Common Core Standards Addressed in this Resource

6.RP.3 - Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
Activity page: 20

6.NS.1 - Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.
Activity page: 23

6.NS.2 - Fluently divide multi-digit numbers using the standard algorithm.
Activity page: 15

6.NS.4 - Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.
Activity page: 16

6.NS.6 - Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
Activity pages: 34, 35

6.NS.7 - Understand ordering and absolute value of rational numbers.
Activity pages: 13, 25

6.EE.1 - Write and evaluate numerical expressions involving whole-number exponents.
Activity page: 6

6.EE.2 - Write, read, and evaluate expressions in which letters stand for numbers.
Activity pages: 8, 9, 31

6.EE.3 - Apply the properties of operations to generate equivalent expressions.
Activity page: 4

6.EE.5 - Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
Activity pages: 10, 14

6.EE.7 - Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.
Activity pages: 12, 24

7.NS.1 - Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
Activity pages: 26, 27, 28

7.NS.2 - Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
Activity pages: 29, 30

7.NS.3 - Solve real-world and mathematical problems involving the four operations with rational numbers
Activity pages: 21, 22

7.EE.4 - Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
Activity pages: 11, 32

8.EE.2 - Use square root and cube root symbols to represent solutions to equations of the form $x2 = p$ and $x3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
Activity page: 17

8.F.1 - Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
Activity pages: 37, 38

8.F.3 - Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
Activity pages: 39, 40

8.SP.1 - Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
Activity page: 36

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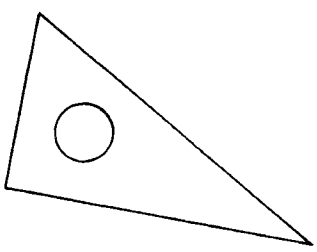
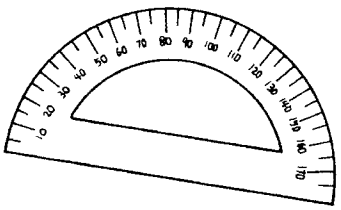
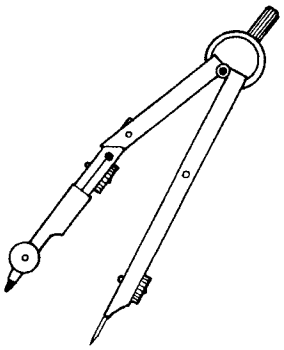
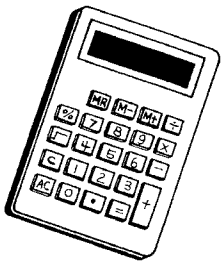




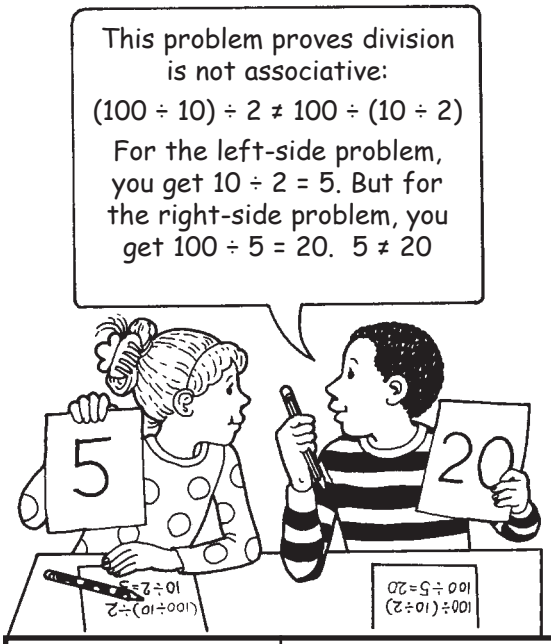




Name _____

Number Properties

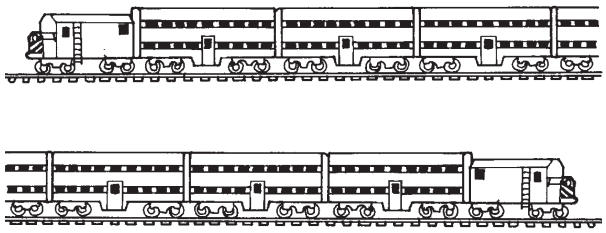
Play these tic-tac-toe games with a partner. To earn an X or O for a box, write a sample problem that supports the statement or explains the property.



The Associative Property of Multiplication $(a \cdot b) \cdot c =$ $a \cdot (b \cdot c)$	The Distributive Property $a \cdot (b + c) =$ $(a \cdot b) + (a \cdot c)$	One is *not* an identity element for division. $a \div 1 = a$, but $1 \div a \neq a$.
The Identity Element for Addition is 0. $a + 0 = a$ $0 + a = a$	Subtraction is not associative. For most numbers, $(a - b) - c \neq$ $a - (b - c)$.	The Zero Property of Multiplication $a \cdot 0 = 0$ $0 \cdot a = 0$
The Commutative Property of Addition $a + b = b + a$	The product of a number and its reciprocal (multiplicative inverse) is 1. $a \cdot \frac{1}{a} = 1$	Division is *not* commutative. For most numbers, $a \div b \neq b \div a$.

The sum of a number and its opposite (additive inverse) is 0. $a + {}^{-}a = 0$	The Identity Element for Multiplication is 1. $a \cdot 1 = a$ $1 \cdot a = a$	Zero is *not* an identity element for subtraction. $a - 0 = a$, but $0 - a \neq a$.
Division is not associative. For most numbers, $(a \div b) \div c \neq$ $a \div (b \div c)$.	The Distributive Property $a \cdot (b - c) =$ $(a \cdot b) - (a \cdot c)$	The Commutative Property of Multiplication $a \cdot b = b \cdot a$
Division by zero is undefined. $a \div 0$ *is undefined*	The Associative Property of Addition $(a + b) + c =$ $a + (b + c)$	Subtraction is *not* commutative. For most numbers, $a - b \neq b - a$.

Tip! To remember the Commutative Property, think of a commuter train. It takes people back and forth.



Tip! To remember the Associative Property, think of friends. You associate with different groups of friends.

Name _____ # Evaluating Expressions

Given $a = 3$, $b = 5$, and $c = 2$, evaluate the expression.

$$\frac{9b + c^2}{a + c^2} =$$

$$\frac{9(5) + 4}{3 + 4} =$$

$$\frac{45}{3} = 15$$

Wrong!

Right!

Given $a = 3$, $b = 5$, and $c = 2$, evaluate the expression.

$$\frac{9b + c^2}{a + c^2} =$$

$$\frac{[9(5) + 4]}{(3 + 4)} =$$

$$\frac{49}{7} = 7$$

Remember

1. Follow the order of operations (PEMDAS) when evaluating expressions.
2. A fraction bar is a grouping symbol. It indicates division.
3. When a number or letter is written next to a letter, it indicates multiplication.

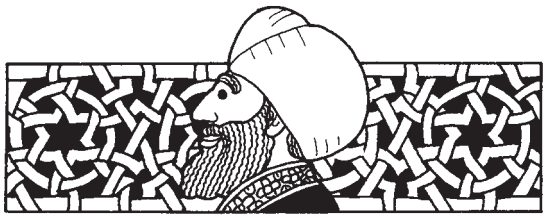
$$\frac{9b + c^2}{a + c^2} = (9b + c^2) \div (a + c^2)$$

$9b = 9(b)$ or $9 \cdot b$ or $9 \times b$

Evaluate each expression given that $a = 3$, $b = 5$, and $c = 2$.

1. $a + b =$ 8 [a]
2. $\frac{14}{c} =$ _____ [d]
3. $4b + c =$ _____ [e]
4. $b - 2c =$ _____ [f]
5. $5b =$ _____ [H]
6. $\frac{10a}{b} =$ _____ [h]
7. $2b - 2a =$ _____ [i]
8. $7ac =$ _____ [K]
9. $ab + c =$ _____ [l]
10. $a^2 =$ _____ [m]
11. $3a^2 =$ _____ [o]
12. $(3a)^2 =$ _____ [–]
13. $(a + b)(b + c) =$ _____ [r]
14. $\frac{2(a + c)}{b} =$ _____ [s]
15. $b(c^2 + a) =$ _____ [u]
16. $\frac{6bc}{a + c} =$ _____ [W]
17. $(2a - c)^2 + b =$ _____ [w]
18. $\frac{a^2c^2 + 2(b + c)}{b} =$ _____ [z]

Use the answer code to find the name of an important Arabic math scholar and the place where he studied in Baghdad in the 800s. The word *algebra* comes from the title of his math work.



a						a						;														
8	17	81	42	6	21	8	56	4	10	9	4		25	27	35	2	22	27	1	12	4	2	7	27	9	

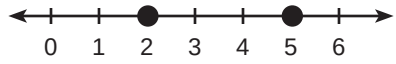
Name _____

Graphing Inequalities

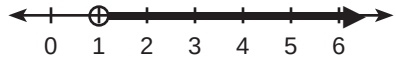
Remember

1. The arrowhead always points to the smaller value.
2. When graphing a linear inequality on a number line, use . . .
   an open dot for < or >.
   a solid dot for ≤ or ≥.

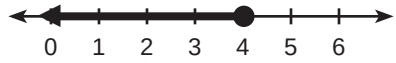
$6 - 4 < 5$
$5 > 6 - 4$



$n > 1$

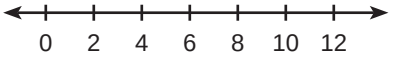
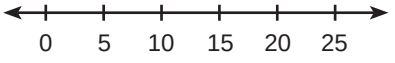
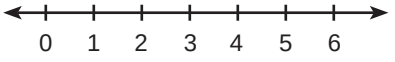
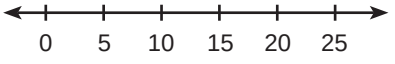
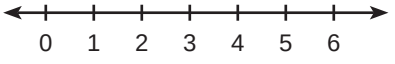
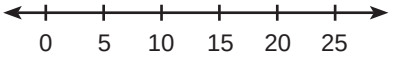
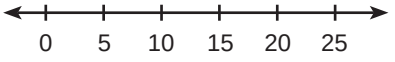
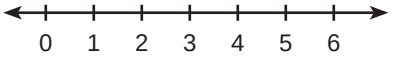
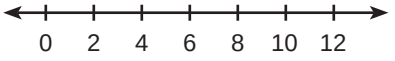
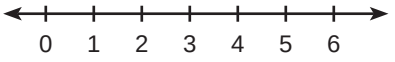
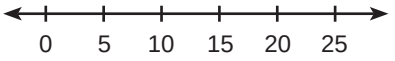
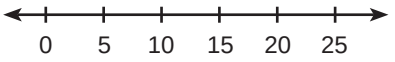


$n \leq 4$



Draw straight lines to match the descriptions and inequalities. Then graph the inequality on the corresponding number line. The uncrossed letters will spell out a message.

1. Six is greater than three. •
2. Three is less than five. •
3. Six is less than ten. •
4. Ten is less than three times five. •
5. Ten is greater than five minus five. •
6. Twenty is greater than fifteen. •
7. A number is less than or equal to five. •
8. A number is greater than three. •
9. A number is greater than or equal to eight plus two. •
10. A number is less than the product of five and two. •
11. A number is less than or equal to the sum of three and five. •
12. A number is greater than five times two. •

G	•	$6 < 10$	
M	•	$10 < 3 \cdot 5$	
A			
T	•	$6 > 3$	
R	•	$20 > 15$	
E			
H A	•	$3 < 5$	
T	•	$10 > 5 - 5$	
J	•	$n \geq 8 + 2$	
R U	•	$n > 3$	
	•	$n \leq 3 + 5$	
O L			
	•	$n \leq 5$	
E B			
	•	$n > 5 \cdot 2$	
S			
!	•	$n < 5 \cdot 2$	

Name ______________________________

Ordered Pairs

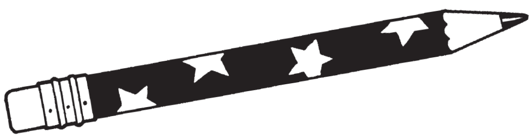
Remember

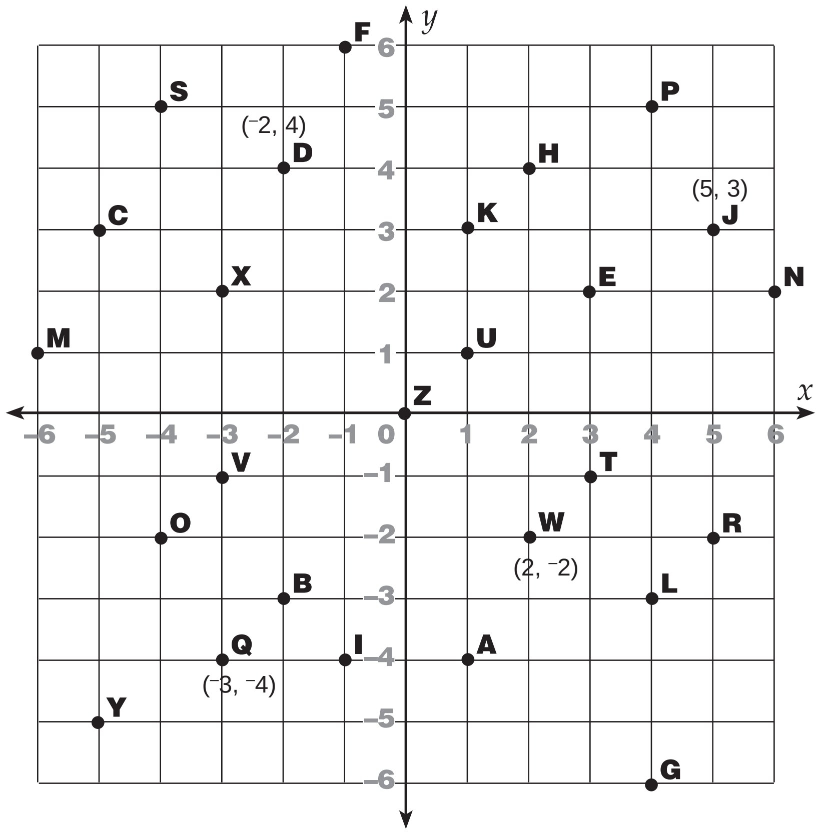
The first number in an ordered pair is the x-coordinate. It tells where a point is located along the horizontal axis.

The second number in an ordered pair is the y-coordinate. It tells where a point is located along the vertical axis.

Examples:

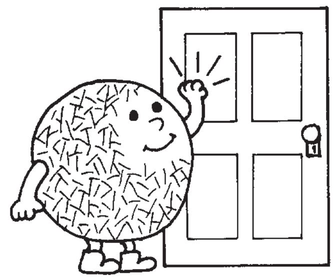
D ($^-2$, 4)	**J** (5, 3)
Q ($^-3$, $^-4$)	**W** (2, $^-2$)





1. Write the letter from the graph that corresponds to each ordered pair to decode the punch line to this knock-knock joke.

Knock-knock. *Who's there?* **Cantaloupe.** *Cantaloupe who?*



___ ___ ___ ' ___ ___ ___ ___ ___ ___

($^-5$, 3) (1, $^-4$) (6, 2) (3, $^-1$) (3, 2) (4, $^-3$) ($^-4$, $^-2$) (4, 5) (3, 2)

___ ___ ___ ___ ___ ___ ___, ___ ' ___ ___ ___ ___ ___!

(3, $^-1$) ($^-4$, $^-2$) (6, 2) ($^-1$, $^-4$) (4, $^-6$) (2, 4) (3, $^-1$) ($^-1$, $^-4$) ($^-6$, 1) ($^-2$, $^-3$) (1, 1) ($^-4$, 5) ($^-5$, $^-5$)

2. Write a favorite riddle or knock-knock joke here. Encode the punch line by writing the matching ordered pair in place of each letter. Trade and solve riddles with a partner.

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