Holt Algebra 1: 1.1 Variables and Expressions

variable: _____

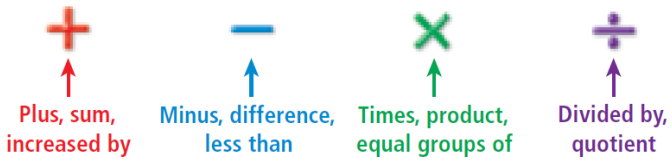
constant: _____

numerical expression: _____

5 + 4 8 • 2 _____ _____

algebraic expression: _____

15 – x 1 + y ÷ 15 _____ _____



Example 1: Translating from Algebra to Words

Give two ways to write each algebraic expression in words.

A. $x - 5$

B. $j \div 10$

C. $3 \cdot k$

D. $13 + w$

Example 2: Translating from Words to Algebra

A. John types 62 words per minute. Write an expression for the number of words he types in *m* minutes.

B. Roberto is 4 years older than Emily, who is *y* years old. Write an expression for Roberto's age.

C. Joe runs a mile in 6 minutes. Write an expression for the number of miles that Joe runs in *m* minutes.

D. Angela is *a* inches shorter than Georgia, who is 59 inches tall. Write an expression for Angela's height.

evaluate: _____

Example 3: Evaluating Algebraic Expressions

Evaluate each expression for $x = 4$, $y = 2$, and $z = 10$

A. $x + y$

B. $\frac{z}{y}$

C. xy

D. $z - x$

Holt Algebra 1: 1.2 Adding and Subtracting Real Numbers

When using a number line, it is important to remember the following rules:

If the symbols are the same, _____ Ex: + + means + – – means +

If the symbols are different, _____ Ex: + – means – – + means –

When subtracting two numbers, take the sign of the _____ number.

1. If two symbols are next to each other in the expression, _____

Ex: -9 + (-2) 4 – (-5)

2. Start at _____

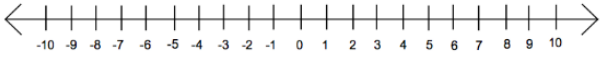
3. The _____ _____ means move to the left

4. The _____ _____ means move to the right

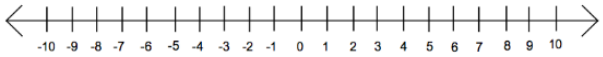
Example 1: Adding and Subtracting Numbers on a Number Line

Add or subtract using a number line.

A. 4 – 7 B. 3 – (–2)



C. –2 – (–7) D. – 1 – 6



Example 2: Adding Real Numbers

A. $-7 + 10 =$

B. $-11 + 5 =$

C. $8 - (+6) =$

D. $-4 + (-12) =$

E. $5 + (+6) =$

F. $5 - (-6) =$

G. $-2 - (-10) =$

H. $3 + (-9) =$

I. $8 - 15 =$

J. $-16 - (-4) =$

Example 3: Evaluating Expressions for a Given Value of the Variable

Evaluate.

A. $x + 8$ for $x = -14$

B. $y - 20$ for $y = -2$

C. $3 + k$ for $k = 12$

D. $h + (-9)$ for $h = -6$

E. $13 - g$ for $g = 30$

F. $-3 - f$ for $f = -2$

HOLT ALGEBRA 1: 1.3 MULTIPLYING AND DIVIDING REAL NUMBERS

When you multiply or divide numbers with the same sign, the answer is _____

Example: $10 \cdot 5 =$ _____ $-12 \div -2 =$ _____

When you multiply or divide numbers with different signs, the answer is _____

Example: $6(-3) =$ _____ $-18 \div 2 =$ _____

Example 1: Multiplying and Dividing Signed Numbers

Find the value of each expression.

A. $-11 \cdot 5$ B. $6y$ for $y = -1.5$ C. $-80 \div -10$

D. $11 \cdot -5$ E. $\frac{w}{4}$ for $w = 12$ F. $-20b$ for $b = -\frac{3}{4}$

*Flip ONLY the second fraction, then multiply. Worry about the negative symbol at the end.

Example 2: Dividing by Fractions

Divide.

A. $\frac{3}{7} \div \left(-\frac{4}{5}\right)$ B. $-\frac{10}{3} \div 20$

C. $-\frac{5}{4} \div \left(-\frac{15}{8}\right)$ D. $2 \div 1\frac{7}{8}$

- Any number multiplied by 0 is 0

- Zero divided by any number is 0 (zero on top or first)

- Any number divided by zero is UNDEFINED (zero on bottom or second)

Example: Multiplying and Dividing with Zero

Multiply or divide if possible. If not possible, write UNDEFINED.

A. $-7 \cdot 0$

B. $\frac{0}{g}$

C. $35 \div 0$

D. $\frac{g}{0}$

E. $0 \cdot 15$

F. $0 / -4$

Holt Algebra 1: 1.4 Powers and Exponents

power: _____

Examples:

Power: _____ 4^3

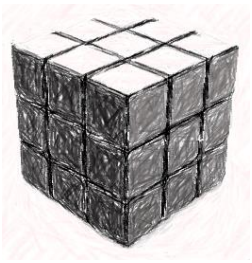
Base: _____ 4^3

Exponent: _____ 4^3

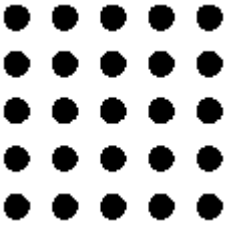
Two dimensional figures can be described by using an exponent of _____

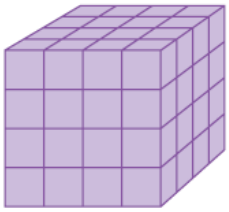
Three dimensional figures can be described by using an exponent of _____

Example 1: Writing Powers for Geometric Models

A. 

B. 

C. 

D. 

Reading Exponents			
Words	Multiplication	Power	Value

If there are no parentheses:

If the base is positive, the answer is _____.

If the base is negative, the answer is _____.

If there are parentheses:

If the base is positive, the answer is _____.

If the base is negative and the exponent is EVEN, the answer is _____.

If the base is negative and the exponent is ODD, the answer is _____.

If you have a power where the base is a fraction

_____.

Example 2: Evaluating Powers

Simplify each expression.

A. $(-4)^2$

B. 6^3

C. -2^5

D. $(-2)^5$

E. $(-1)^6$

F. -3^4

G. $\left(\frac{2}{7}\right)^2$

H. $(-3)^4$

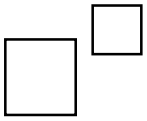
I. $\left(\frac{3}{8}\right)^3$

J. $\frac{-2^4}{(-3)^3}$

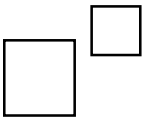
Example 3: Writing Powers

Write each number as a power of the given base.

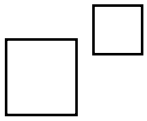
A. 8; base of 2



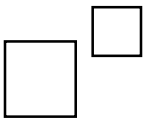
B. -36, base of -6



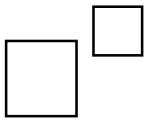
C. - 125; base of -5



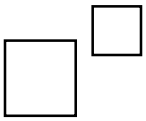
D. 16; base of -2



E. 81; base of -3



F. 81; base of 9



HOLT ALGEBRA 1: 1.5 SQUARE ROOTS AND REAL NUMBERS

square root: _____

square root symbol:

$4 \cdot 4 = 4^2 = 16 \longrightarrow \sqrt{16} = 4$ ← Positive square root of 16

$(-4)(-4) = (-4)^2 = 16 \rightarrow -\sqrt{16} = -4$ ← Negative square root of 16

perfect square: _____

0	1	4	9	16	25	36	49	64	81	100

Example 1: Finding Square Roots of Perfect Squares

Find each square root.

A. $\sqrt{64}$ B. $\sqrt{25}$ C. $-\sqrt{1}$

D. $\sqrt{9}$ E. $-\sqrt{64}$ F. $-\sqrt{100}$

We can classify numbers by group names:

Natural Numbers: _____

Wh**O**le Numbers: _____

Integers: _____

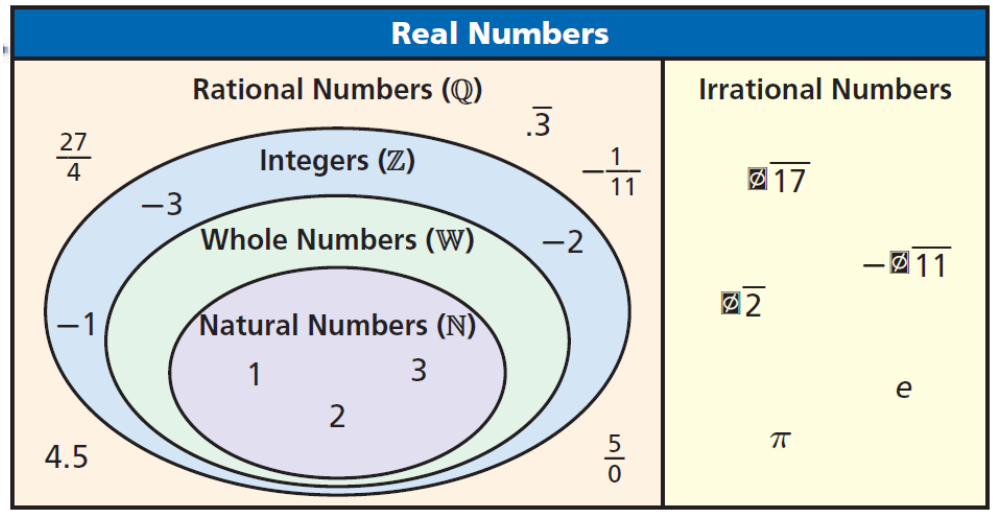
Rational Numbers: _____

***Terminating Decimals: _____

***Repeating Decimals: _____

Irrational Numbers: _____

Real Numbers: _____



When classifying real numbers, it helps to change them into decimals.

_____

Worry about classify them as terminating decimals or repeating decimals at the very end.

Example 2: Classifying Real Numbers

Write all classifications that apply to each number. Use your calculator to help.

A. $\frac{7}{11}$

B. -15

C. 6

D. $\sqrt{20}$

E. 4.52

F. 0

HOLT ALGEBRA 1: 1.6 ORDER OF OPERATIONS

order of operations: _____

Order of Operations	
First:	
Second:	
Third:	
Fourth:	

Example 1: Simplifying Numerical Expressions

A. $\frac{1}{2} \times 8 + 6 \div 2$

B. $-20 \div [15 - (8 + 2)]$

C. $4.2 - 3^2 \bullet 2$

D. $5(4 - 2 \times 10)$

E. $(2 - 6)^2 - 10$

F. $7.2 - 3 - 6 + 11$

Example 2: Evaluating Algebraic Expressions

Evaluate each expression for the given values of *x*. The **first step** is to plug the number into the variable.

A. $13 - x + 3(6)$ for $x = 2$

B. $(x)^2 + 5 \div 5$ for $x = 10$

C. $14 - 8 + 11 - (x)$ for $x = -7$

D. $-8 - 10 + (x + 2)^2$ for $x = -2$

If you see a fraction bar, first evaluate the _____, then evaluate the _____.

The absolute value symbol acts as a grouping symbol as well. Treat them as you would parentheses.

Example 3: Simplifying Expressions with Other Grouping Symbols

Simplify each expression.

A. $\frac{3^2-6}{6(5-4)}$

B. $|11-9| + 2^3$

C. $\frac{8-2+7}{-4-(-12)}$

D. $17 - |3 - 14| + 1$

Example 4: Translating from Words to Math

A. one third times the sum of 8 and 2

B. the absolute value of the quotient of 6 and 3

C. the product of 3 and 11 divided by k

D. the square root of the difference of 11 and 9

HOLT ALGEBRA 1: 1.7 SIMPLIFYING EXPRESSIONS

communicative property: _____

_____

associative property: _____

_____

Example 1: Using the Commutative and Associative Properties

Simplify each expression.

A. $4 \cdot 9 \cdot 25$

B. $4\frac{3}{5} + 6 + 3\frac{2}{5}$

C. $470 + 92 + 30 + 8$

D. $\frac{1}{2} \cdot 5 \cdot 12$

Distributive Property

WORDS	NUMBERS	ALGEBRA
You can multiply a number by a sum or multiply by each number in the sum and then add. The result is the same.	$3(4 + 8) = 3(4) + 3(8)$	$a(b + c) = ab + ac$

Example 2: Using the Distributive Property with Mental Math

Write each product using the Distributive Property. Then simplify.

A. 12(104)

B. 5(98)

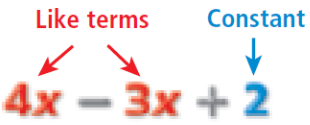
C. 8(19) D. 7(53)

terms: _____

like terms: _____

_____

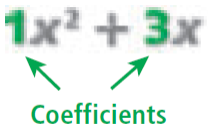
constants: _____



coefficient_____

_____

_____



Example 3: Combining Like Terms

Simplify each expression by combining like terms.

A. $5x + 2x$ B. $9 + 3 + 1$ C. $8m^2 + 8m^3$

D. $8y^2 – 2.4y^2$ E. $– 11v^5 – 6v^5$ F. $–15f + 2f^2$

*****Notes continued on next page.**

Example 4: Simplifying Algebraic Expressions

Simplify 2 (x + 6) + 3x. Justify each step with an operation or property.

	Procedure	Justification
1.	$2(x + 6) + 3x$	
2.	$2(x) + 2(6) + 3x$	Distributive Property
3.	$2x + 12 + 3x$	Multiply.
4.	$2x + 3x + 12$	Commutative Property
5.	$(2x + 3x) + 12$	Associative Property
6.	$5x + 12$	Combine like terms.

Simplify each expression.

A. 5 (x + 2) – 6

B. 11 (2 – x) + 5x

C. 8b + 7a – 6b + 3b

D. $2t^2 – 4 (t + 9)$

HOLT ALGEBRA 1: 1.8 INTRODUCTION TO FUNCTIONS

coordinate plane: _____

origin: _____

x-axis: _____

y-axis: _____

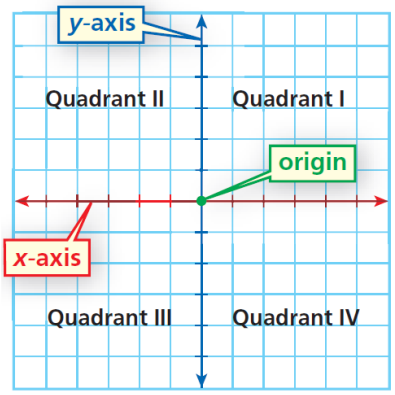
x-coordinate: _____

_____

y-coordinate: _____

_____

ordered pair: _____



When graphing points, start at the _____. First move left or right, then up or down.

FRIST NUMBER: If positive, move _____; if negative, move _____

SECOND NUMBER: If positive, move _____ ; if negative, move _____

If the first number is _____, DON'T move left or right

If the second number is _____, DON'T move up or down.

Example 1: Graphing Points in the Coordinate Plane

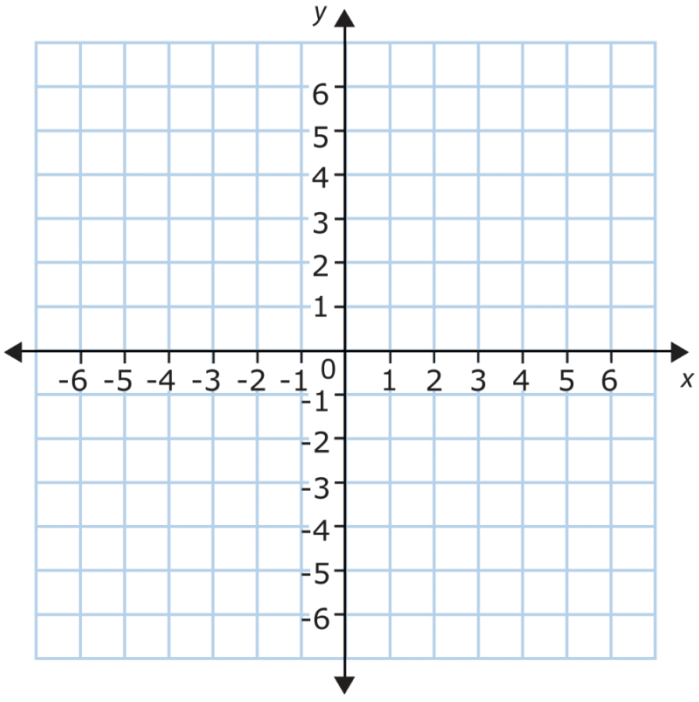
Graph each point.

A. (6, 2) B. (-3, 5)

C. (4, -1) D. (-1, -5)

E. (0, 4) F. (-2, 1)

G. (-5, -5) H. (3, 0)



The x-axis and y-axis divide the coordinate plane into _____ quadrants.

Points that are on an axis are _____

Example 2: Locating Points in the Coordinate Plane

Name the quadrant in which the point lies.

A. Q

B. R

C. P

D. U

E. S

F. T