THE LEARNING WALL

A - B

The 3 – 5 MATH Concept Learning Bricks packet is organized alphabetically, with each concept explanation (concept, question, answer, gesture, and examples) listed first and the Concept Learning Brick visual listed behind the explanation. This section contains **19** Concept Learning Bricks from the A and B sections. Please refer to The Learning Wall Introduction and Explanation at www.PEPnonprofit.org for details on how to implement these items in your classroom.

Aa

absolute value, acute angle, acute triangle, addend, adding negative integers, adding negative and positive integers, adding positive integers, addition, algebraic expression, area, area of a parallelogram, area of a triangle, array, ascending order, associative property of addition, associative property of multiplication

Bb

bar graph, base (geometry), base (number)

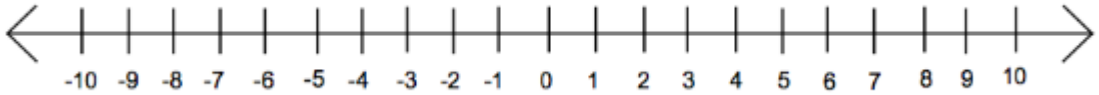
Absolute Value

Question: What is absolute value?

Answer: Absolute value of a number is the distance the number is from zero. -8 is 8 away from zero, therefore the absolute value of -8 is 8. +4 is 4 away from zero, therefore the absolute value of +4 is 4.

Gesture: Say a number (-5) and walk your fingers that many steps (5). Let your fingers do the walking.

Examples: Draw a number line on the white board with both positive and negative numbers. Plot different numbers on the number line and show their absolute value (distance from zero). You can also draw a large number line with chalk outside. Assign a student a number (-5). Have them physically walk the absolute value of that number.



absolute value

Acute Angle

Question: What is an acute angle?

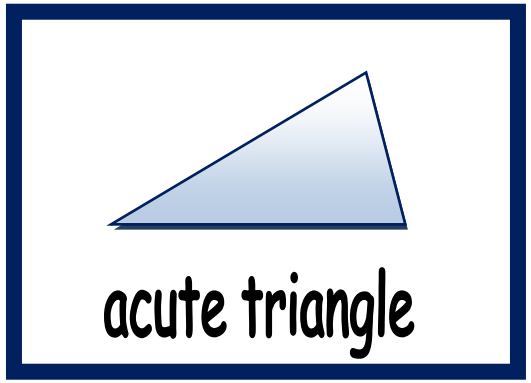
Answer: An acute angle is an angle less than 90 degrees. A cute little angle.

Gesture: Hold your arms out forming an acute angle.

Examples: Get some pipe cleaners for your students to bend in various angles. Also, write the letters MATH on the white board (or on a piece of paper for students) and have the class circle any angles they find and indicate what kind of angles they are.

acute angle

Acute Triangle

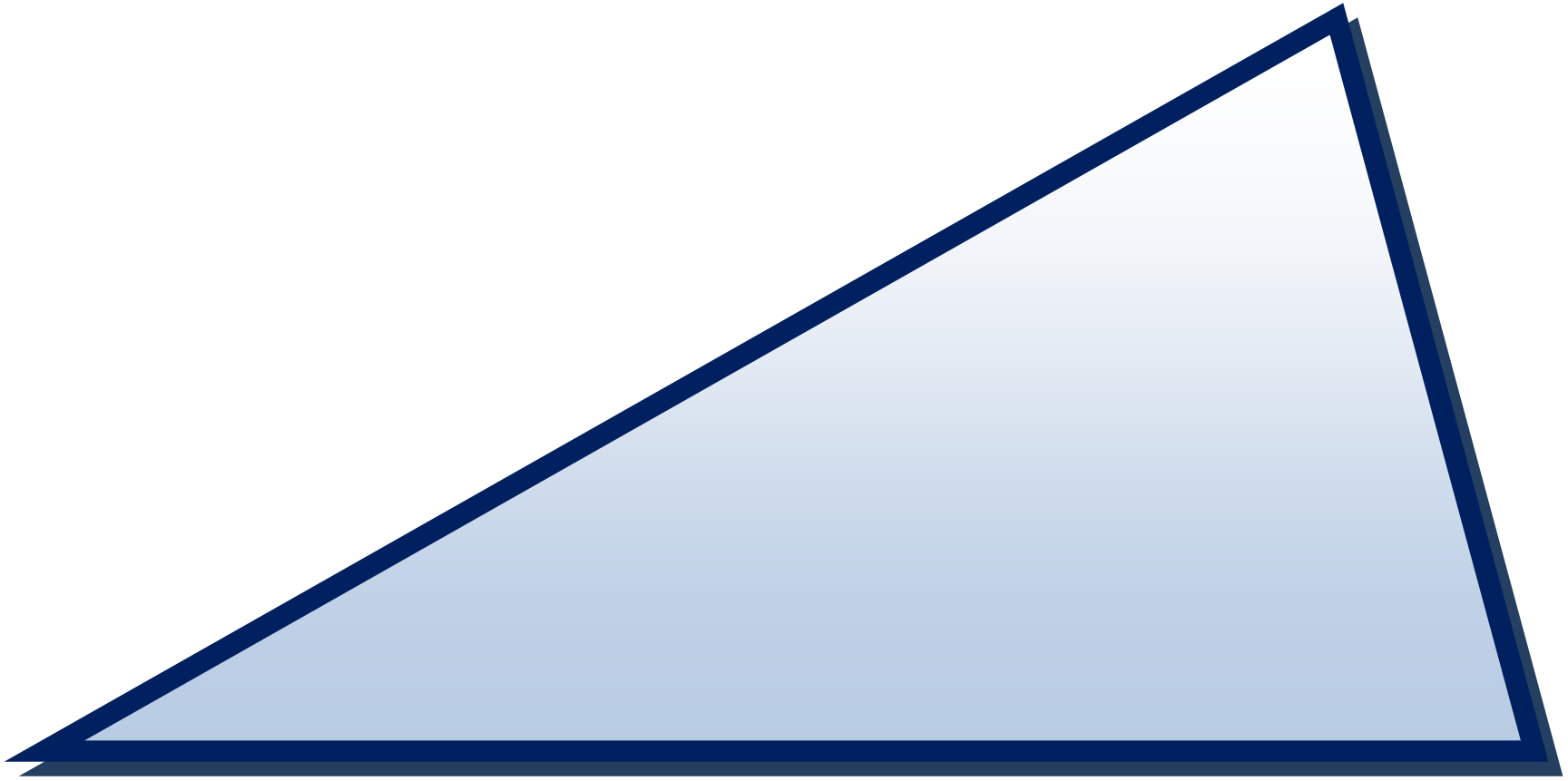


Question: What is an acute triangle?

Answer: An acute triangle is a triangle where all three internal angles are less than 90 degrees.

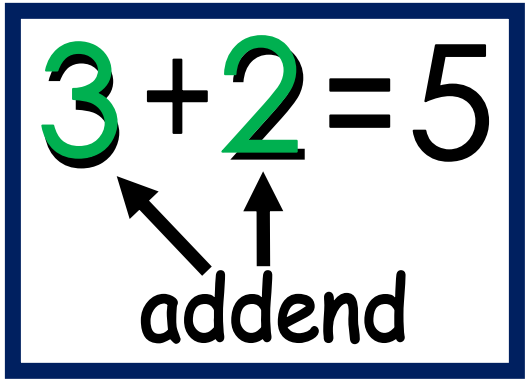
Gesture: Make an acute triangle with your fingers.

Examples: Give your students some spaghetti pasta (dry) and mini marshmallows. Let them create different triangles by connecting the pasta and marshmallows. Once they've built a few triangle models, have them sort them into appropriate groups and explain the definition of each triangle.



acute triangle

Addend

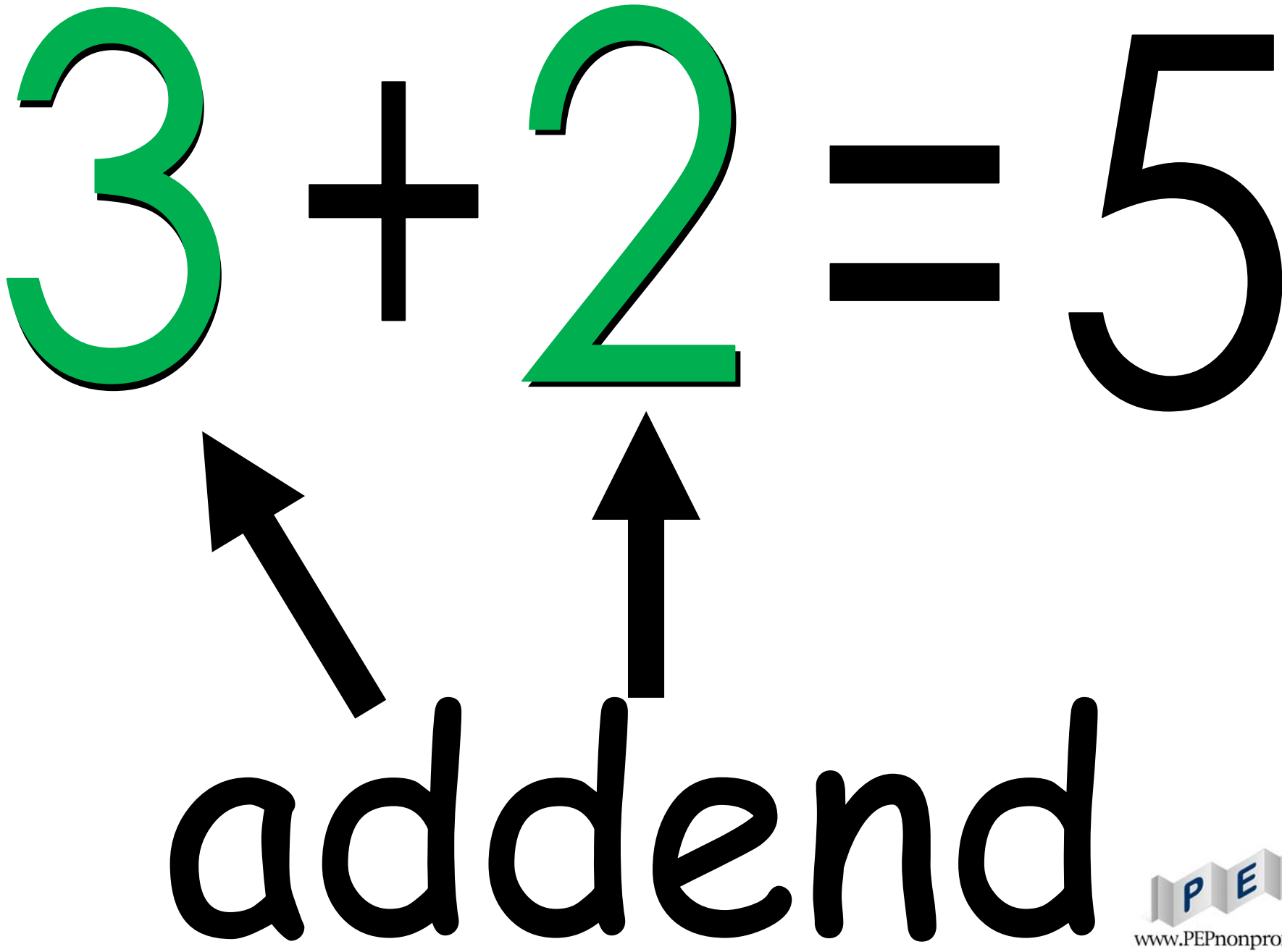


Question: What is an addend?

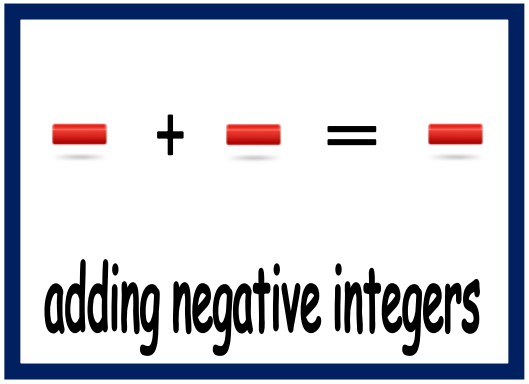
Answer: An addend is a number being added.

Gesture: Hold up 3 fingers in one hand and two fingers in the other hand. Then cross your arms like an addition symbol.

Examples: Write some math problems on the board with missing addends. Example: __ + 7 = 10 For more of a challenge (and for a better conversation) put up a few problems that have no addends. Example: __ + __ = 17. Let the students play with the different ways to get the sums for the problems with no addends.



Adding Negative Integers



Question: How do you add negative integers?

Answer: A negative integer plus a negative integer equals a negative integer.

Gesture: Hold out one arm (horizontal to the ground) to represent a negative sign. Put both arms together to form an addition sign. Hold out one arm (horizontal to the ground) to represent a negative sign. Hold out both arms parallel to each other (horizontal to the ground) to represent an equal sign. Finally hold out one arm…last time (horizontal to the ground) to represent a negative sign.

Examples: Write the following examples on the board. Give each number sentence a story: I owed my dad 2 dollars (-2) and then I borrowed 9 more dollars (-9). Now I owe him 11 dollars (-11).

Adding Negative Integers	
Integers	Sum
$^{-}2 + {}^{-}9 =$	$^{-}11$
$^{-}5 + {}^{-}8 =$	$^{-}13$
$^{-}13 + {}^{-}7 =$	$^{-}20$

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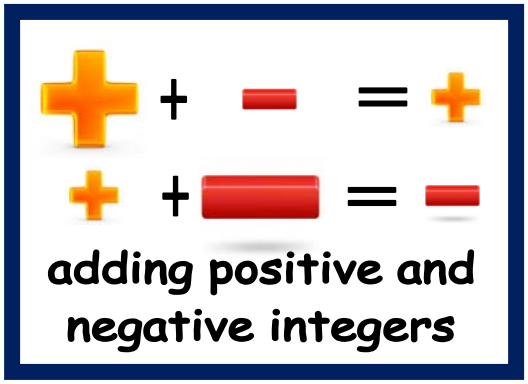
adding negative integers

Adding Negative and Positive Integers



Question: How do you add negative and positive integers?

Answer: When adding negative and positive integers, use the sign of the larger number and subtract.

Gesture: Hold out one arm (horizontal to the ground) to represent a negative sign. Put both arms together to form an addition sign. Put both arms together to represent a positive sign. Hold out both arms parallel to each other (horizontal to the ground) to represent an equal sign. Finally hold arms wide apart to show the answer is the bigger of the two signs.

Examples: Write the following examples on the board. Give each number sentence a story: I owed my dad 2 dollars (-2) but then I found a 5 dollar bill (+5). I paid my dad back his 2 dollars and still have 3 dollars for myself (+3).

Adding Negative and Positive Integers	
Integers	**Sum**
$^{-}2 + {}^{+}5 =$	$^{+}3$
$^{+}5 + {}^{-}8 =$	$^{-}3$

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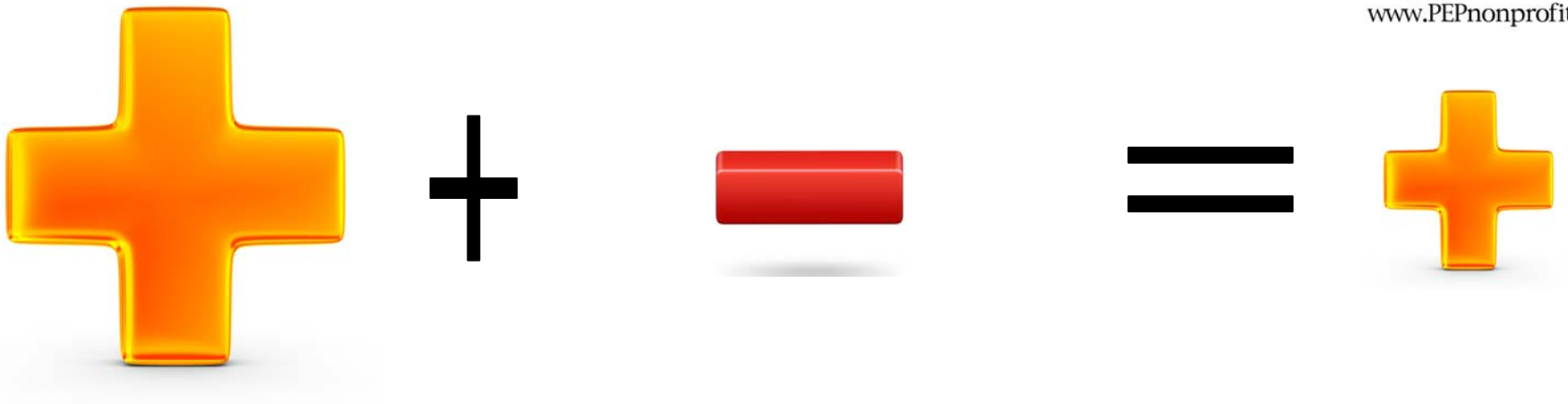
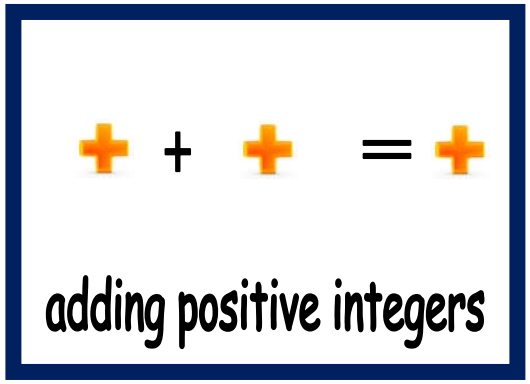


adding positive and negative integers

Adding Positive Integers



Question: How do you add positive integers?

Answer: A positive integer plus a positive integer equals a positive integer.

Gesture: Put both arms together to represent a positive sign. Put both arms together to form an addition sign. Put both arms together to represent a positive sign. Hold out both arms parallel to each other (horizontal to the ground) to represent an equal sign. Put both arms together to represent a positive sign.

Examples: Write the following examples on the board. Give each number sentence a story: I had 7 dollars (+7) saved in my bank and I earned 5 dollars (+5) for washing the car. Now I have 12 dollars (+12).

Adding Negative Integers	
Integers	Sum
$^{+}7 + {}^{+}5 =$	$^{+}12$
$^{+}3 + {}^{+}9 =$	$^{+}12$
$^{+}13 + {}^{+}7 =$	$^{+}20$

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adding positive integers

Addition

Question: What is addition?

Answer: Addition is finding the total, or sum, by combining two or more numbers.

Gesture: Put both arms together to form an addition sign.

Examples: Give students each an individual bag of colored candies, crackers, or counters. Ask how many are orange? Green? Add them together. How many orange plus green altogether? How many are purple? How many are there in all?

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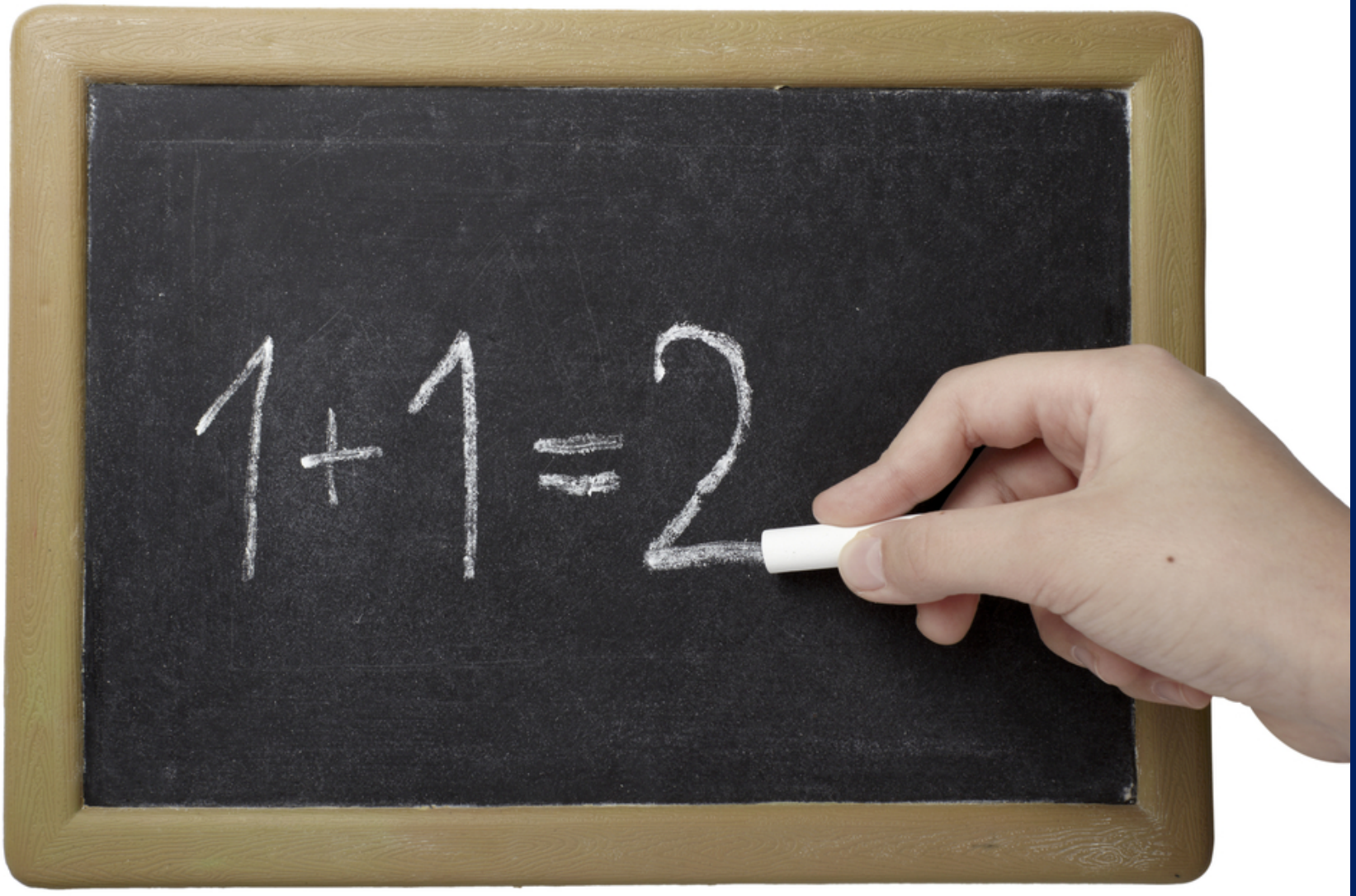
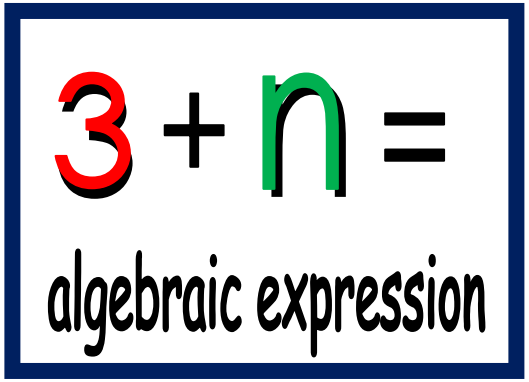


addition

Algebraic Expression



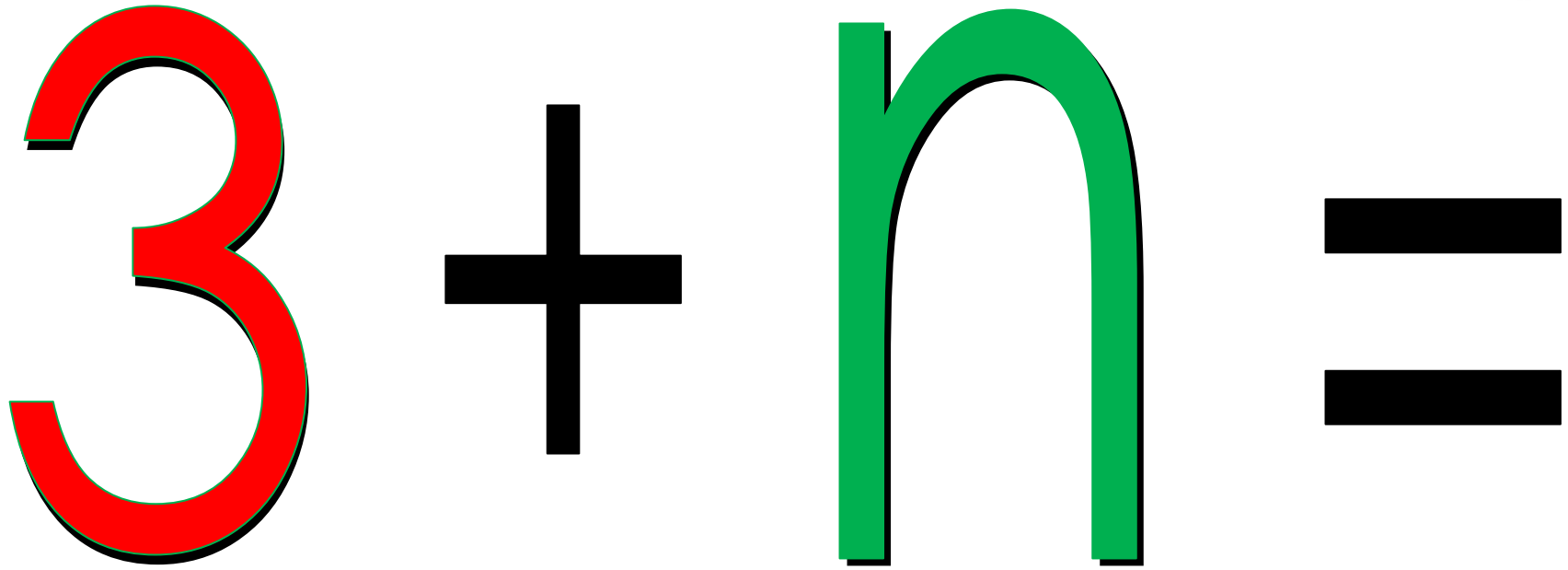
Question: What is an algebraic expression?

Answer: An algebraic expression is a combination of numbers, letters (variables), and four basic arithmetic operations (addition, subtraction, multiplication, division).

Gesture: Hold up three fingers. Put both arms together to form an addition sign. Curve your pointing finger and thumb to form the lowercase letter n.

Examples: Write the following examples on the board: 3 increased by n, 17 decreased by n, 3 times n, 60 people seated in n vans, n decreased by 3

Have students write algebraic expression for each of the examples above. When finished, have students write a statement for each of these algebraic expressions: 3 x n =, 100 – n =, n – 5 =, n ÷ 10 =, n + 8 =



algebraic expression

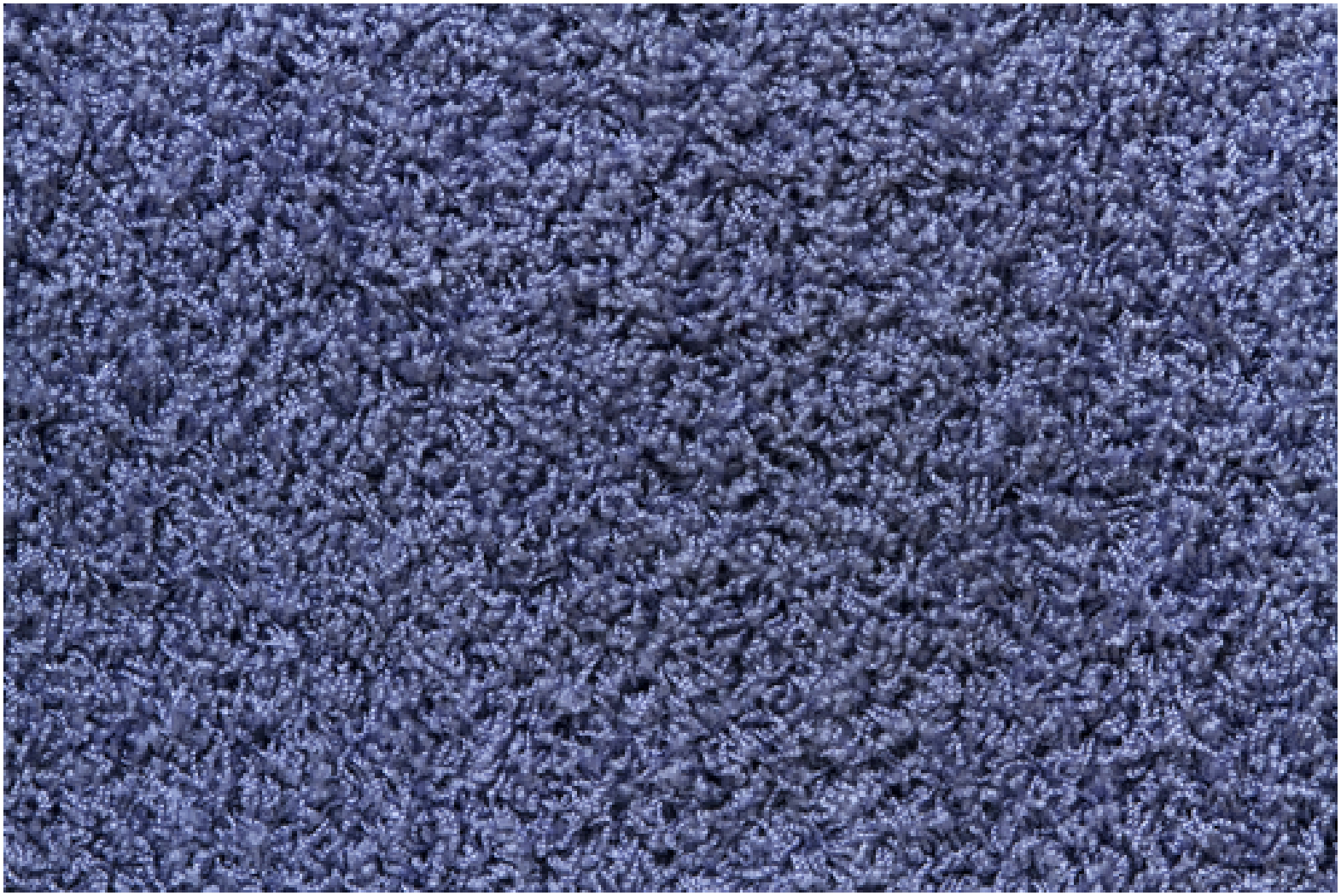
Area

Question: What is area?

Answer: Area is the inside space of a shape (like carpet in a room).
The formula to find area is L x W = Area.

Gesture: With your right hand make a letter L with your thumb and pointing finger (length). Cross both of your arms like an X (multiplication symbol). With your left hand make the letter W with three fingers.

Examples: Take students outside and have them stand on the line of a four square court. Next give each student a piece of square (12 by 12) paper with masking tape on the back. Students will lay down their pieces of paper until the entire court is covered. Next, count up the squares. The amount is the area of the court in feet squared.



area: L x W

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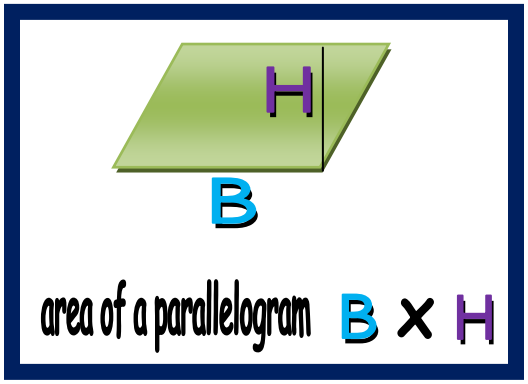
Area of a Parallelogram

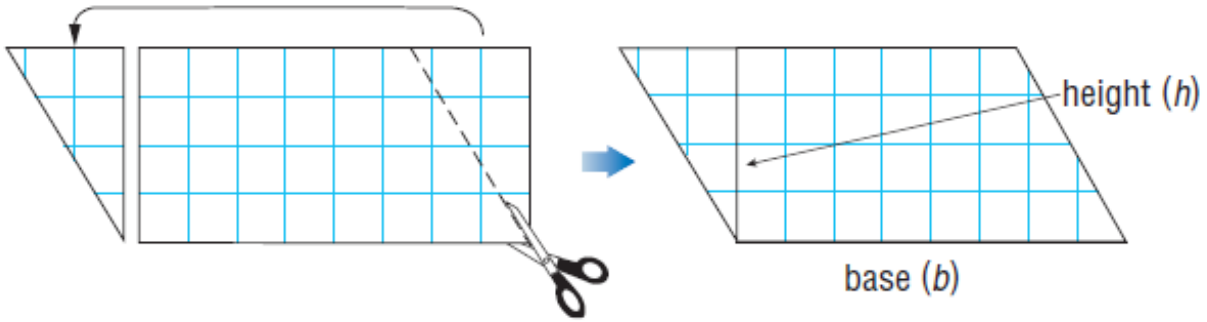


Question: How do you find the area of a parallelogram?

Answer: The formula to find the area of a parallelogram is Base x Height.

Gesture: Hold out one arm horizontally (base). Cross both of your arms like an X (multiplication symbol). Hold out one arm vertically (height).

Examples: Give students a cut out rectangle of graph paper. Cut a triangle and move it from one side of the rectangle to the other side to form a parallelogram, so students can see the connection of height and base.



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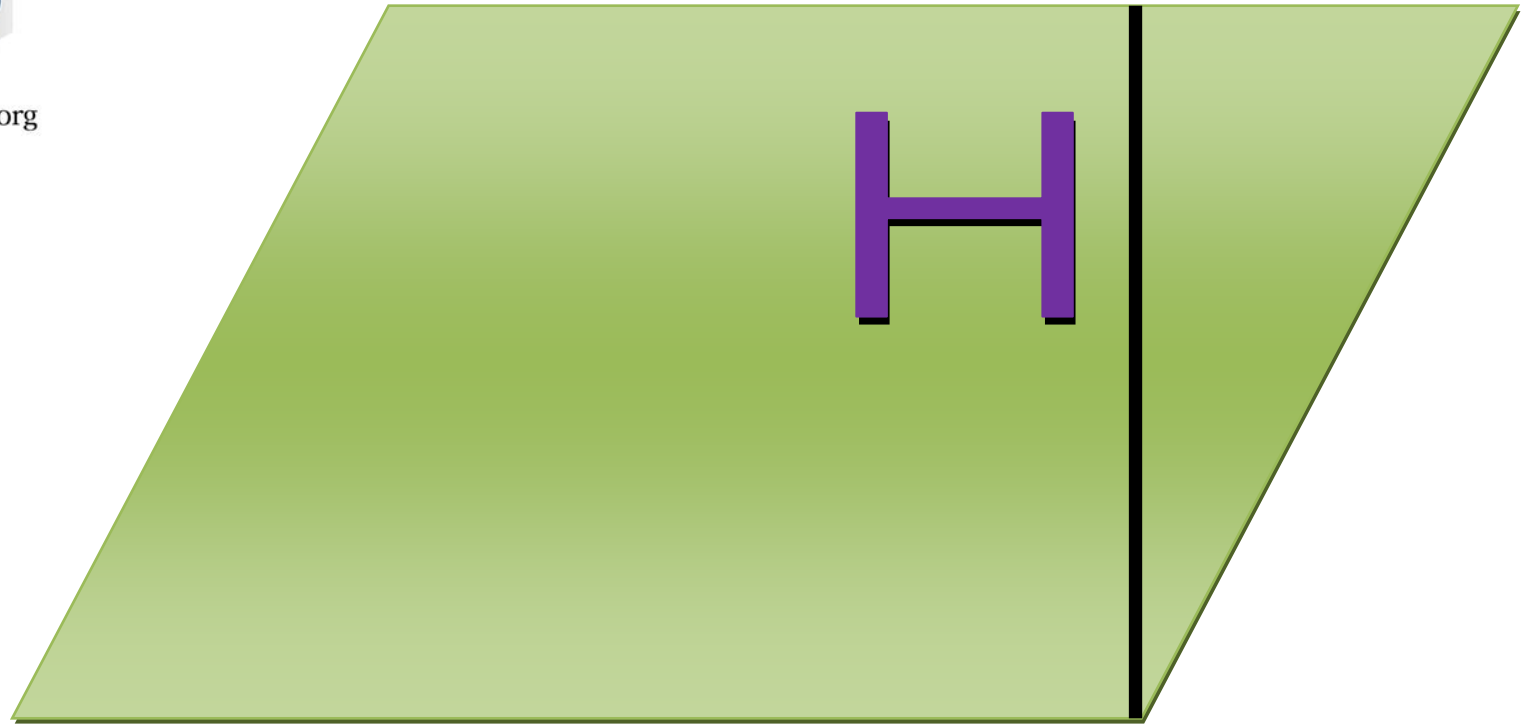
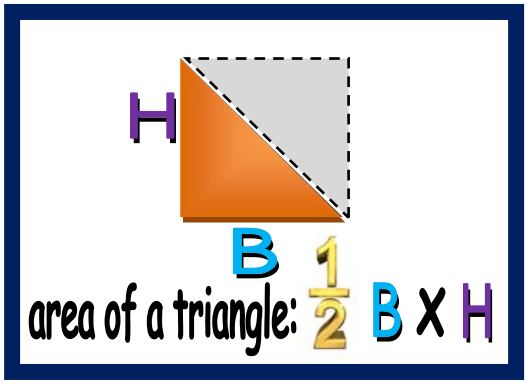


area of a parallelogram: B x H

Area of a Triangle

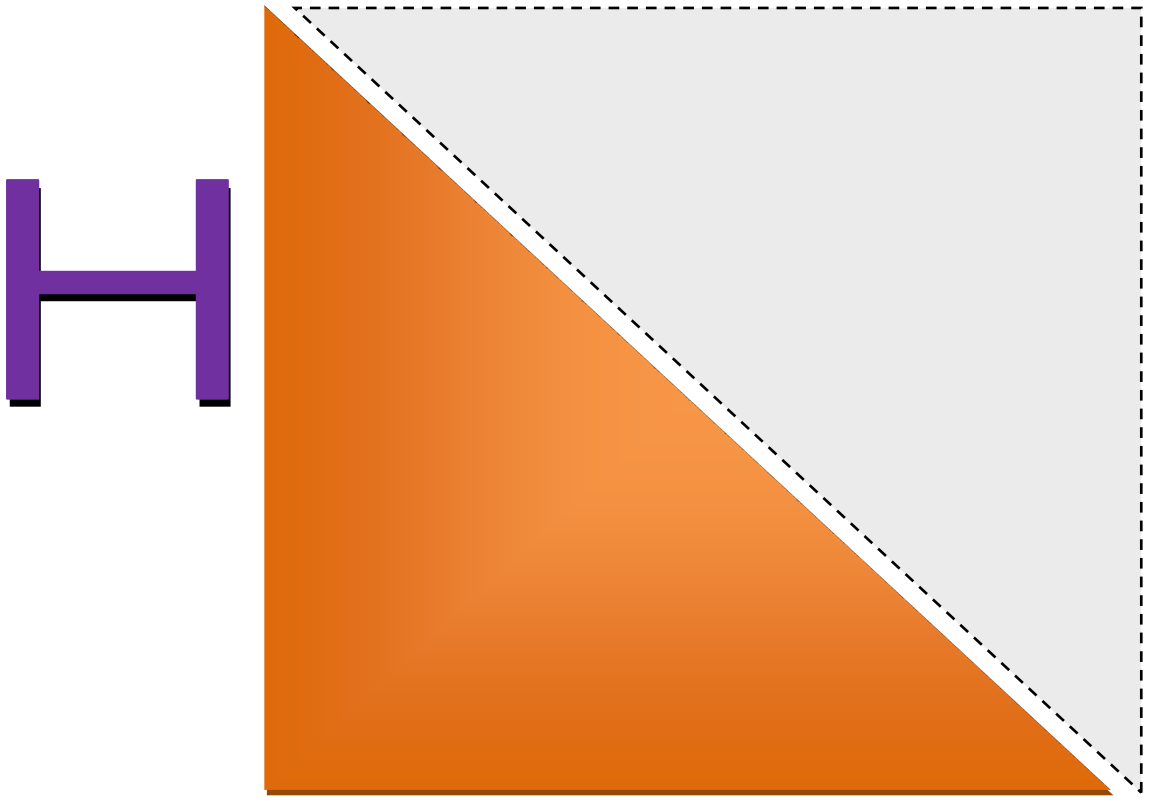


Question: How do you find the area of a triangle?

Answer: The formula to find the area of a triangle is ½ x Base x Height.

Gesture: Hold one finger up, swipe your arm, hold two fingers up (one half). Hold out one arm horizontally (base). Cross both of your arms like an X (multiplication symbol). Hold out one arm vertically (height).

Examples: Draw a few parallelograms on the board. Show the class that if you cut the parallelograms in half, you have two triangles. Have the students cut some parallelograms out of paper (graph paper is recommended). Next have students cut two triangles from the cut out parallelograms. After students see the connection, write down only the base and height of some parallelograms. B=4 H=2, B=18 H=6, B=8 H=4. Let you students find the area of a single triangle within each of the assigned Base and Height combinations by using the formula for area of a triangle.



area of a triangle: $\frac{1}{2}$ B x H

Array

Question: What is an array?

Answer: An array is a group of objects arranged in rows and columns.

Gesture: Hold your arms out in front of you (horizontally like rows). Hold your arms out in front of you (vertically like columns).

Examples: Give bags of counters to small groups or partners. Have them arrange the counters into equal groups and discuss different ways to organize the same number of objects. Remind students that the groups should have equal numbers of objects. Afterwards, have students draw their different arrangements and practice counting the groups. Finally, have students write multiplication or addition number sentences to go with each arrangement to calculate the total.

array

Ascending Order

Question: What is ascending order?

Answer: Ascending order is when numbers are arranged smallest to biggest.

Gesture: Hold your hands close together. Then spread them apart a little and move them up a bit. Then spread them apart a little more and move them up a little higher. Repeat as many times as you wish to show the number is getting larger and higher.

Examples: Have numbers written on various index cards. Give the cards to random students throughout the class. Have the students come up to the front of the classroom and organize themselves into ascending order.

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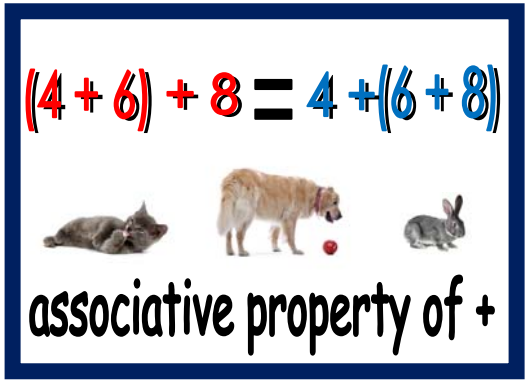
ascending order

Associative Property of Addition



Question: What is associative property?

Answer: The associative property states that the way in which addends are grouped does not change the sum.

Gesture: Waggle your finger as you state, "the way in which addends are grouped does not change the sum."

Examples: Fold a sheet of paper in half (hot dog style) and draw an animal scene that has 3 different groups on the top half. Show 2 of the groups being buddies in that scene (2 cats with 4 dogs, while 3 rabbits are by themselves). Then draw the same animal groups on the bottom section grouped differently (4 dogs with 3 rabbits, while the 2 cats are by themselves). They are grouped differently, but still have the same amount of animals. This ties the images on the on the learning brick to the idea of associative property.

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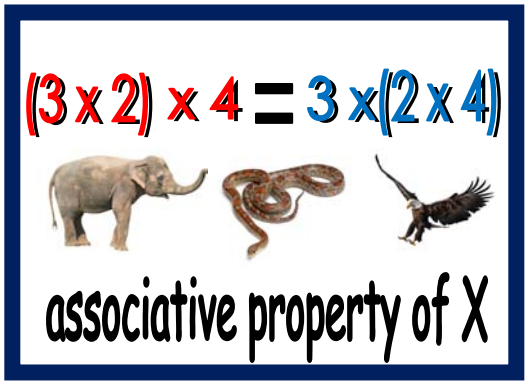
$$(4 + 6) + 8 = 4 + (6 + 8)$$

associative property of +

Associative Property of Multiplication



Question: What is the associative property of multiplication?

Answer: The associative property states that the way in which factors are grouped does not change the product.

Gesture: Waggle your finger as you state, "the way in which factors are grouped does not change the product."

Examples: Fold a sheet of paper in half (hot dog style) and draw an animal scene that has 3 different groups on the top half. Show 2 of the groups being buddies in that scene (2 elephants with 4 snakes, while 3 eagles are by themselves). Then draw the same animal groups on the bottom section grouped differently (4 snakes with 3 eagles, while the 2 elephants are by themselves). They are grouped differently, but still have the same amount of animals. This ties the imag on the learning brick to the idea of associative property.

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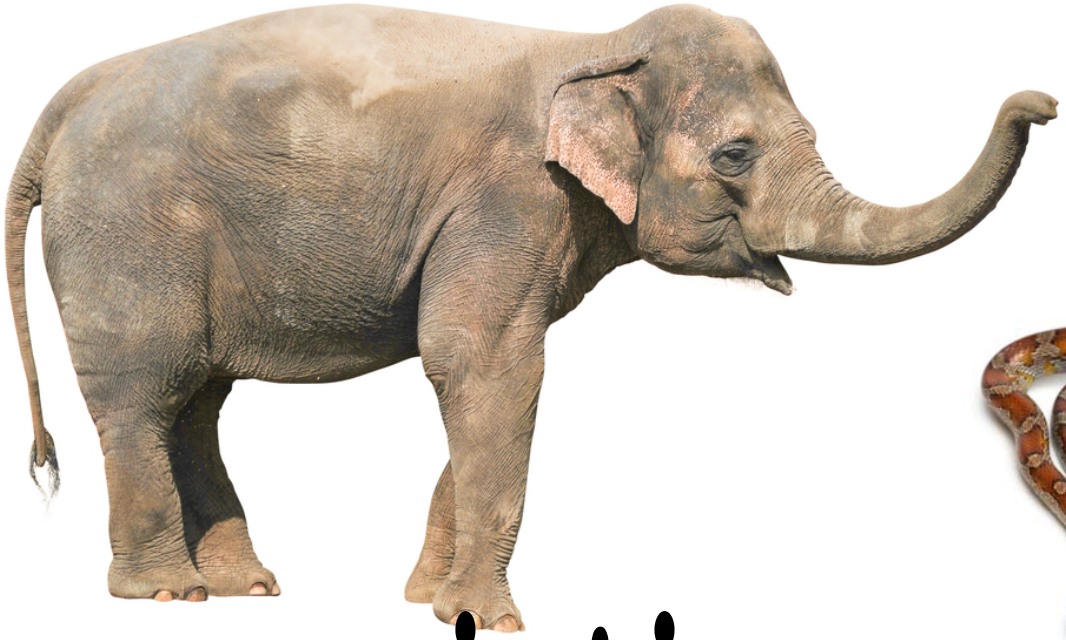
$$(3 \times 2) \times 4 = 3 \times (2 \times 4)$$



associative property of X

Bar Graph

Question: What is a bar graph?

Answer: A bar graph is a graph drawn using rectangular bars to show how large each value is.

Gesture: Scatter all of your fingers to show a mess; then make rows with your forearms to show the information in an organized manner.

Examples: Think of a question for your students to answer. What kinds of pets do they have? What is their favorite fruit? What is their favorite sport? Where would they like to go on a class trip? What is their favorite season? Survey their answers and create a tally chart and a bar graph together. Have students title their graphs and label each side of the graph. See if your students can look at the bar graphs and deduce how many people total were surveyed?

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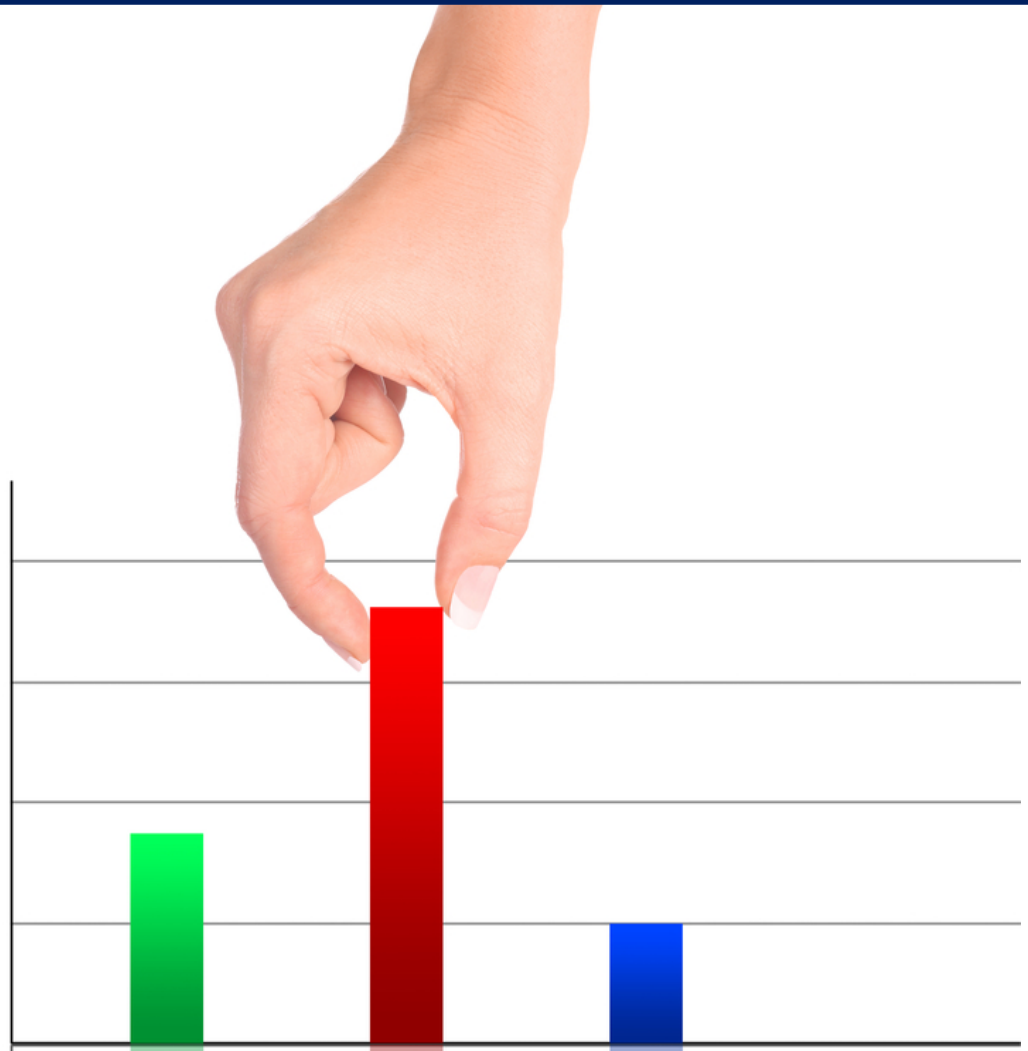
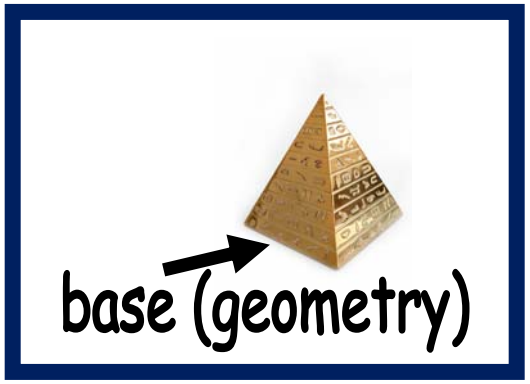


bar graph

Base (geometry)



Question: What is a base?

Answer: A base is the surface that a solid object stands on, or the bottom line of a shape such as a triangle or rectangle.

Gesture: Draw a shape in the air (triangle, angle, square, rectangle) then redraw the base or bottom of the drawn shape.

Examples: Bring in some objects into class (cone, pyramid, cylinder, rectangular prism, cube) and draw some shapes on the board (triangle, angle, square, rectangle). For each of the 3D objects, write BASE on the bottom of each (on a post it). For the shapes on the board, draw the base of each shape in a blue and the other parts in black.

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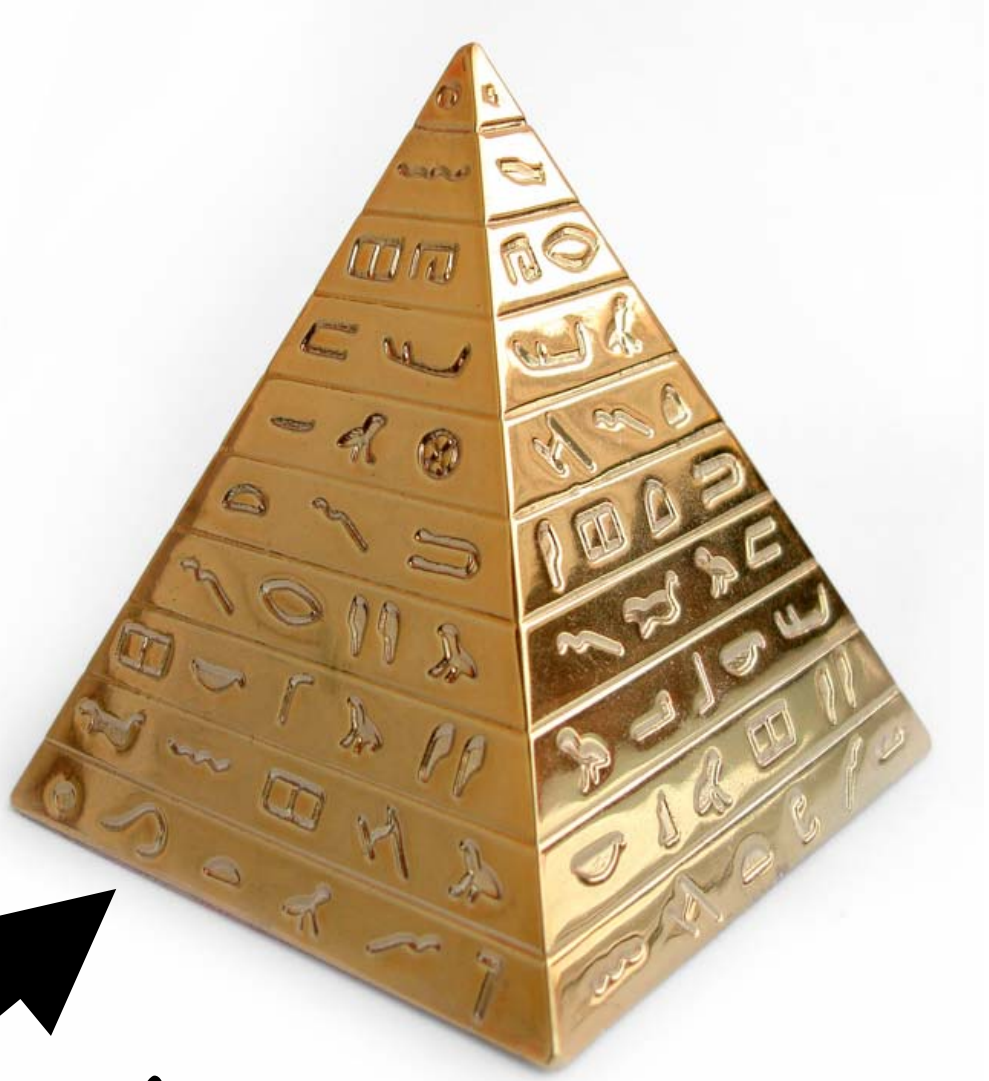

base (geometry)

Base (number)

Question: What is a base number?

Answer: A base number is the number that is going to be raised to a power.

Gesture: Hold up five fingers (while you say, "The base is five.") Hold up three fingers to show the exponent (while you say, "to the third power.")

Examples: Write some bases and exponents on the board: 5^3 3^4 8^2 9^5 Have the students find the base from the examples on the board. Next, write down some other examples on the board: 4 x 4 x 4 x 4 x 4 = what is the base? 6 x 6 x 6 = what is the base? 8 x 8 = what is the base? Don't worry about the exponent at this point, just allow your students to truly understand what the base number is.

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5^3

base (number)