Objective: REVIEW

Working With Expressions and Equations

Since **variables** represent numbers, number properties apply to variables as well.
For example, the commutative property allows you to say both

$$8 + 2 = 2 + 8 \text{ and } a + b = b + a.$$

You can use number properties to write and identify **equivalent expressions**. Expressions are equivalent if they name the same number regardless of which value a variable stands for. Remember that if a variable appears more than once in an expression, that variable refers to the same number in each instance.

An **equation** is a mathematical statement that says two expressions are equal. An equation has an **equal sign** (**=**).
A variable can be used to represent an unknown number in an equation. Here are some examples of equations with variables.

$$6z = 36 \qquad n = \frac{3}{4}p \qquad a + 3 = 11 \qquad d - 5 = 22 \qquad \frac{c}{7} = 8$$

Equations can be used to represent real-world situations. For example, imagine that Holly used 90 chocolate chips to make 15 cookies, and each cookie contained the same number of chips. You could use the equation $15x = 90$ to represent this situation, with x representing the unknown number of chocolate chips in each cookie.

EXPLORE 1

Working With Expressions

1. Which expression is equivalent to $b + b + b + b$?

   A. $4b$
   B. $b + 4$
   C. b^4
   D. $b \div 4$

2. Which expression is equivalent to $7(3 + g)$?

   A. $21 + g$
   B. $10g$
   C. $21 + 7g$
   D. $21g$

3. Which expression is **not** equivalent to $5x + 6$?

   A. $4x + 7 + x - 1$
   B. $3x + 3 + 2x + 3$
   C. $5(x + 1) + 1$
   D. $x(5 + 6)$

4. Which expression is equivalent to $4t + 3t$?

   A. $7t^2$
   B. $7 + 2t$
   C. $7t$
   D. $12t$

5. Which expression is equivalent to $9c + 12d + 2c$?

   A. $18c^2 + 12d$
   B. $11c + 12d$
   C. $11c^2 + 12d$
   D. $23cd$

6. Which expression is **not** equivalent to $4k + 12$?

   A. $3k + 4 + k + 8$
   B. $3(k + 3) + 3$
   C. $4(k + 3)$
   D. $2(2k + 5) + 2$

7. Which expression is equivalent to $6(p + 5)$?

A. $30 + 6p$

B. $30p$

C. $30 + p$

D. $11p$

8. For which value or values are the expressions $15k + 9$ and $3(2k + 3) + 9k$ equivalent?

A. no values

B. 3

C. 3, 5, and 8

D. all values

9. The lengths of the sides of a triangle are represented by $3m$, $3m$, and $3m$.

A. What is an expression, in simplest form, for the perimeter of the triangle?

B. Use the distributive property to write an equivalent expression for the perimeter of the triangle.

10. Select True or False for each statement.

A.	$3(x - 6)$ is equivalent to $3x - 6$.	○ True	○ False
B.	$88n + 40$ is equivalent to $8(11n + 5)$.	○ True	○ False
C.	$z + z + z$ is equivalent to $3z$.	○ True	○ False
D.	$12a + 5b + 4a$ is equivalent to $16a + 5b$.	○ True	○ False
E.	$8x - 3x$ is equivalent to $5x^2$.	○ True	○ False

11. Draw a line from each expression in the left column to an equivalent expression in the right column.

A.	$10c + 2d - 3c$	• $c + 8d$
B.	$2(d - c) + 3(2d + c)$	• $3c + 2d$
C.	$10c + 2d - 7c$	• $7c + 2d$
D.	$4(c + 5d) + 2(c - 8d)$	• $6c + 4d$

12. Circle the number that makes each statement true.

$186q - 114 = \boxed{\begin{matrix}4\\6\\8\end{matrix}}(31q - 19)$ $196r + 154 = \boxed{\begin{matrix}8\\12\\14\end{matrix}}(14r + 11)$

13. Circle every expression that is equivalent to $4c + 20$.

A. $2c + 2c + 12 + 8$

B. $4(c + 5)$

C. $3c + 20 + 2c$

D. $4c(c + 5)$

E. $4(c + 20)$

EXPLORE 2

Equations

1. Which is the solution to $2f = 32$?

A. 12
B. 14
C. 16
D. 18

2. Which step should be taken to isolate the variable in the following equation?

$$7d = 49$$

A. Add 7 to both sides of the equation.
B. Subtract 7 from both sides of the equation.
C. Multiply both sides of the equation by 7.
D. Divide both sides of the equation by 7.

3. What is the value of c in the following equation?

$$29 + c = 62$$

A. 33
B. 43
C. 81
D. 91

4. What is the value of j in the following equation?

$$j - 87 = 165$$

A. 78
B. 88
C. 242
D. 252

5. What is the value of n in the following equation?

$$22n = 418$$

A. 12
B. 14
C. 19
D. 24

6. What is the value of k in the following equation?

$$\frac{1}{5}k = 5$$

A. 0
B. 1
C. 10
D. 25

7. What is the value of a in the following equation?

$$3a = 15$$

A. 1
B. 5
C. 6
D. 45

8. A music teacher bought 19 recorders. She spent a total of \$57. Each recorder was the same price. The equation $19r = 57$ can be used to find r, the price of each recorder in dollars. What was the price of each recorder?

A. \$3
B. \$4
C. \$38
D. \$76

9. Trista solved an equation for x. Her solution is shown below.

$$36 + x = 54$$
$$36 + x - 36 = 54 + 36$$
$$x = 90$$

A. Trista's solution is incorrect. What is the correct value of x? Show your work.

B. What error did Trista make?

10. Does performing the given operation on both sides of each equation isolate the variable? Select Yes or No.

A. $6j = 18$; multiply by 6 ○ Yes ○ No
B. $k + 8 = 4$; subtract 4 ○ Yes ○ No
C. $\frac{m}{5} = 12$; multiply by 5 ○ Yes ○ No
D. $n - 7 = 10$; add 7 ○ Yes ○ No
E. $p + 3 = 8$; subtract 3 ○ Yes ○ No

11. Compare the solution of each equation to 5. Write each equation in the correct box.

$r + 3 = 7$	$s - 4 = 1$	$\frac{t}{6} = 36$	$2u = 4$

Solution < 5	Solution ≥ 5

12. Is the value of the variable a solution to each equation? Select True or False for each equation and its stated solution.

A. $3x = 6; x = 2$ ○ True ○ False

B. $\frac{n}{5} = 15; n = 3$ ○ True ○ False

C. $z + 8 = 22; z = 14$ ○ True ○ False

D. $a - 6 = 21; a = 15$ ○ True ○ False

13. Draw a line from each equation to its solution.

A. $x + 6 = 8$ •	• $x = 25$
B. $x - 10 = 15$ •	• $x = 14$
C. $\frac{x}{2} = 7$ •	• $x = 5$
D. $5x = 25$ •	• $x = 2$

Name: _____ Date: _____ Class: _____

Homework HW

LESSON SE 3b

Objective

Compare each expression to $3t + 4$. Write each expression in the correct box.

$2(t + 2)$	$t + 3 + 2t + 1$	$2t + 4 + t$
$t + 4t + 4$	$t + 3 + 2t - 1$	

Equivalent to $3t + 4$	NOT Equivalent to $3t + 4$

Circle every equation that has a solution of 12.

A. $9x = 108$

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

C. $x + 3 = 9$

D. $x - 4 = 16$