

Name: Key
Algebra 1Date: _____
Band: _____

Foundations of Algebra Study Guide

LT#1: Simplify expressions involving exponents.

Simplify each expression.

1. 9^2	2. 5^3	3. $(\frac{1}{6})^2$	4. $7^2 \div 5$	5. $(2^4 - 6)^2$	6. $(3^3 - 4) + 5^2$
$9 \cdot 9$	$5 \cdot 5 \cdot 5$	$\frac{1}{6} \cdot \frac{1}{6}$	$49 \div 5$	$(16 - 6)^2$	$(27 - 4) + 25$
$\boxed{81}$	$25 \cdot 5$	$\frac{1}{36}$	$\frac{49}{5}$ or $9\frac{4}{5}$	10^2	$23 + 25$
	$\boxed{125}$		or $\boxed{9.8}$	$10 \cdot 10$	$\boxed{48}$
				$\boxed{100}$	

7. A car travels at 205 mi/h. How far does the car travel in 3h?

$$\frac{205 \text{ mi}}{h} \cdot 3h = \boxed{615 \text{ mi}}$$

LT#2: Use order of operations to evaluate expressions.1. A student studies with a tutor for 1 hour each week and studies alone for h hours each week. What is an expression for the total hours spent studying each week? Evaluate the expression for $h = 5$.

expression: $\boxed{1 + h}$

$h = 5$

$1 + 5 = \boxed{6}$

Evaluate each expression for $c = 3$ and $d = 5$.

1. $d^3 \div 15$	2. $(2 + d)^2 - 3^2$	3. $cd^2 + 4$	4. $(3c^2 - 3d)^2 - 21$
$(5)^3 \div 15$	$(2 + 5)^2 - 3^2$	$(3)(5)^2 + 4$	$(3(3)^2 - 3(5))^2 - 21$
$125 \div 15$	$(7)^2 - 9$	$3(25) + 4$	$(3(9) - 15)^2 - 21$
$\frac{25}{3}$ or $8\frac{1}{3}$	$49 - 9$	$75 + 4$	$(27 - 15)^2 - 21$
	$\boxed{40}$	$\boxed{79}$	$(12)^2 - 21$
			$144 - 21$
			$\boxed{123}$

LT#3: Classify, graph, and compare real numbers.

Tell whether each number is rational or irrational.

1. -5.422

2. $\sqrt{7}$

3. π

4. $-\frac{1}{2}$

5. $\sqrt{\frac{2}{3}}$

6. $0.\overline{57}$

rational

irrational

irrational

rational

irrational

rational

Name the subset(s) of the real numbers to which each number belongs.

7. -17

8. $\frac{13}{62}$

9. $\sqrt{94}$

10. $\sqrt{100} = 10$

11. 4.288

12. $1\frac{2}{3}$

integer
rational

rational

irrational

natural
whole
integer
rational

rational

rational

Order the numbers in each from least to greatest.

13. $-1\frac{2}{3}, 1.6, -1\frac{4}{5}$
↓ ↓
 $-1.\overline{6}$ -1.8

$$-1\frac{4}{5} < -1\frac{2}{3} < 1.6$$

14. $\frac{7}{9}, -0.8, \sqrt{3}$
↓ ↓
 $.\overline{7}$ $1.732\dots$

$$-0.8 < \sqrt{3} < \frac{7}{9}$$

LT#4: Identify and use properties of real numbers.

1. Use an identity property to simplify $-\frac{7ab}{a}$.

$$-\frac{7\cancel{a}b}{\cancel{a}} = -7b$$

Simplify each expression.

2. $-8 + 9w + (-23)$

$$-31 + 9w$$

3. $\frac{6}{5} \cdot (-10 \cdot 8)$

$$\frac{6}{5} \cdot (-80)$$

$$-96$$

4. $(\frac{4}{3} \cdot 0) \cdot (-20)$

$$(0) \cdot (-20)$$

$$0$$

5. $53 + (-12) + (-4t)$

$$41 - 4t$$

6. $\frac{6+3}{9} = \frac{9}{9} = 1$

Tell whether the expression in each pair are equivalent.

7. $(5-2)c$ and $c \cdot 3$

$$5c - 2c \quad 3c$$

$$\text{Not equivalent}$$

8. $41 + z + 9$ and $41 \cdot z \cdot 9$

$$\text{not equivalent}$$

9. $\frac{81xy}{3x}$ and $9xy$

$$27y$$

$$\text{not equivalent}$$

10. $\frac{11t}{(5+7-11)}$ and t

$$\frac{11t}{1}$$

$$\text{not equivalent}$$

LT#5: Find sums and differences of real numbers.

1. Cave explorers descend to a site that has an elevation of -1.3 km. (Negative elevation means below sea level). The explorers descend another 0.6 km before they stop to rest. What the elevation at their resting point?

$$-1.3 \text{ km} - 0.6 \text{ km} = \boxed{-1.9 \text{ km}}$$

Find each sum.

2. $1 + 4$

$$\boxed{5}$$

3. $3 + (-8)$

$$\boxed{-5}$$

4. $-2 + (-7)$

$$\boxed{-9}$$

Simplify each expression.

5. $-5.6 + 7.4$

$$\boxed{1.8}$$

6. $-13 + (-6)$

$$\boxed{-19}$$

7. $-9 - (-12)$

$$-9 + 12$$

$$\boxed{3}$$

Evaluate each expression for $p = 5$ and $q = -3$.

8. $-3q + 7$

$$-3(-3) + 7$$

$$9 + 7$$

$$\boxed{16}$$

9. $q - 8$

$$-3 - 8$$

$$\boxed{-11}$$

10. $5p - 6$

$$5(5) - 6$$

$$25 - 6$$

$$\boxed{19}$$

11. $7q - 7p$

$$7(-3) - 7(-3)$$

$$-21 - (-21)$$

$$-21 + 21$$

$$\boxed{0}$$

LT#6: Find products and quotients of real numbers.

Simplify each expression.

1. -12^2

$$\boxed{-144}$$

2. $-5(-8)$

$$\boxed{40}$$

3. $4.5 \div (-1.5)$

$$\boxed{-3}$$

4. $(-2)(-2)(-2)$

$$4(-2)$$

$$\boxed{-8}$$

5. $-54 \div (-0.9)$

$$\boxed{60}$$

Evaluate each expression or $p = 5$ and $q = -3$.

6. $-(4q)$

$$-(4 \cdot -3)$$

$$-(-12)$$

$$\boxed{12}$$

7. $-(2p)^2$

$$-(2 \cdot 5)^2$$

$$-(10)^2$$

$$-100$$

$$\boxed{-100}$$

8. $(pq)^2$

$$(5 \cdot -3)^2$$

$$(-15)^2$$

$$(5 \cdot -3)(-15)$$

$$\boxed{225}$$

9. $2q \div 4p$

$$2(-3) \div 4(5)$$

$$-6 \div 20$$

$$\boxed{-\frac{3}{10} \text{ or } -0.3}$$

LT#7: Use the Distributive Property to simplify expressions.

1. Simplify $7t + (3 - 4t)$

$$7t + 3 - 4t$$

$$\boxed{3t + 3}$$

Simplify each expression.

2. $5(2x - 3)$

$$5 \cdot 2x - 5 \cdot 3$$

$$\boxed{10x - 15}$$

3. $-2(7 - a)$

$$-2(7) - 2(-a)$$

$$-14 - (-2a)$$

$$\boxed{-14 + 2a}$$

4. $(-j + 8)\frac{1}{2}$

$$-\frac{1}{2} \cdot -j + 8 \cdot \frac{1}{2}$$

$$\boxed{-\frac{1}{2}j + 4}$$

5. $3v^2 - 2v^2$

$$\boxed{v^2}$$

5. $2(3y - 3)$

$$2 \cdot 3y - 2 \cdot 3$$

$$\boxed{6y - 6}$$

6. $(6y - 1)\frac{1}{4}$

$$\frac{1}{4} \cdot 6y - \frac{1}{4} \cdot 1$$

$$\boxed{\frac{3}{2}y - \frac{1}{4}}$$

7. $(24 - 24y)\frac{1}{4}$

$$24 \cdot \frac{1}{4} - 24y \cdot \frac{1}{4}$$

$$\boxed{6 - 6y}$$

8. $6y - 3 - 5y$

$$\boxed{y - 3}$$

9. $\frac{1}{3}y + 6 - \frac{2}{3}y$

$$\boxed{-\frac{1}{3}y + 6}$$

10. $-ab^2 - ab^2$

$$\boxed{-2ab^2}$$

11. All 95 members of the jazz club pay \$30 each to go see a jazz performance. What is the total cost of tickets?

$$95(30) = \boxed{\$2850}$$

12. Are $8x^2y$ and $-5yx^2$ like terms? Explain.

Yes; because they have the same variable factors x^2y (remember multiplication is commutative

$$\text{so } x^2 \cdot y = y \cdot x^2 \Rightarrow x^2y = yx^2)$$