

Name: \_\_\_\_\_

### Grade 8: Algebra 1 H Summer Assignment

**NO CALCULATORS** – Teachers will expect you to know how to compute with all numbers without a calculator.

#### Section 1

Evaluate the expression for  $n = 2$ ,  $m = 3$ , and  $t = 5$ .

1.  $3t - 4n$

2.  $13 - (m + n)$

Compare. Write  $<$ ,  $=$ , or  $>$ .

3.  $-7$  \_\_\_  $7$

4.  $32$  \_\_\_  $|-32|$

5.  $|-9|$  \_\_\_  $-3$

6.  $|-8|$  \_\_\_  $|-6|$

Simplify each expression. Refer to the integer rules below.

<p>To add integers with the same sign, add absolute values and use the same sign.</p> $3 + 5 = 8 \quad -2 + -4 = -6$ <p>To add integers with different signs, subtract absolute values and use the sign of the integer with the greater absolute value.</p> $-7 + 3 = ?$ $ -7  -  3  = 7 - 3 = 4$ <p>Use the sign of <math>-7</math>.</p> <p>So, <math>-7 + 3 = -4</math></p>	<p>To subtract an integer, add its opposite</p> $3 - (-2) = 3 + 2 \quad \text{The opposite of } -2 \text{ is } 2$ $= 5$ $3 - 4 = 3 + (-4) \quad \text{The opposite of } 4 \text{ is } -4$ $= -1$ $-4 - (-5) = -4 + 5 \quad \text{The opposite of } -5 \text{ is } 5$
<p>If two integers have the same sign, the product is positive.</p> $8 \cdot 7 = 56 \quad 8 \cdot (-7) = -56$ <p>If two integers have opposite signs, the product is negative.</p> $(-8) \cdot 7 = -56 \quad 8 \cdot (-7) = -56$	<p>If two integers have the same sign the quotient is positive.</p> $8 \div 2 = 4 \quad (-8) \div (-2) = 4$ <p>If two integers have opposite signs, the quotient is negative.</p> $(-8) \div 2 = -4 \quad 8 \div (-2) = -4$

7.  $-6 + 4$

8.  $-4 + (-5)$

9.  $-2 - 6$

10.  $-8 - (-5)$

11.  $15 - (-8)$

12.  $-15 \cdot (-5)$

13.  $2 \cdot (-7) \cdot 5$

14.  $\frac{-12}{6}$

15.  $\frac{-80}{-16}$

Identify each property. Refer to the properties below.

### KEY CONCEPTS Properties of Operations

#### Commutative Properties of Addition and Multiplication

##### Arithmetic

$$7 + 12 = 12 + 7$$

$$7 \cdot 12 = 12 \cdot 7$$

##### Algebra

$$a + b = b + a$$

$$a \cdot b = b \cdot a$$

#### Associative Properties of Addition and Multiplication

##### Arithmetic

$$(4 + 7) + 3 = 4 + (7 + 3)$$

$$(4 \cdot 7) \cdot 3 = 4 \cdot (7 \cdot 3)$$

##### Algebra

$$(a + b) + c = a + (b + c)$$

$$(a \cdot b) \cdot c = a \cdot (b \cdot c)$$

### KEY CONCEPTS Identity Properties

##### Arithmetic

$$6 + 0 = 0 + 6 = 6$$

$$6 \cdot 1 = 1 \cdot 6 = 6$$

##### Algebra

$$a + 0 = 0 + a = a$$

$$a \cdot 1 = 1 \cdot a = a$$

### KEY CONCEPTS Distributive Property

##### Arithmetic

$$3(2 + 7) = 3 \cdot 2 + 3 \cdot 7$$

$$(2 + 7)3 = 2 \cdot 3 + 7 \cdot 3$$

$$5(8 - 2) = 5 \cdot 8 - 5 \cdot 2$$

$$(8 - 2)5 = 8 \cdot 5 - 2 \cdot 5$$

##### Algebra

$$a(b + c) = ab + ac$$

$$(b + c)a = ba + ca$$

$$a(b - c) = ab - ac$$

$$(b - c)a = ba - ca$$

16.  $2(11) + 2(4) = 2(11 + 4)$

17.  $(3 + 4) + 5 = 3 + (4 + 5)$

18.  $2n + p = p + 2n$

19.  $(3 + m)(-7) = -21 - 7m$

## Section 2

---

Solve each equation.

1.  $a - 10 = 12$

2.  $-3x = 27$

3.  $6n + 3 = 21$

4.  $10 = \frac{m}{5} + 2$

5.  $-b + 2 = -\frac{1}{2}$

6.  $7g - 4 = 10$

Simplify each expression.

7.  $6x + 4 - 3x$

8.  $7(h - 5)$

9.  $13q + 91 - 13q$

10.  $-(8z + 2z - 1)$

Solve each equation.

11.  $16 = -(2 - 2b)$

12.  $0 = 1.5(7 - k) - k$

13.  $123 = 9y + 4 - 7y$

14.  $4(2.2d - 1) - 0.8d = 23$

15.  $2(x + 3) = 2x + 2 + 4$

16.  $4y - (y - 3) = 3(y + 4)$

### Section 3

---

Write the fraction in simplest form.

1.  $\frac{20}{25}$

2.  $\frac{7}{77}$

3.  $\frac{-9}{42}$

4.  $\frac{36}{63}$

Write each decimal as a mixed number or fraction in simplest form.

5. 0.45

6. 12.2

7.  $0.\overline{8}$

Compare. Write  $<$ ,  $=$ , or  $>$ .

8.  $\frac{25}{36}$  \_\_\_\_\_  $0.6\overline{94}$

9. 2.7 \_\_\_\_\_  $\frac{10}{3}$

10. -4.3 \_\_\_\_\_ -4.2

11.  $\frac{-17}{5}$  \_\_\_\_\_ -15.9

Simplify. Write each answer in simplest form.

12.  $-\frac{3}{8} + \frac{7}{8}$

13.  $3\frac{1}{2} - (-\frac{11}{14})$

14.  $\frac{-3}{7} \cdot \frac{5}{9}$

15.  $-4\frac{5}{24} \cdot (-6)$

16.  $-2\frac{1}{2} \div 6$

17.  $-25 \div \frac{5}{7}$

Simplify or evaluate each expression.

18.  $-3^2 - (-8)$

19.  $(-2)^3 + 4 \div 2 - 3$

20.  $(3 - 4)^5 - 17 + 1^{12}$

21.  $2r^2 + 6r + 3$  for  $r = -6$

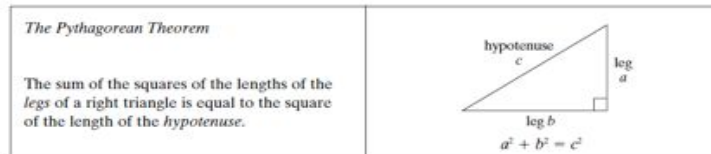
22.  $-c^3 + 2c^2 - c + 8$  for  $c = 3$

## Section 4

Identify each number as *rational* or *irrational*.

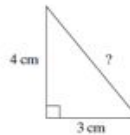
1. 1.020304      2.  $\sqrt{25}$       3.  $\sqrt{26}$       4.  $5.\overline{63663}$

Use the Pythagorean theorem to find the hypotenuse of the right triangle from the given lengths of the two legs.



*Example 1:* Find the length of the hypotenuse.

$$\begin{aligned}a^2 + b^2 &= c^2 \\3^2 + 4^2 &= c^2 \\9 + 16 &= c^2 \\25 &= c^2 \\\sqrt{25} &= c \\5 &= c\end{aligned}$$



5. 3,4      6. 10,24      7.  $\sqrt{2}$ ,  $\sqrt{7}$

Given leg  $l$  and hypotenuse  $h$  determine the length of the missing leg of the right triangle.

8.  $l = 7$ ,  $h = 25$       9.  $l = 7.5$ ,  $h = 12.5$

**Multiply. Write your answer in scientific notation.**

10.  $(1 \times 10^3)(2.6 \times 10^8)$       11.  $(7 \times 10^2)(8 \times 10^{10})$

**Simplify each expression.**

12.  $(-4x^2)(3x^4)$       13.  $4x^2(2x - 7)$

**Write each expression using a single exponent.**

14.  $\frac{4^7}{4^5}$       15.  $\frac{8.1^{15}}{8.1^{12}}$

**Write each number in scientific notation.**

16. 400,000,000      17. 8,750,000