an equation in the form $|A| = b$, where A represents a variable expression and $b > 0$, solve $A = b$ and $A = -b$.

Complete.

14. To solve $|b| = 3$, solve $b = \boxed{}$ and $b = \boxed{}$.

15. To solve $|x - 5| = 6$, solve $x - 5 = \boxed{}$ and $x - 5 = \boxed{}$.

16. To solve $|h + 7| = 2h$, solve $h + 7 = \boxed{}$ and $h + 7 = \boxed{}$.

Problem 2　Solving an Absolute Value Equation

Got It? What are the solutions of $|3x - 1| = 8$? Check the solutions.

17. The absolute value equation is solved below. Write a justification for each step.

$3x - 1 = 8$	$3x - 1 = -8$	Write two equations.
$3x = 9$	$3x = -7$	
$x = 3$	$x = -\dfrac{7}{3}$	

18. Check the solutions in the original equation.

Lesson 3-7

✅ **Problem 3** **Solving an Absolute Value Equation With No Solution**

Got It? What are the solutions of $|3x - 6| - 5 = -7$?

19. To isolate the absolute value expression, you add 5 to each side of the equation. Circle the simplified value of the right side.

| −12 | −7 | −6 | −5 | −3 | −2 |

20. Underline the correct word to complete the sentence.

The absolute value of an expression cannot be negative / positive , so the inequality has no solution.

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take note

Key Concept **Solving Absolute Value Inequalities**

Let A represent a variable expression and let $b > 0$.

To Solve an Inequality in the Form	Solve	
$|A| < b$	$-b < A < b$	(For $|A| \le b$, solve $-b \le A \le b$.)
$|A| > b$	$A < -b$ or $A > b$	(For $|A| \ge b$, solve $A \le -b$ or $A \ge b$.)

21. Circle the compound inequality you would use to solve $|5x| > 3$.

| $-3 < 5x < 3$ | $-3 \le 5x \le 3$ | $5x < -3$ or $5x > 3$ | $5x \le -3$ or $5x \ge 3$ |

22. Circle the compound inequality you would use to solve $|3x| < 5$.

| $-5 < 3x < 5$ | $-5 \le 3x \le 5$ | $3x < -5$ or $3x > 5$ | $3x \le -5$ or $3x \ge 5$ |

✅ **Problem 4** **Solving an Absolute Value Inequality Involving ≥**

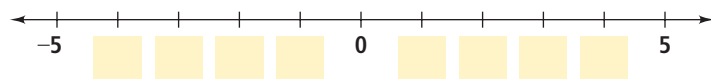**Got It?** What are the solutions of $|2x + 4| \ge 5$? **Graph the solutions.**

23. Write a compound inequality to solve the absolute value inequality.

$2x + 4$ ☐ -5 or $2x + 4$ ☐ 5

24. Solve the inequalities.

	or	

25. Graph your solutions on the number line below.

Got It? A food manufacturer makes 32-oz boxes of pasta. Not every box weighs exactly 32 oz. The allowable difference from the ideal weight is at most 0.05 oz. Write and solve an absolute value inequality to find the range of allowable weights.

26. Complete the model.

Relate | difference between ideal and actual weights | is at most | 0.05 oz

Define Let w = the actual weight.

Write $|w - \boxed{}|$ $\boxed{}$ 0.05

27. Write the absolute value inequality as a compound inequality.

$-0.05 \boxed{} w - \boxed{} \boxed{} \boxed{}$

28. Solve the compound inequality.

29. A box of pasta must weigh between $\boxed{}$ oz and $\boxed{}$ oz, inclusive.

Lesson Check • Do you UNDERSTAND?

Reasoning How many solutions do you expect to get when you solve an absolute value equation? Explain.

30. Write how many solutions each absolute value equation has.

$|x| = 9$ | $|x| = 0$ | $|x| = -9$

$\boxed{}$ solution(s) | $\boxed{}$ solution(s) | $\boxed{}$ solution(s)

31. Explain how many solutions are possible for any absolute value equation.

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Math Success

Check off the vocabulary words that you understand.

☐ absolute value ☐ equation ☐ inequality

Rate how well you can *solve absolute value equations and inequalities.*

| Need to review | 0 2 4 6 8 10 | Now I get it! |