A long time ago
in a galaxy
far, far away....

STAR WARS MATH

ACCELERATED MATHEMATICS

CHAPTER 1

NUMBER SENSE & ALGEBRAIC REASONING

BROUGHT TO YOU BY:

EVIL MATH VADER

(BETTER KNOWN AS MR. MANGHAM)

TOPICS COVERED:

- Rational Numbers
- Operations with Decimals
- Squares and Square Roots
- Exponents
- Order of operations
- Algebraic Expressions and Equations
- Variables
- Properties of numbers

Created by Lance Mangham, 6th grade math, Carroll ISD

Frosted Fudge Cakes: _____

Cosmic Brownies: _____

Zebra Cakes: _____

Swiss Cake Rolls: _____

Donut Sticks: _____

Oatmeal Creme Pies: _____

Star Crunch: _____

Devil Squares: _____

Nutty Bars: _____

Honey Buns: _____

Created by Lance Mangham, 6th grade math, Carroll ISD

The First Day of School

I want my students to know the following…

1. I want to be here.

2. I want you to be here.

3. I am excited about getting started.

4. I am enthusiastic and optimistic about the opportunities you will have.

5. You are important.

6. I am here to help you and learn with you – all of you.

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Activity 1-1: **Interest Inventory** Name:

1	This is the grade I entered Southlake schools:	
2	In my house the following adults live…	
3	In my house the following kids live… (list names and ages)	
4	In my house the following pets live… (name and animal)	
5	Something special and unique about me is…	
6	My greatest talent is…	
7	My favorite subject(s) are…	
8	The thing I most want to improve is…	
9	Careers that might interest me are…	
10	In my free time my hobbies include…	
11	My favorite sports are…	
12	The one song, TV show, or book I will always remember from this summer is…	
13	My favorite movie of all-time is….	
14	My favorite book or book series is…	
15	The three people I admire the most are…	
16	If I were an animal I would be a…	
17	A responsibility I handle well is…	
18	If I were principal of this school the one thing I would change is…	
19	If I was going to eat only one food item for the entire next week it would be…	
20	Major favorite restaurant is…	
21	My favorite dessert is…	
22	Other than people and pets the two possessions I most value in my house are…	
23	My most memorable event is…	

24	Places I have traveled include…	
25	If I could visit any country or city outside the US it would be…	
26	One thing that really gets on my nerves is…	
27	The happiest day of my life was…	
28	I was really sad when I learned that…	
29	The best opportunity I ever had was…	
30	If you were allowed to stop going to school, would you?	
31	The wildest and craziest thing I have ever done is…	
32	If I were given $1,000 to help other people I would spent it...	
33	My fifth grade teachers would describe me as…	
34	My parents would describe me as….	
35	My best friend would describe me as…	
36	What I am most proud of having accomplished in the past year is…	
37	The luckiest thing that ever happened to me was…	
38	If I could invite five famous people, dead or alive, to come eat dinner with me I would choose…	
39	If I could grow up to be famous and successful, I would like to be known for…	
40	In 5th grade the place in school where I felt most important was…because…	
41	***Think carefully about this one.*** What I wish my teachers knew about me is…	

Activity 1-2: **Lost On The Mangham Moon** Name:

(Taken from Cooperative Group Problem Solving – Frank Schaffer Publications, Inc.)

You are a crew member of the spaceship *DukeRules*! Your mission has been to search for life forms in space and return safely to Earth. The mission has been jeopardized because of problems with the cooling systems in your spaceship. You have been forced to land 175 miles from your space station, which is on the lighted surface of Mangham Moon. Mangham Moon has a circumference of 350 miles. Because of a difficult landing, your crew has been forced to evacuate quickly. Moments after the evacuation, an explosion destroyed most of the contents of your spaceship. All that remains are the 15 items listed below.

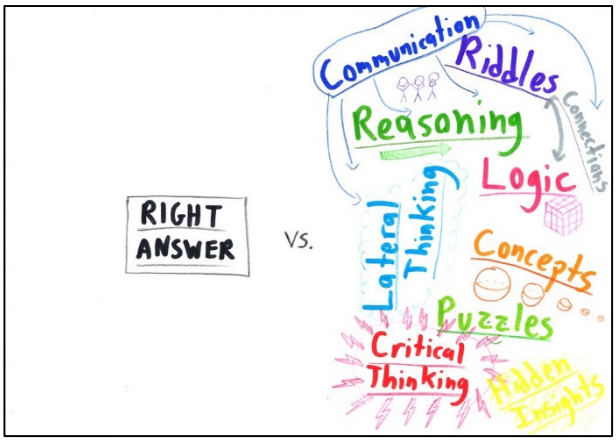
Your crew's survival depends on reaching the space station. You must choose the most important items from surviving gear, those which will have the most value in reaching the space station.

Place a number 1 alongside the most important item, number 2 by the second most important, and so on through number 15, the least important.

	You	**Team**	**Expert**	**You/Expert**	**Team/Expert**
A cigarette lighter					
Concentrated food					
60 feet of nylon rope					
Signal flares					
A magnetic compass					
Six 50-pound tanks of oxygen					
A case of dehydrated milk					
Parachute silk					
A solar-powered heating unit					
A 357 magnum pistol					
A map of this moon					
A self-inflating life raft					
5 gallons of water					
First-aid kit					
Solar-powered FM two-way radio					
			TOTAL		

The Answer vs. The Process

Taken from "Mad With Bad Drawings" website



What is important in math?

The most common answer I get from students is "the right answer".

Sometimes that is true, but not all the time. There needs to be a balance between getting the answers and the process used to get the answers.

In this class there are times when you will be graded on the **process** and times when you will be graded on the **answer**.

Times when the process is more important

- **Homework and classwork** covering new material

Here I will usually emphasize the process. Showing your work shows me the process you used. Your grade could be up to 100% based on the work (process) you show to solve your questions.

Times when the process and the answers are balanced

- **Quizzes, mini-projects** over material we have covered for a few days

Often on these types of assignments both answers and process will count as part of your grade.

Times when answers are more important

- **Tests, projects** at the end of an entire unit to show mastery

Tests and final projects will emphasize the correct answers because you have now had numerous opportunities to practice the process. By this point in time you should know the process well enough to be able to get correct answers.

Showing your work is important so that both you can understand and I can understand your thought process. I don't ask you to show your work to make you spend more time on homework and classwork. The work you show could count anywhere from 0% to 100% of your grade.

What all students need for their future is as much about how they think as about what they know.

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Activity 1-3: **Real Numbers** Name:

Place the following numbers in the correct place on the diagram on Activity 1-4.

28	1,000,000	82%
3.14159…	$6.\overline{7}$	300%
$\frac{7}{8}$	0	$\frac{7}{2}$
1.8	0.123	−10
$\sqrt{17}$	$-\sqrt{25}$	20%
8	−6.2	157
$-5\frac{2}{3}$	$7\frac{1}{8}$	$\frac{27}{3}$
5.0	$-\frac{3}{2}$	

REAL NUMBERS
All rational and irrational numbers.

RATIONAL NUMBERS
All numbers that are not irrational. Any number that can be written as a fraction.

IRRATIONAL NUMBERS
1. All non-repeating, non-terminating decimals.
2. All square roots of non-square numbers.

INTEGERS

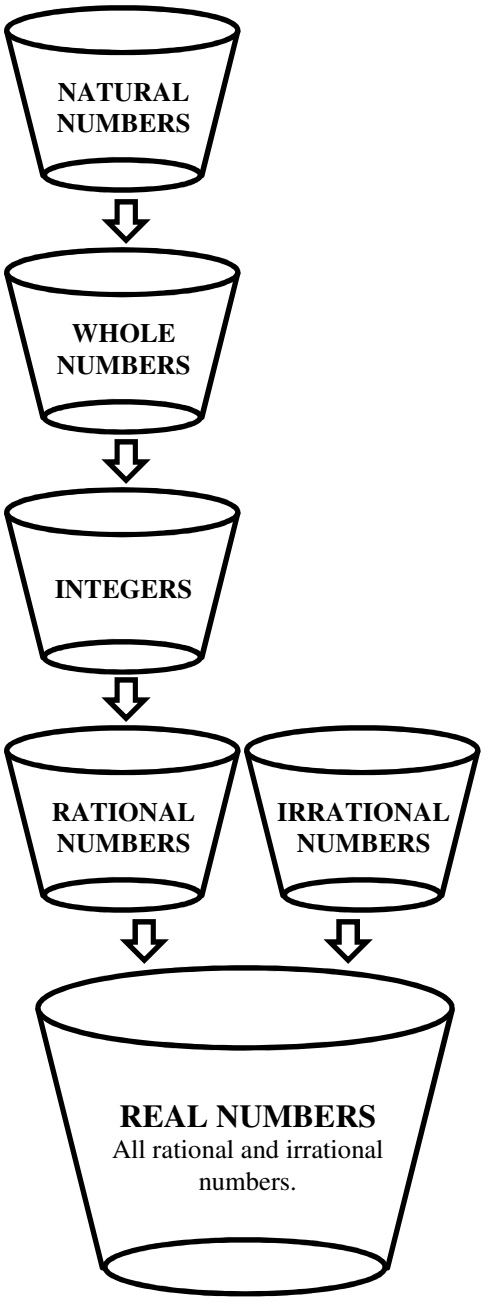
{...-3, -2, -1, 0, 1, 2, 3, ...}

WHOLE NUMBERS

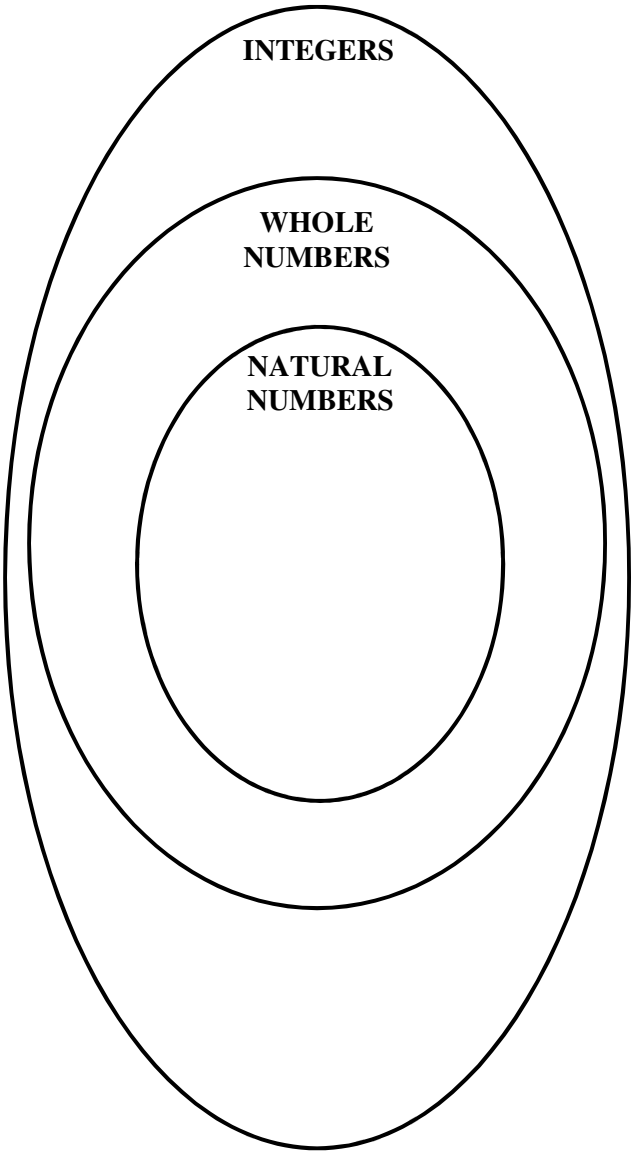
{0, 1, 2, 3, 4, …}

NATURAL NUMBERS
(Counting Numbers)

{1, 2, 3, 4, ...}



REAL NUMBERS



RATIONAL NUMBERS

IRRATIONAL NUMBERS

IMAGINARY NUMBERS

Yes, there are such things as imaginary numbers! They all consist of the square root of -1. In fact they are not really imaginary, but they are planar. It is like rotating a point "anti-clockwise".

If you are counting stones, fractions are meaningless. If you are measuring the mass of an object, negative numbers are meaningless. For many things imaginary numbers are meaningless, but some things they are very important: electromagnetism, cartography, vibration analysis, quantum mechanics, signal processing

Sounds interesting, huh?
You will learn more about imaginary numbers in Algebra II.

Which of the following statements about integers, whole numbers, natural numbers and rational numbers is true?

A Sets of whole numbers include negative and positive whole numbers.
B Sets of integers and whole numbers include natural numbers.
C Sets of whole numbers and natural numbers include decimals.
D Sets of rational numbers do not include integers.

Activity 1-5: **Rational Numbers and More** Name:

Natural Numbers start at 1 and are counting numbers 1, 2, 3, etc.
Whole Numbers start at 0 and are counting numbers 0, 1, 2, 3, etc.
Integers include all whole numbers and their opposites $\ldots -3, -2, -1, 0, 1, 2, 3 \ldots$
Rational Numbers include mixed numbers, decimals, integers, and whole numbers. They also include any repeating decimals.
Irrational Numbers cannot be written as a fraction. This includes non-repeating, non-terminating decimals (ex. 53.66563146….). All square roots of non-square numbers are also irrational (ex. $\sqrt{8}$ and $\sqrt{33}$).
Real Numbers are all rational and irrational numbers.

Check all the sets of numbers to which each number belongs.

		Natural Numbers	**Whole Numbers**	**Integers**	**Rational Numbers**	**Irrational Numbers**	**Real Numbers**
1.	0						
2.	–0.15						
3.	–5						
4.	$\sqrt{7}$						
5.	$\frac{28}{4}$						
6.	$21\frac{1}{2}$						
7.	0.13						
8.	$-1\frac{1}{3}$						
9.	–625.0						
10.	0.14159…						
11.	$-\frac{2}{3}$						
12.	$\frac{\sqrt{64}}{5}$						
13.	$\frac{3}{5}$						
14.	–1.7						
15.	6.27819234…						
16.	$-\frac{6}{2}$						

Activity 1-6: **Decimals Operations** Name:

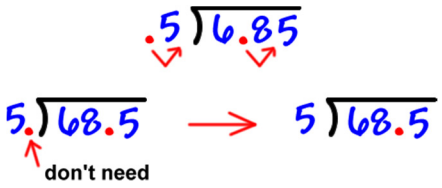
Show all work on a separate sheet of paper.

Solve the following decimal addition and subtraction problems.

1.	2.135 + 1.5		2.	14.688 + 0.384		3.	2.4 + 1.47	
4.	32.4 + 10.82		5.	3.45 + 4.18 + 5.21		6.	43.6 + 5.327	
7.	2.135 – 1.5		8.	14.688 – 0.384		9.	2.4 – 1.47	
10.	32.4 – 10.82		11.	12 – 5.003		12.	43.6 – 5.327	

Solve the following decimal multiplication problems.

13.	$6 \bullet 0.35$		14.	$27 \bullet 0.21$	
15.	$1.21 \bullet 3.2$		16.	$26 \bullet 1.5$	
17.	$4.25 \bullet 5.4$		18.	$3.4 \bullet 4.2$	



Example: $\frac{30.5}{0.005} \rightarrow \frac{\bullet 1000}{\bullet 1000} = \frac{30500}{5} = 6100$

Solve the following decimal division problems. Record all answers as decimals.

19.	$\frac{1.2}{6}$		20.	$\frac{3.00}{12}$		21.	$\frac{2.46}{12}$	
22.	$\frac{0.0079}{2}$		23.	$\frac{5.04}{14}$		24.	$\frac{0.99}{6}$	
25.	$1.35 \div 0.9$		26.	$0.935 \div 0.5$		27.	$19.95 \div 1.9$	
28.	$\frac{0.105}{0.00005}$		29.	$\frac{141.62}{0.73}$		30.	$2.279 \div 5.3$	

31.	You took a car trip that was exactly 496.8 miles. The trip took 9 hours. What was your average speed (miles per hour)?
32.	Mr. Mangham's bank account had a starting balance of $125.36. He spent one-fourth of his money to buy a gift for his sister. He then writes a check in the amount of $26.50 to pay for his home electricity. What is the balance in Mr. Mangham's bank account?
33.	Your car gets about 19.8 miles to the gallon. If you buy 12 gallons of gas, how many miles can you expect to drive?
34.	The temperature outside is 78.3 degrees. How far away from 100 degrees is it?

Activity 1-7: **Decimal Word Problems** Name: _____

Solve the following decimal word problems.

1.	If apples cost $0.89 a pound and Mr. Wyrick buys 2.4 pounds, how much will they cost (do not round)?
2.	If bananas cost $0.59 a pound and Mrs. Leidner buys 6.2 pounds of bananas, how much will they cost (do not round)?
3.	If Mrs. Scogin runs 3.1 miles for 125 straight days, how far did she run?
4.	Mrs. Fauatea ran the 400 meter dash in 51.18 seconds. If she ran this same speed on 13 consecutive runs, what would her total time be?
5.	The cost of 12 gallons of gas is $14.28. How much would you pay per gallon?
6.	Your car travels an average of 19.7 miles per gallon in the city and 23.8 miles per gallon on the highway. On an 11-gallon tank of gas how much farther can you travel on the highway than in the city?
7.	Mr. Silvia bought a dozen donuts for $3.38 and they gave him an additional donut free. What is Mr. Silvia's cost per donut?
8.	Write and solve an expression to determine how many 0.3 meter pieces of duct tape can be cut from an 8.4 meter roll.
9.	Mr. Mangham combined 6.8 pounds of chocolate with 7.6 pounds of peanut butter. He put the mixture into jars holding 0.3 pounds each. How many jars did he use?
Bonus	On 2/2/00, the date had all even digits. Which day before this date was the last to have all even digits?

Below are the length and width of rectangles. Determine the perimeter and area of each rectangle.

10.	Length = 6.2 in	Width = 4.8 in	11.	Length = 9.1 in	Width = 5.22 in
12.	Width = 9.8 in	Length = 4.51 in	13.	Width = 7.6 in	Length = 7.6 in

14.	When you…	• by	A number > 1	your answer gets…	
15.	When you…	÷ by	A number > 1	your answer gets…	
16.	When you…	• by	A number between 0 and 1	your answer gets…	
17.	When you…	÷ by	A number between 0 and 1	your answer gets…	

Activity 1-8: **Decimal Word Problems** Name:

A Day at The Ballpark in Arlington

1.	Mr. Mangham wanted to know if the Red Sox had any pitchers that were good. He found the following pitcher's ERA's (how many runs a pitcher gives up): 2.76, 2.307, 2.706 What is the difference between the lowest and highest ERA's?

In the middle of the fifth inning with the Rangers leading 4-3, Mr. Mangham decided to go to the snack bar. The following items were for sale:

COTTON CANDY	$4.05	SNOW CONE	$2.19	CRACKER JACKS	$5.82
FRITO PIE	$7.25	FUNNEL CAKE	$6.60	DR. PEPPER	$4.50
PEANUTS	$3.47	LEMONADE	$3.95		

2.	How much is it for 2 Frito pie's and 2 Dr. Pepper's?
3.	How much more is it for 4 Cracker Jacks than for 3 peanuts?
4.	If Mr. Mangham order a Frito pie and a lemonade and pays with $20, how much change will he receive?
5.	If you get 80 peanuts in a bag, how much does each peanut cost (to the nearest hundredth)?
6.	If your Dr. Pepper contains 24 ounces, how much does it cost per ounce (exactly)?
7.	If the lemonade contains 0.25 liters, how much does it cost per liter?

Finally Mr. Mangham makes it back to the game and looks to see how well the Rangers' batters have done this season. He finds the following 8 batting averages (how often a batter gets a hit):

0.312 0.267 0.330 0.291 0.321 0.282 0.259 0.304

8.	If you were one of the best batters of all-time, you might have a batting average of 0.4. How far away is the batter who is hitting 0.267?
9.	What is the sum of the three highest batting averages?
10.	Texas hits a homerun that traveled 0.078 miles (which over 400 ft.). If it traveled at 0.03 miles per second, how long did it take to get out of the park?
11.	How long would it take if the ball traveled 0.015 miles per second?

Below are two measurements of rectangles. Determine the perimeter and length or width of each rectangle.

12.	$A = 32.5 in^2$	Length = 6.5 in	13.	$A = 38.5 in^2$	Length = 5.5 in
14.	$A = 42.75 in^2$	Width = 9.5 in	15.	$A = 72.25 in^2$	Width = 8.5 in

Activity 1-9: **Really Big Numbers!** Name: ________________

Google is a play on the word googol. It refers to the number represented by the numeral 1 followed by 100 zeros. Google's use of the term reflects the company's mission to organize the immense, seemingly infinite amount of information available on the web. You couldn't count to a googol in a million lifetimes!

So a googol is:
10000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000

So what about a googolplex? A googolplex is 1 with a googol of zeros. Can you imagine how big that is? If you wrote 1 zero every inch there would not be enough room to write this number if you went to the farthest star in the universe.

So what are some other large numbers?
Thousand, Million, Billion, Trillion, Quadrillion, Quintillion, Sextillion, Septillion, Octillion, Nontillion, Decillion, Undecillion, and a Duodecillion would be 1 with 39 zeros

Continuing
Tredecillion (42 zeros), Quattuordecillion (45 zeros), Quidecillion (48 zeros), Sexdecillion (51 zeros), Septendecillion (54 zeros), Octadecillion (57 zeros), Novemdecillion (60 zeros), Vigintillion (63 zeros), Unvigintillion (66 zeros), Duovigintillion (69 zeros), Trevigintillion (72 zeros), Quattuorvigintillion (75 zeros)

Q: On what day will you celebrate having been alive for one billion seconds? How old will you be?

Really big numbers are hard to comprehend. They get so big it is hard to tell them apart! Is $1 trillion dollars that much more than $1 billion or $1 million? Think about this:

One trillion miles will get you to Pluto – 350 times!

A million seconds ago was 12 days ago. A billion seconds ago was 50 years ago. A trillion seconds ago Neanderthal man was walking the Earth because it was 31,688 years ago!!!

If you made 1 million dollars every day starting today, you would have 1 trillion dollars in 2737 years.

How about a spending spree with where you spend $20 per second?

Starting Amount ($)	**Duration of Shopping Spree**	**Starting Amount ($)**	**Duration of Shopping Spree**
1	1 second	1,000,000	13 hr, 48 min
100	5 seconds	10,000,000	5 days, 19 hr
1,000	50 seconds	100,000,000	57 days, 21 hr
10,000	8 min, 20 sec	1,000,000,000	1 yr, 214 days
100,000	1 hr, 23 min	1,000,000,000,000	1585 years

Pick your top 5 characters (rank 1 to 5)

My Pick	Star Wars Character	Height	Brains	Dark Side	Jedi Powers	Battle Skills	Force Factor
		h	***b***	***d***	***j***	***s***	***f***
	Luke Skywalker	1.72m	15	4	90	43	4
	Princess Leia	1.5m	17	1	50	38	4
	Chewbacca	2.28m	12	5	10	55	4
	C3PO	1.67m	19	0	0	8	6
	R2D2	0.96m	14	0	0	14	6
	Lando Calrissian	1.78m	15	8	6	48	2
	Obi-Wan Kenobi	1.75m	18	1	80	26	6
	Yoda	0.66m	20	0	100	10	5
	Wedge Antilles	1.7m	11	3	10	37	3
	Imperial Stormtrooper	1.83m	9	19	1	49	3
	Jabba the Hutt	3.9m	13	20	0	10	3
	Darth Vader	2.02m	16	22	82	55	4
	Emperor Palpatine	1.73m	14	25	95	25	5
	Boba Fett	1.83m	11	20	17	49	4
	Han Solo	1.8m	13	6	4	50	3
	Anakin Skywalker	1.93m	16	10	82	55	4
	Qui-Gon Jinn	1.95m	19	2	65	41	1
	Queen Amidala	1.65m	17	2	30	40	3
	Jar Jar Binks	1.96m	2	5	20	30	3
	Darth Maul	1.75m	9	24	80	48	1

What is your Star Wars name?

Your first name: First three letters of your last name + First two letters of your first name
Your last name: First two letters of your mom's maiden name + First three letters of the city where you were born

Created by Lance Mangham, 6th grade math, Carroll ISD

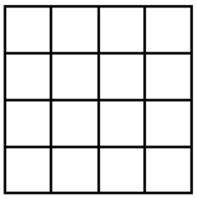
Activity 1-10: **Squares and Square Roots** Name:

$1^2 = 1$	$5^2 = 25$	$9^2 = 81$
$2^2 = 4$	$6^2 = 36$	$10^2 = 100$
$3^2 = 9$	$7^2 = 49$	$11^2 = 121$
$4^2 = 16$	$8^2 = 64$	$12^2 = 144$

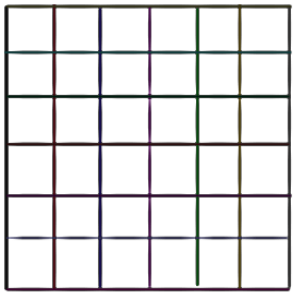
$\sqrt{0} = 0$	$\sqrt{16} = 4$	$\sqrt{64} = 8$
$\sqrt{1} = 1$	$\sqrt{25} = 5$	$\sqrt{81} = 9$
$\sqrt{4} = 2$	$\sqrt{36} = 6$	$\sqrt{100} = 10$
$\sqrt{9} = 3$	$\sqrt{49} = 7$	

Read 5^2 as "five squared." The 2 is called an exponent.
Read $\sqrt{16}$ as "the square root of 16." The symbol, $\sqrt{\ }$ called a **radical sign**.
Both the squared sign and the square root sign are exponents.

You are finding the **square** of a number when you multiply a number by itself.



$4 \bullet 4 = 4^2 = 16$



$6 \bullet 6 = 6^2 = 36$

On a separate sheet of paper make a **drawing** to demonstrate each problem.

1. 3^2	2. 7^2	3. $\sqrt{25}$
4. A side length of $\sqrt{9}$	5. A square with an area of 36 sq. units	6. 9^2
7. Arrange 16 marbles to demonstrate 4^2	8. $\sqrt{1}$	9. 8^2

10.	How many square inches are in a square foot? Draw a picture to prove your answer.	

Find each square.

11.	17^2		12.	30^2		13.	24^2	
14.	15^2		15.	40^2		16.	22^2	
17.	100^2		18.	45^2		19.	31^2	

Activity 1-11: **Squares and Square Roots** Name:

Find each square root.

1.	$\sqrt{225}$		2.	$\sqrt{576}$		3.	$\sqrt{1225}$	
4.	$\sqrt{3600}$		5.	$\sqrt{0.09}$		6.	$\sqrt{0.0016}$	
7.	$\sqrt{900}$		8.	$\sqrt{0.25}$		9.	$\sqrt{729}$	

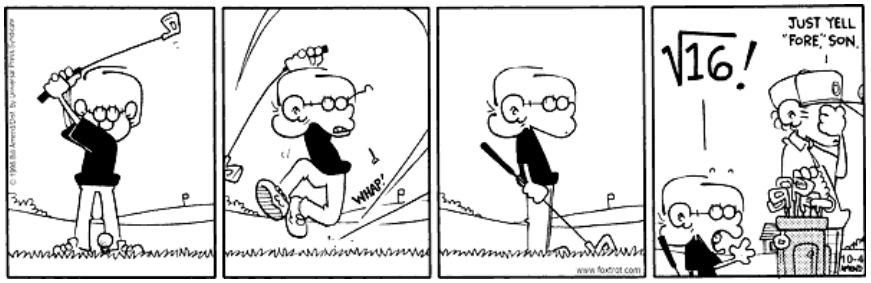
Find two consecutive whole numbers between which the square roots lie.

10.	$\sqrt{76}$		11.	$\sqrt{130}$		12.	$\sqrt{200}$		13.	$\sqrt{500}$	

Solve. Round your answer to the nearest tenth, if necessary. Draw a number line on a separate sheet of paper, label the whole numbers, and plot your answers.

14.	$\sqrt{60}$		15.	$\sqrt{10}$		16.	$\sqrt{120}$	
17.	$\sqrt{200}$		18.	$\sqrt{5}$		19.	$\sqrt{150}$	
20.	$\sqrt{2}$		21.	$\left(\sqrt{1225}\right)^2$		22.	$\sqrt{300}$	

23.	Which of the following could represent $\sqrt{225}$? A. 5 rows of 45 squares C. 25 rows of 9 squares B. 15 rows of 15 squares D. 3 rows of 75 squares	
24.	I am larger than 15^2 and smaller than 16^2. I am odd and divisible by 3. The product of my digits is 24. Who am I?	
25.	When, if ever, can $x^2 = 2x$?	
26.	The first five square numbers are 1, 4, 9, 16, and 25. Determine how many factors each one has. Do you notice any similarity in your numbers?	
27.	A lot is a square with each side being 72 feet long. What is the area of the lot?	
28.	The area of a square room is 150 square feet. To the nearest integer, how long is each side?	



Activity 1-12: **Powers and Exponents** Name:

1. Complete the table to show the volume of each cube in exponential form and in cubic feet.

Edge Length	Volume (multiply)	Volume (exponents)	Volume of cube	Edge Length	Volume (multiply)	Volume (exponents)	Volume of cube
2	$2\times2\times2$	2^3	8	7			
4				8			
5				9			
6				10			

Did You Know: If you know the volume of a cube you can find the edge length by finding the cube root. The symbol for the cube root is $\sqrt[3]{\ }$. For example, a cube with a volume of 27 would have an edge length of $\sqrt[3]{27}=3$.

Compute.

2.	7^3		3.	5^4	
4.	6^3		5.	10^5	
6.	$(0.4)^3$		7.	9^3	
8.	20^3		9.	$(0.01)^3$	
10.	1.4^3		11.	2^5	
12.	3^4		13.	10^6	
14.	The volume of a cube is 343 ft^3. What is the length of each side?		15.	$\sqrt[3]{125}$	
16.	If $a+b=12$ and $a^2+b^2=80$, find a^3+b^3.				

Write each expression using exponents.

17.	$4\bullet4$		18.	$5\bullet5\bullet5\bullet5\bullet5\bullet5$	
19.	$2\bullet2\bullet2\bullet2\bullet2\bullet2\bullet2\bullet2$		20.	$2\bullet2\bullet3\bullet2\bullet5$	
21.	$2\bullet3\bullet2\bullet3\bullet2$		22.	$2\bullet3\bullet2\bullet5\bullet2\bullet3\bullet2$	
23.	$3\bullet3\bullet5\bullet7\bullet x\bullet x$		24.	$5\bullet7\bullet7\bullet r\bullet r\bullet t\bullet t\bullet t$	
25.	8 to the fourth power		26.	m to the third power	

Activity 1-13: **Order of Operations** Name:

G	Grouping symbols ( ), [ ], { } also the fraction bar $\frac{a}{b}$ groups *a* together, then *b* together, then you divide last.
E	Exponents ex. x^2 or $\sqrt{x}$
MD	Multiplication and Division from left to right
AS	Addition and Subtraction from left to right

Circle the operation that should be performed first in each expression.

1.	$(9+3)\bullet 7$	2.	$98-5\bullet 7$	3.	$5\bullet(\sqrt{9}-1)$
4.	$\left(\frac{15}{3}\right)+(4+5)$	5.	$\frac{8^2-2\bullet 10}{30-8}$	6.	$5(5-3)\bullet 2$
7.	$5+4\bullet 7$	8.	$13(6+3)$	9.	$32 \div 4 \bullet 2$

Solve. Use the tornado method and show all work and answers on a separate sheet of paper.

10.	$2(16-9)-(5+1)$	11.	$(43-23)-2 \bullet 5$	12.	$90-45-24 \div 2$
13.	$81 \div (13-4)$	14.	$7 \bullet 8-2 \bullet 8$	15.	$10^2 \bullet 3^2+1$
16.	$5+42\div 3-3^2$	17.	$8 \bullet 3+2^2-1$	18.	$8 \bullet 3^2+7^2-2$
19.	$(15+9^2) \div 3-4$	20.	$(12-3) \div 3^2$	21.	$(34+46) \div 20+20$
22.	$18 \div 3 \bullet 6$	23.	$5^2-12+84 \div 3$	24.	$1+3 \bullet 4+5-3^2$
25.	$\frac{450\div(3+3)\bullet 2}{3^2+1}$	26.	$\frac{9\bullet 3+8^2}{\sqrt{64}-1}$	27.	$\frac{125-5\bullet 7}{2\sqrt{16}-2}$

Insert parentheses to make each statement true.

28.	$16-8 \div 4+10=12$	29.	$5 \bullet 5+5-5=45$
30.	$24 \div 4 \bullet 6 \div 12=3$	31.	$5+5 \bullet 5-28 \div 4 \bullet 7=1$

Compare. Use, <, >, or = to make each statement true.

32.	$3 \bullet (8-2)$	$3 \bullet 8-2$	33.	$(7+2) \bullet 4$	$7+2 \bullet 4$
34.	$4+(20 \div 4)$	$(4+20) \div 4$	35.	$42-(35+4)$	$42-35+4$

Activity 1-14: **Powers and Exponents/OOO** Name:

1.	Which does not represent 256 using exponents? $2^8, 16^2, 8^3, 4^4$	

Evaluate each expression. For expressions with more than one operation use the tornado method.

2.	2^5	3.	4^3	4.	2^3
5.	$2^2 \bullet 3^2$	6.	$2^2 \bullet 11^3$	7.	$2 \bullet 5 \bullet 3^3$
8.	$3^3 + 2^2 \bullet 5^2$	9.	$(3^3 - 4^1) \bullet 2^2$	10.	$2^3 \bullet (5^2 \bullet 7^1)$
11.	$(7^2 + 2) \bullet 3^2$	12.	$\frac{14^2}{2^3 + 2^3}$	13.	$11^2 + 13^2$
14.	$\frac{6^2 - 2^2}{5^2}$	15.	$5^2 \bullet (7^3 + 4^2)$	16.	$2^6 - 3^3$
17.	$2^3 \bullet 3^2$	18.	$1^3 - 1^4 + 2^5$	19.	$2^2 \bullet 3^3 - 2^3 \bullet 3^2$
20.	$3 + 2^4 + (5 - 2)^3$	21.	$2^5 + 5^3$	22.	$3^4 \bullet 5^2 + 2^3 \bullet 3^2$

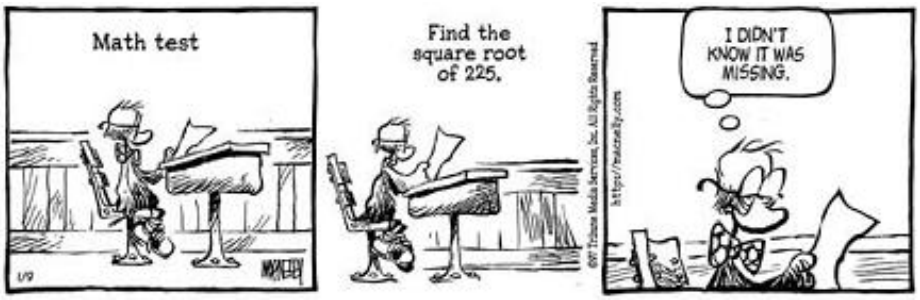
Write each power as the product of the same factor (write it out the long way).

23.	x^7	24.	$(-2)^4$	25.	6^1
26.	$(y + 3)^2$	27.	13^3	28.	5^6
29.	1^8	30.	$(cd)^4$	31.	$(-g)^5$

Evaluate each expression if $p = 1, m = 6, r = 2, y = 3,$ and $z = 5$.

32.	$3ry$	33.	$p^2 m^2$	34.	$(rm)^2$
35.	$p^2 (ry)$	36.	$2zy^2$	37.	$y^3 r^3 p^3$

38.	Six farmers each have 6 barrels. In each barrel are 6 cats that each has 6 kittens. How many total legs are there?	



Expressions vs. Equations

Expression: An expression is a mathematical phrase that combines numbers and/or variables using mathematical operations. It can be ***simplified or evaluated***, but it cannot be solved.

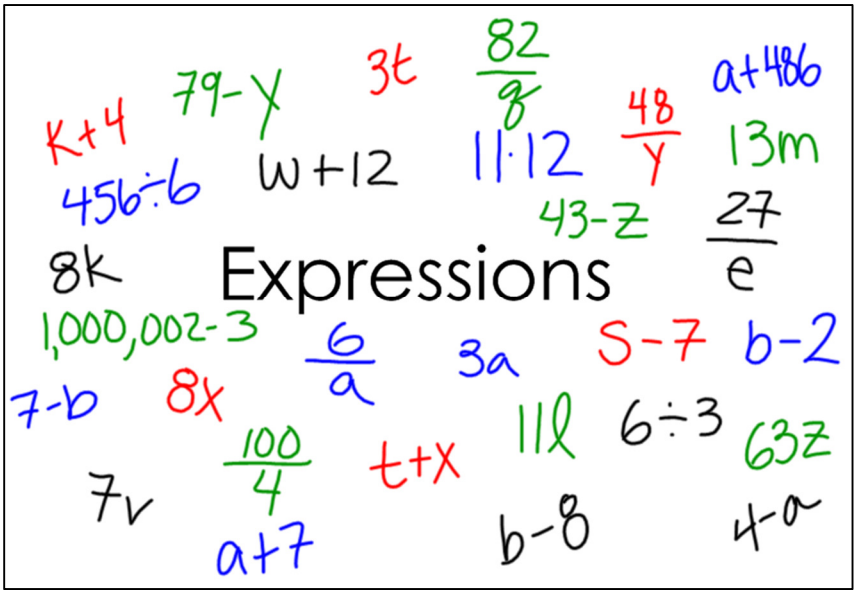
There is no equal sign.

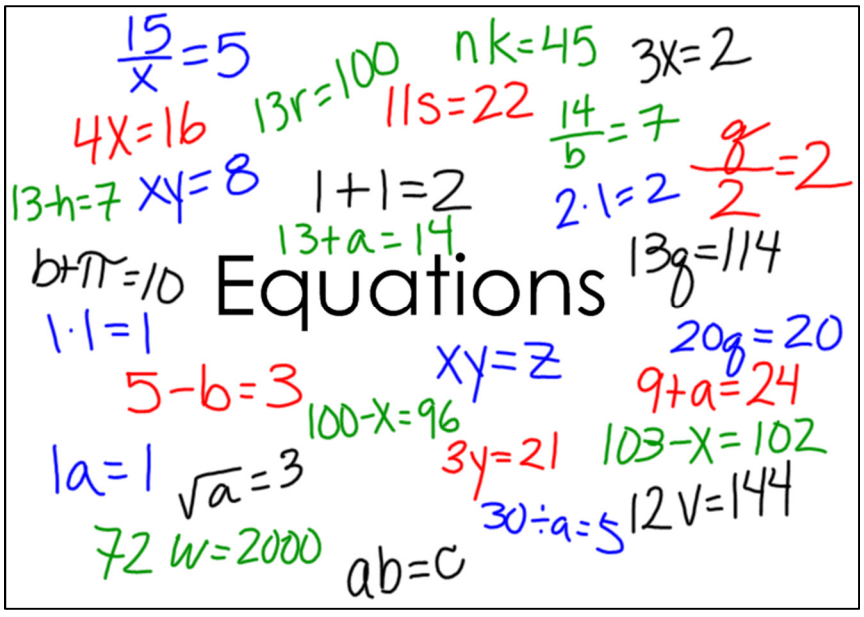
$2+2 \quad 3x-5 \quad x^2-2x-8$

Equation: An equation is a mathematical sentence that combines numbers and/or variables that shows the equality of two expressions. An equation is two expressions set equal to each other. It can usually be ***solved***.

There must be an equal sign.

$2+2=4 \quad 3x-5=7 \quad x^2-2x-8=0$





Created by Lance Mangham, 6th grade math, Carroll ISD

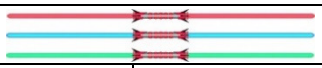
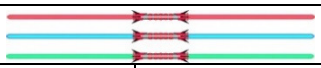
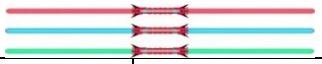
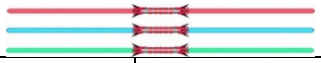
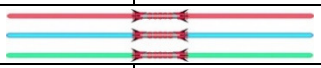
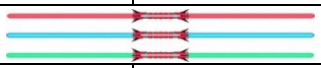
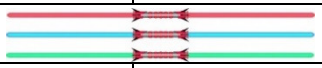
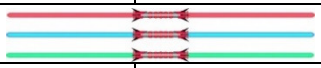
Activity 1-15: **Kaadu Egg Algebra Recording Page** Name:

Kaadu lived on the planet Naboo. They were large flightless waterfowl. They were excellent runners and strong swimmers. They laid their eggs on land. Gungans like Jar Jar Binks rode on the kaadu.

First carton numbers:	**Total:**
Second carton numbers:	**Total:**

Egg carton letter:	**Egg carton letter:**
Egg carton letter:	**Egg carton letter:**
Egg carton letter:	**Egg carton letter:**

Activity 1-16: **Jedi Arenas Recording Page** Name:

Jedi 3 #1 		**Jedi 3 #2** 	
EQUATIONS:	ANSWERS:	EQUATIONS:	ANSWERS:
Jedi 3 #3 		**Jedi 3 #4** 	
EQUATIONS:	ANSWERS:	EQUATIONS:	ANSWERS:
Jedi 4 #1 		**Jedi 4 #2** 	
EQUATIONS:	ANSWERS:	EQUATIONS:	ANSWERS:
Jedi 4 #3 		**Jedi 4 #4** 	
EQUATIONS:	ANSWERS:	EQUATIONS:	ANSWERS:

Activity 1-17: **Order of Operations/Variables** Name:

A ***variable*** is a symbol used to represent one or more numbers. Some of the following problems use a variable to represent an unknown amount.

For each story below, determine or write the correct mathematical expression or equation.

1. Darth Vader makes \$7.50 per party to attend birthday parties. He attends 8 parties in June and 6 parties in July. Which equation can be used to find the total amount Darth Vader made during those two months? A $t = \$7.50(8 \bullet 8 + 6)$ B $t = \$7.50 \bullet 8 + \$7.50 \bullet 6$ C $t = \$7.50(6 \bullet 8 + 8)$ D $t = \$7.50(8 \bullet 6)$	2. Luke Skywalker decides he wants to sell lemonade to all of his galactic friends. He buys 2 bags of cups and 6 packets of lemonade for a total of \$6.03. Each bag of cups costs \$1.29. Which equation can be used to find the total cost of one packet of lemonade? A $t = (\$1.29 \bullet 2) + 6.03$ B $t = \$6.03 - (6 \bullet \$1.29)$ C $t = (\$6.03 - 2 \bullet \$1.29) \div 6$ D $t = (\$6.03 - \$1.29) \div 6$
3. Princess Leia is a very good math student. Her average math grade was a 95 on her 15 tests. If Darth Mangham decides to drop her lowest grade, write an expression that could be used to determine her new test average. You do not need to solve.	4. Jabba the Hut needs to drink a lot of water. His water tank contains 2,500 gallons. A faucet attached to the tank releases water at 5 gallons per minute. Write an expression to express the amount of water left after the faucet has been left open for 2 hours. You do not need to solve.
5. The Force Inc. employs 450 workers. It plans to increase its workforce by 8 employees per month until it has doubled in size. Which equation could be used to determine *m*, the number of months it will take to double in size? A $8m + 450m = 900$ B $2m + 450 = 900$ C $2(8m + 450) = 900$ D $8m + 450 = 900$	6. Which situation is best represented by the equation $4 \bullet h = 68$? A Chewbacca had 68 pieces of candy to give to 4 friends. How many pieces of candy will each friend get? B If one gallon of water costs \$4, how many gallons of water will Han Solo need to drink to walk 68 miles? C Luke is 68 inches tall. How tall will he be if he grows 4 more inches? D Yoda read 4 pages of a book that is 68 pages long. How many pages does Yoda have left to read?
7. Obi-Wan owns a Jedi training business. Each week, he buys 45 pints of "the force" for \$3.49 per pint. If he teaches an 18 week long class, which expression could be used to determine the total amount he spends on "the force"? A $3.49 \bullet 18$ B $3.49 \bullet 45 \bullet 18$ C $45 \bullet 18$ D $45 \div 3.49 \bullet 18$	8. C3PO and R2D2 are both building droids to help Luke. They work 8 hours a day. In one day, C3PO can make 9 droids and R2D2 can make 12 droids. Which equation shows how many total droids C3PO and R2D2 can build in 72 hours? A $(12 + 9) \bullet 8$ B $(12 + 9) \bullet 72$ C $(12 + 9)(72 \div 8)$ D $(12 + 9)(8 \div 72)$

Activity 1-18: **Describing the Ideal School** Name:

Vocabulary:
A ***variable*** is a symbol used to represent one or more numbers.
A ***variable expression*** is a mathematical phrase that uses numbers, variables, and operation symbols. Variable expressions are made up of one or more terms.
A ***term*** is a number, a variable, or the product or quotient of a number and a variable.

These variables represent information about a particular math class.

s = number of students in the class	g = number of girls in the class
r = number of students in the class with red hair	b = number of students in the class with black hair
t = number of textbooks given to each student	h = number of hours of classes each day

Tell what each of the following expressions represents.

1.	$s - g$		4.	$s - b$	
2.	$5h$		5.	st	
3.	$b + r$		6.	$\frac{g}{s} \bullet 100$	

Write an expression for each of the following.

7.	the number of students who do not have red hair	
8.	the number of textbooks handed out to girls	
9.	the number of minutes of classes each day	
10.	the number of textbooks handed out to all the students	
11.	the percentage of students who have black hair	

Write an equation for each of the following.

12.	there are 16 more students with black hair than students with red hair	
13.	there are twice as many students as girls	
14.	40% of the students have black hair	

Translate each equation into words. Then make a table showing four pairs of sample values that fit the equation.

15.	$s = b + 21$		
16.	$b = 4r$		
17.	$s = 2g + 5$		

18.	Write an equation that says that y is equal to 1.25 times x. Then make a table of values that fit the equation. For x, pick whole numbers ranging from 1 to 10. Write y as a decimal. Show all work on a separate sheet of paper.

Activity 1-19: **Algebraic Expressions and Variables** Name:

Phrases	Expression	Phrases	Expression
9 more than a number the sum of 9 and a number a number plus 9 a number increased by 9 the total of x and 9	$x+9$	4 subtracted from a number a number minus 4 4 less than a number a number decreased by 4 the difference of h and 4	$h-4$
Phrases	**Expression**	**Phrases**	**Expression**
6 multiplied by g 6 times a number the product of g and 6	$6g$	a number divided by 5 the quotient of t and 5 divide a number by 5	$\frac{t}{5}$

Phrases	Equation
Sixty less than three times a number is $59. Three times the amount less 60 is equal to 59. 59 is equal to 60 subtracted from three times a number. A number times three minus 60 equals 59.	$3n - 60 = 59$

On a separate sheet of paper, write each phrase as an algebraic expression or equation.

1.	the total of 5 and *c*	2.	23 divided into *y*
3.	the product of *k* and 9	4.	the difference of 6 and *r*
5.	nine less than *t*	6.	a number increased by 7 is 11
7.	the price decreased by $4 is $29	8.	twice as many points as Bob would be 18 points
9.	after dividing the money 5 ways, each person got $67	10.	three more than 8 times as many trees is 75 trees
11.	seven less than a number is 15	12.	the difference of six squared and a number is nine
13.	fourteen divided by a number is 21	14.	four times the number of feet is 12 feet
15.	27 is seven fewer students than last year	16.	the number of cats decreased by 17 is 19
17.	two and one-half times the amount of interest is $2,500	18.	one hundred increased by a number is 537
19.	81 increased by *n*	20.	the sum of *b* squared and *h*
21.	three times the difference of a number and nine equals 15	22.	five less than a six times a number is equal to 5
23.	12 times the number of muffin pans	24.	the quotient of five divided by the sum of *g* and *k*
25.	two times a number decreased by 5 is equal to 8	26.	a service charge of $20 plus a charge of $3 per window cleaned
27.	two times the quantity *x* decreased by 8 is 23	28.	five times a number divided by 8 is one

Activity 1-20: **Algebraic Expressions and Variables** Name:

Evaluate each expression if $j = 2$, $k = 7$, and $m = 9$.

1.	$2m - 5j$		2.	$3m + j$		3.	$42 \div k + m$	
4.	$j + m - k$		5.	$2j + k - m$		6.	$jm - k$	

Evaluate each expression if $x = 5$, $y = 4$, and $z = 3$.

7.	$x + z$		8.	$y + 3 - z$		9.	$x - x + 4$	
10.	$xy - 2$		11.	$yz + 10$		12.	$xz + 4$	

For all problems below, use the tornado method and show all work on a separate sheet of paper.

Evaluate each expression if $a = 8$, $b = 4$, and $c = 2$.

13.	$\frac{a}{b} + 5$	14.	$3bc - 7$	15.	$\frac{b}{c} + a$
16.	$\frac{2a}{4} - b$	17.	$3(b + a) - c$	18.	$2b - 3c$
19.	$\frac{2b}{c}$	20.	$\frac{6(a + c)}{b}$	21.	$b(b + a) - b$

Evaluate each expression if a = 12, b = 3, and c = 4, m = 9, n = 3.

22.	$\frac{m}{n} + 6$	23.	$10mn$	24.	$\frac{a}{c} - b$
25.	$\frac{3n}{m} + 4$	26.	$3(n + n) - m$	27.	$4c - 3b$
28.	$10 - \frac{2m}{n}$	29.	$\frac{3(b + c)}{(b + c)}$	30.	$b(c - b) + c$

Evaluate each algebraic expression for the given values of the variables.

31.	$(b^2 - c) \bullet d - 4$, for $b = 6$, $c = 4$, and $d = 12$	
32.	$(a + b^2) \bullet c \div d$, for $a = 7$, $b = 2$, $c = 6$, and $d = 3$	
33.	$s^2 - 3 \bullet t \div v$, for $s = 5$, $t = 7$, and $v = 3$	

Activity 1-21: **Expressions/Order of Operations** Name:

Will Anakin Skywalker restore order to the force? Will you restore order to the operations?

For all problems on this page, show all work using the tornado method on a separate sheet of paper.
When necessary, round answers to the nearest tenth.

Back at the beginning of this unit you chose a Star Wars character to be for this unit. For the following order of operations, use your character and the numbers given to solve the following problems.

1.	The Tall and Small Index	$10h+2b-d$	
2.	The Smart Heart Index	$4(2b^2-df)$	
3.	The Dark Mark Index	$\frac{50d+2s}{f}$	
4.	The Power Hour Index	$\frac{jsf}{(f+4)}$	
5.	The Skill and Chill Index	$4(b+j)-\frac{d}{2}$	
6.	The Force is the Source Index	$100f^2+5j-3d$	

Apply the same indices to one of the following characters: C3PO, Qui-Gon Jinn, or Jabba the Hut.

7.	The Tall and Small Index	$10h+2b-d$	
8.	The Smart Heart Index	$4(2b^2-df)$	
9.	The Dark Mark Index	$\frac{50d+2s}{f}$	
10.	The Power Hour Index	$\frac{jsf}{(f+4)}$	
11.	The Skill and Chill Index	$4(b+j)-\frac{d}{2}$	
12.	The Force is the Source Index	$100f^2+5j-3d$	

Create a brand new index name and formula and apply it to the characters below.

New name:	New formula:

13.	Yoda		14.	Darth Maul	
15.	Chewbacca		16.	Princess Leia	

Activity 1-22: **Algebraic Expressions** Name:

Translate each phrase below into an algebraic expression. Write the correct letter next to each expression.

1.		3 times a number
2.		3 more than a number
3.		3 decreased by a number
4.		3 less than a number
5.		one third of a number
6.		8 more than 3 times a number
7.		8 less than 3 times a number

A	$x+3$
B	$3x-8$
C	$x-3$
D	$3x+8$
E	$3x$
F	$3-x$
G	$\frac{x}{3}$

8.		7 less than 4 times a number
9.		7 decreased by 4 times a number
10.		9 less than twice a number
11.		9 decreased by twice a number
12.		9 less than half a number
13.		7 times a number, increased by 4
14.		7 times a number, increased by 4 times the number

H	$7-4x$
I	$2x-9$
J	$7x+4$
K	$4x-7$
L	$7x+4x$
M	$9-2x$
N	$\frac{x}{2}-9$

15.		5 times a number, increased by 8
16.		5 times the sum of a number and 8
17.		5 more than 8 times a number
18.		8 times the sum of a number and 5
19.		twice the sum of 5 times a number and 8
20.		2 more than five-eighths of a number
21.		8 times the sum of twice a number and 5

O	$8(x+5)$
P	$8(2x+5)$
Q	$8x+5$
R	$2(5x+8)$
S	$5x+8$
T	$5(x+8)$
U	$\frac{5}{8}x+2$

22.		9 meters higher than altitude x
23.		15 meters per second slower than speed x
24.		15 degrees hotter than temperature x
25.		9 meters shorter than twice length x
26.		9 years older than twice age x
27.		\$9 cheaper than 4 times price x
28.		9 centimeters less than three-fourths of length x

V	$x+15$
W	$x+9$
X	$4x-9$
Y	$2x-9$
Z	$2x+9$
AA	$x-15$
BB	$\frac{3}{4}x-9$

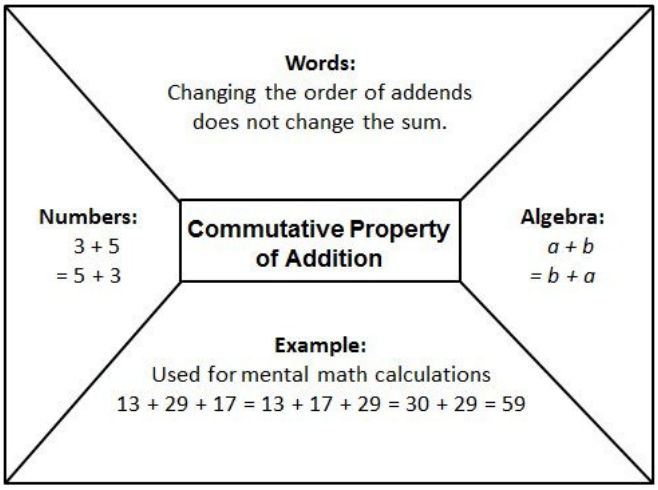
Activity 1-23: **Algebraic Expressions** Name:

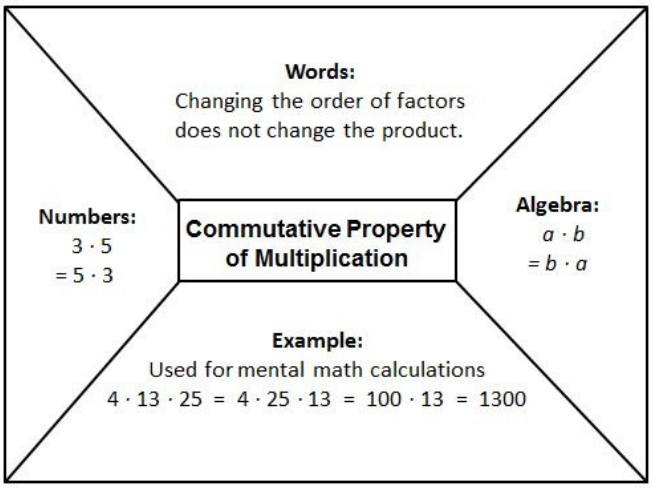
Translate each phrase below into an algebraic expression. Write the correct letter next to each expression.

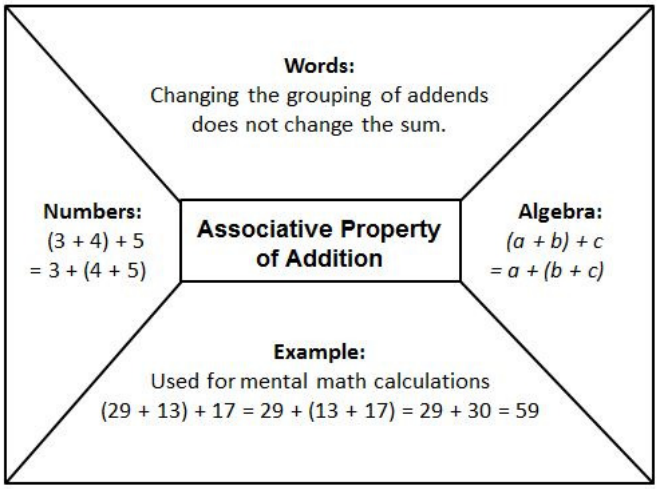
1.		Product of 7 and x
2.		7 less than 3 times x
3.		Product of 3 and the sum of 7 and x
4.		7 less than the quotient of 3 and x
5.		Sum of 7 and three times x
6.		3 more than twice x
7.		Twice the sum of 7 and x
8.		7 subtracted from x
9.		2 more than x tripled
10.		7 more than x doubled
11.		x less than 7
12.		Twice x minus 7
13.		2 plus the product of x and 7
14.		3 less than x squared
15.		Difference of 7 times x and 3
16.		x squared subtracted from 3
17.		The square of the sum of x and 3
18.		3 more than x squared
19.		3 plus the quotient of x and 7
20.		Product of 3, 7 and x

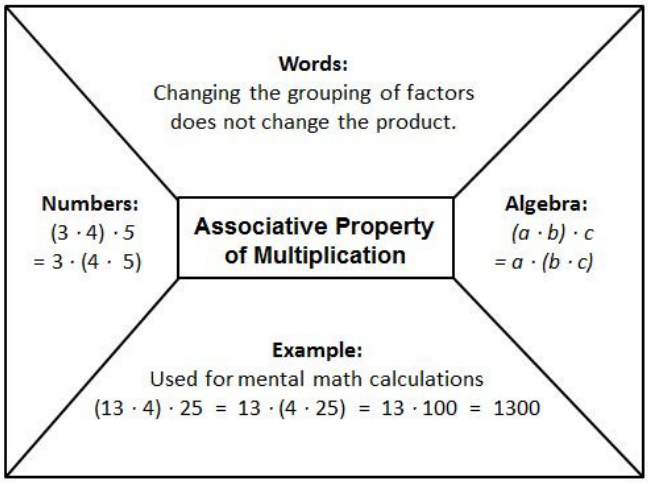
A	$2+7x$
B	$3x+7$
C	$7x-3$
D	$x-7$
E	$3 \bullet 7 \bullet x$
F	$7x$
G	x^2+3
H	$(x+3)^2$
I	$\frac{3}{x}-7$
J	$2(7+x)$
K	$3-x^2$
L	$7-x$
M	$3x-7$
N	$2x+7$
O	$3 \bullet (7+x)$
P	$3+\frac{x}{7}$
Q	$2x+3$
R	x^2-3
S	$3x+2$
T	$2x-7$

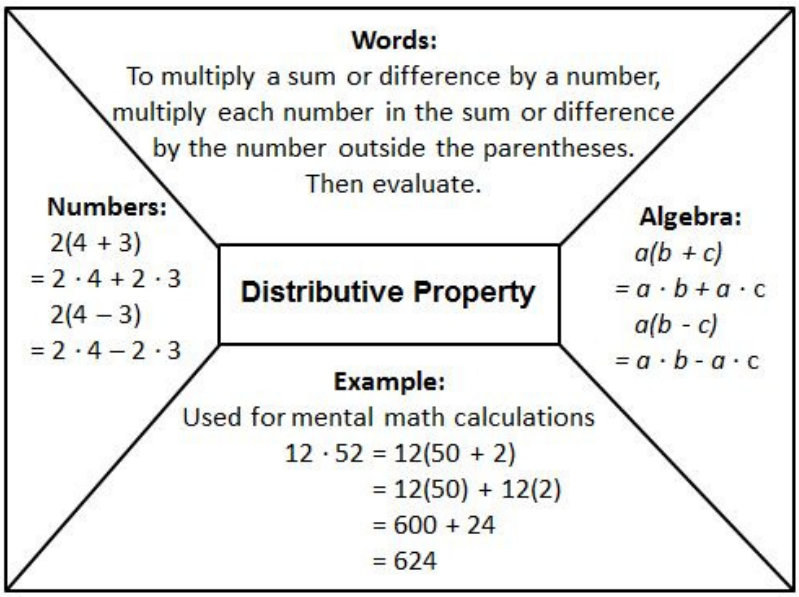
Activity 1-24: **Properties** Name:











Activity 1-25: **Properties of Numbers** Name:

A	**Commutative Property of Addition**	The order in which numbers are added does not change the sum.	$5 + 3 = 3 + 5$
B	**Commutative Property of Multiplication**	The order in which numbers are multiplied does not change the product.	$2 \bullet 4 = 4 \bullet 2$
C	**Associative Property of Addition**	The way in which addends are grouped does not change the sum.	$(2 + 4) + 6 = 2 + (4 + 6)$
D	**Associative Property of Multiplication**	The way in which factors are grouped does not change the product.	$(3 \bullet 5) \bullet 7 = 3 \bullet (5 \bullet 7)$
E	**Identity Property of Addition**	The sum of an addend and zero is the addend.	$7 + 0 = 7$
F	**Identity Property of Multiplication**	The product of a factor and one is the factor.	$9 \bullet 1 = 9$
G	**Multiplicative Property of Zero**	The product of a factor and zero is zero.	$5 \bullet 0 = 0$
H	**Distributive Property**	The sum of two addends multiplied by a number is the sum of the product of each addend and the number.	$4 \bullet (7 + 2) = 4 \bullet 7 + 4 \bullet 2$

Name the property shown by each statement. You may write the letter listed for your answer.

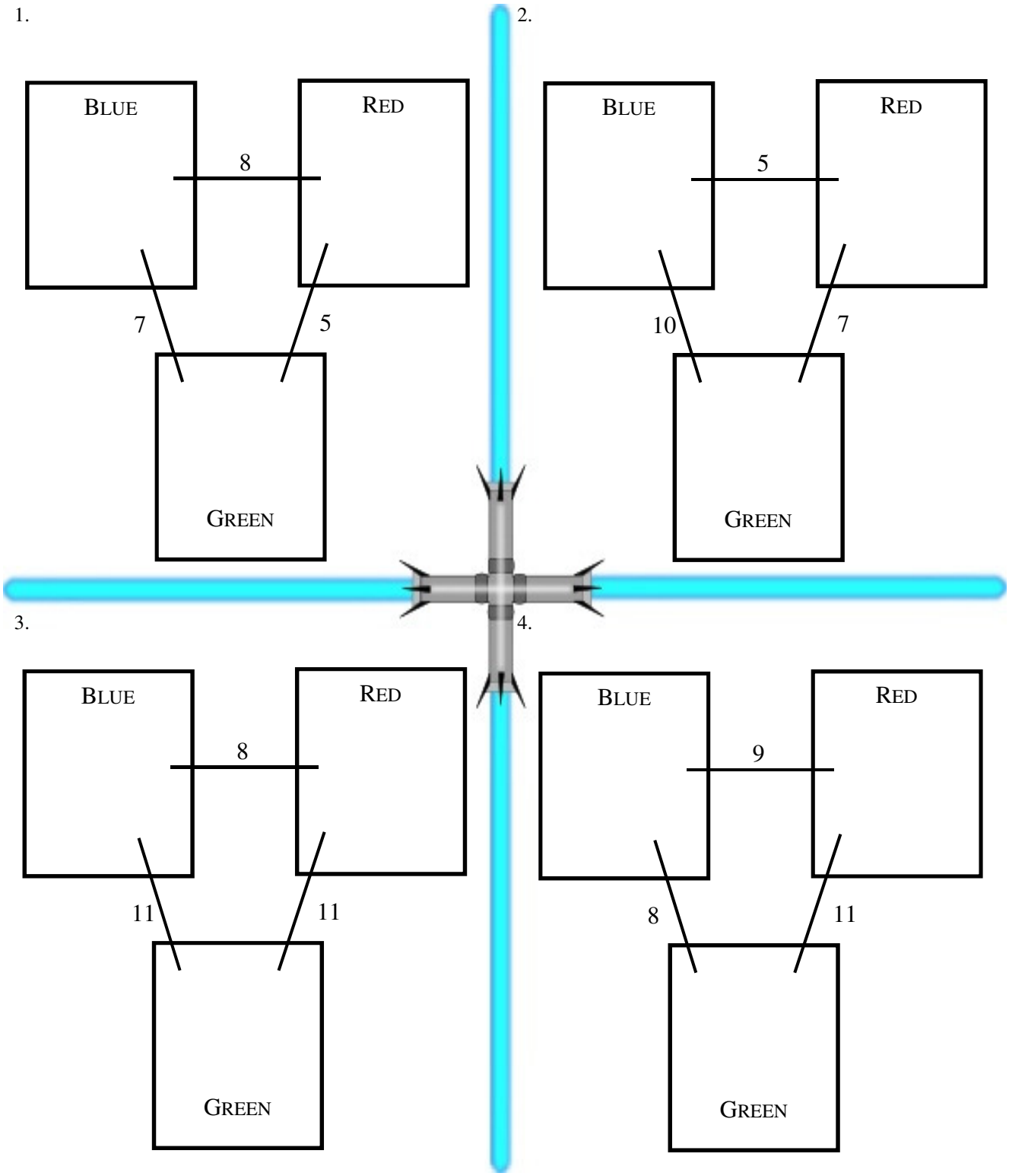
1.	$4 + (9 + 6) = (4 + 9) + 6$		2.	$x + 12 = 12 + x$	
3.	$(3 + y) + 0 = 3 + y$		4.	$(x + y) + z = x + (y + z)$	
5.	$(15 + x) + 2 = 2 + (15 + x)$		6.	$x \bullet 1 = x$	
7.	$14xy = 14yx$		8.	$(3 + 5) + c = 3 + (5 + c)$	
9.	$(2 \bullet 5) \bullet 0 = 0$		10.	$6 \bullet (8 + c) = (8 + c) \bullet 6$	
11.	$6 \bullet (4 \bullet 3) = (6 \bullet 4) \bullet 3$		12.	$(3 \bullet 9) \bullet 1 = 3 \bullet 9$	
13.	$(a + b) + c = c + (a + b)$		14.	$(x + y) \bullet 5 = (y + x) \bullet 5$	
15.	$(x \bullet y) \bullet z = (y \bullet x) \bullet z$		16.	$(7 + 3) \bullet 5 = (3 + 7) \bullet 5$	

Use the distributive property to rewrite each of the following.

17.	$8(50 + 4)$		18.	$5 \bullet (20 + 9)$	
19.	$7(40 - 2)$		20.	$4 \bullet 400 - 4 \bullet 2$	
21.	$800 \bullet 200 + 800 \bullet 10$		22.	$89 \bullet 10 + 89 \bullet 2$	
23.	$2 \bullet 60 + 2 \bullet 4$		24.	$501 \bullet 11$	

Jedi 1

There are many jedis, like Luke Skywalker and Obi-Wan Kenobi, in the arenas below. The arenas are connected by bridges. The number on each bridge tells the total number of jedis in the two arenas it connects. Use cubes to show how many jedis are in each arena.



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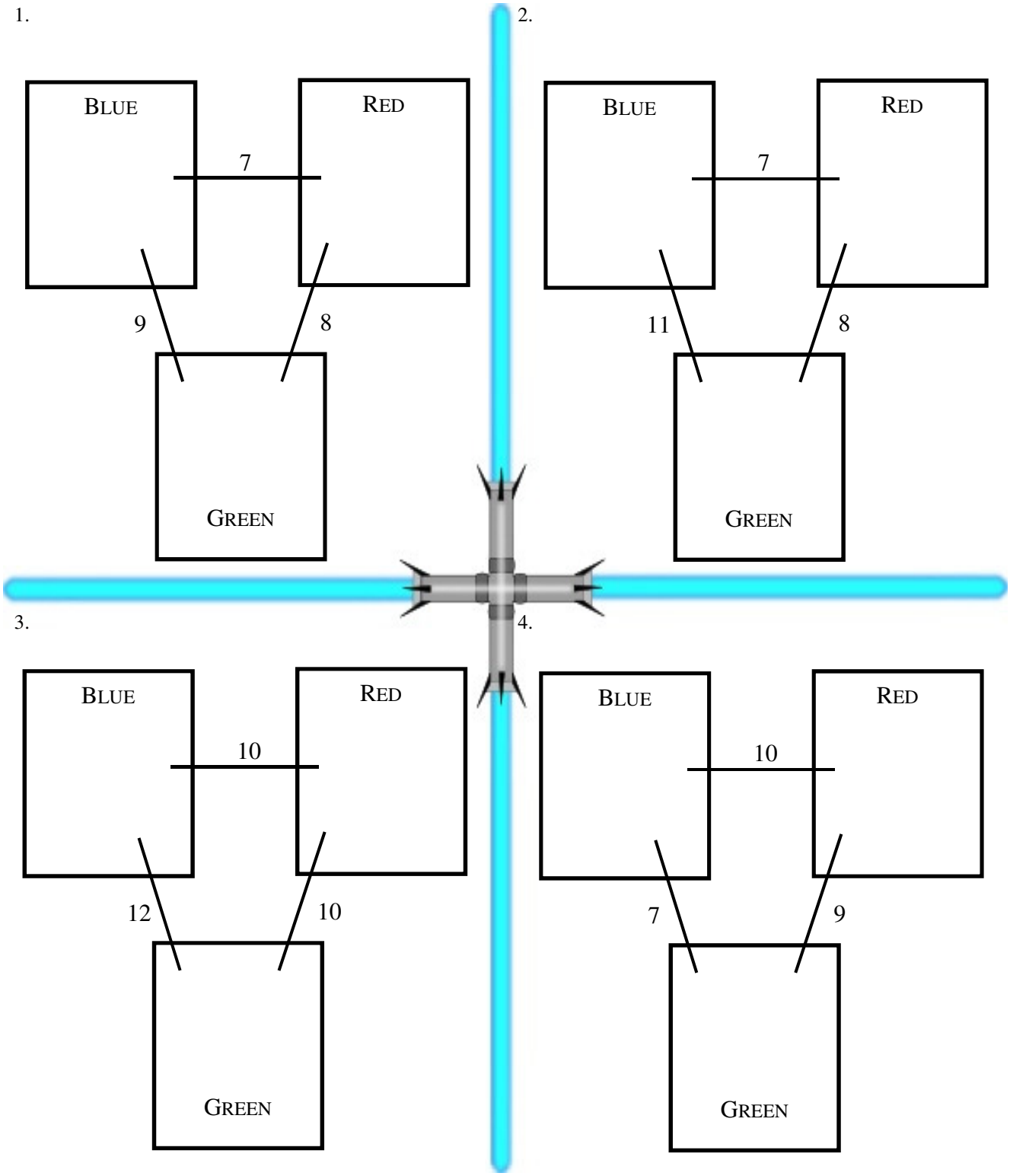
Jedi 2

There are many jedis, like Luke Skywalker and Obi-Wan Kenobi, in the arenas below. The arenas are connected by bridges. The number on each bridge tells the total number of jedis in the two arenas it connects. Use cubes to show how many jedis are in each arena.



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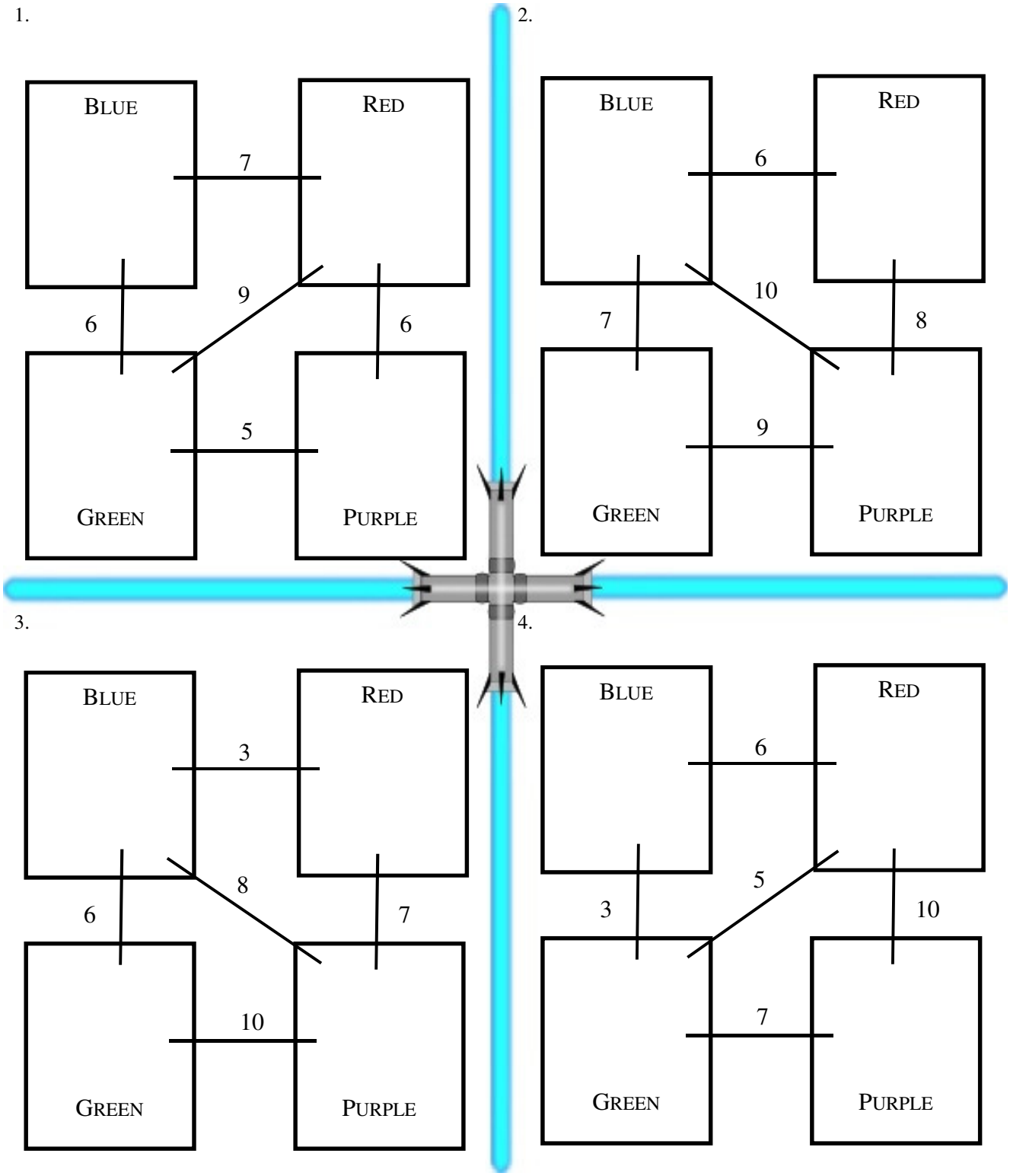
Jedi 3

There are many jedis, like Luke Skywalker and Obi-Wan Kenobi, in the arenas below. The arenas are connected by bridges. The number on each bridge tells the total number of jedis in the two arenas it connects. Use cubes to show how many jedis are in each arena.



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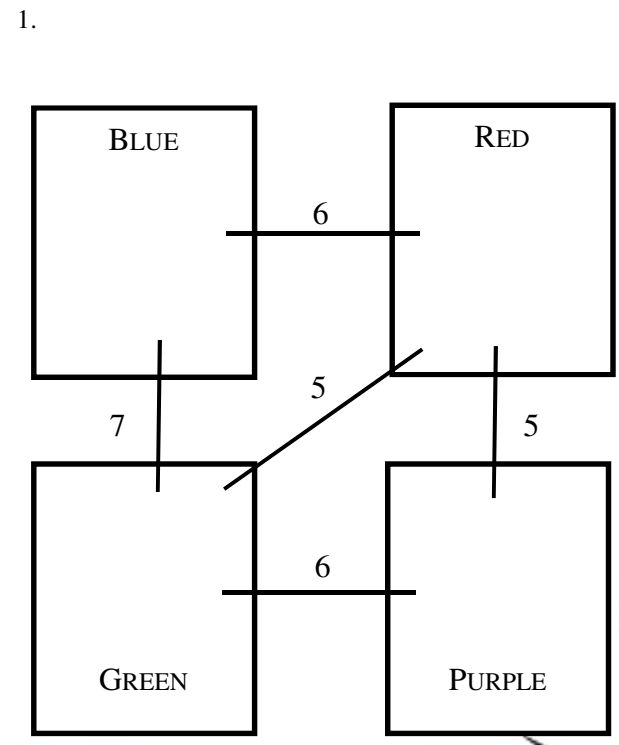
Jedi 4

There are many jedis, like Luke Skywalker and Obi-Wan Kenobi, in the arenas below. The arenas are connected by bridges. The number on each bridge tells the total number of jedis in the two arenas it connects. Use cubes to show how many jedis are in each arena.

1.



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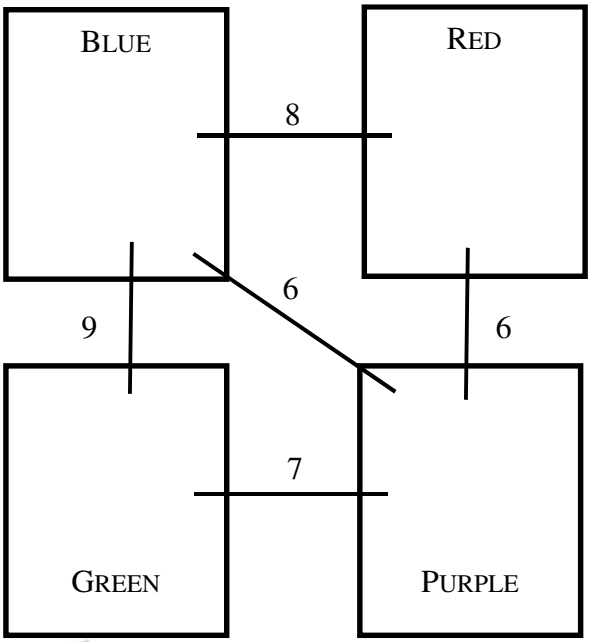

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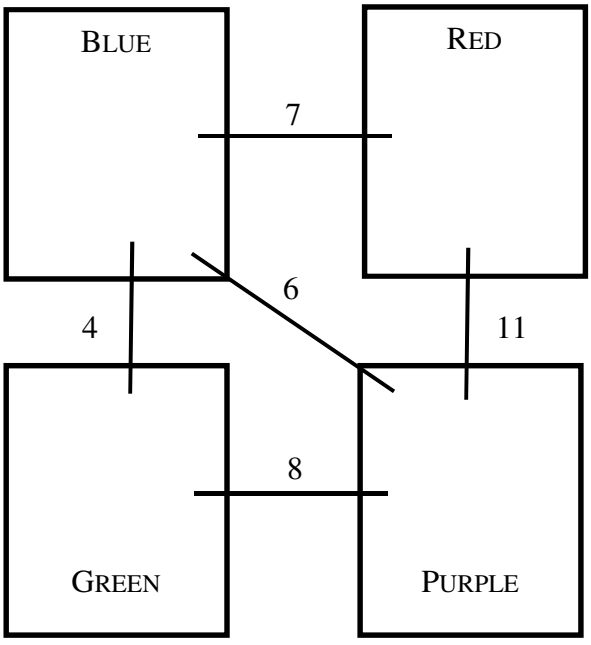

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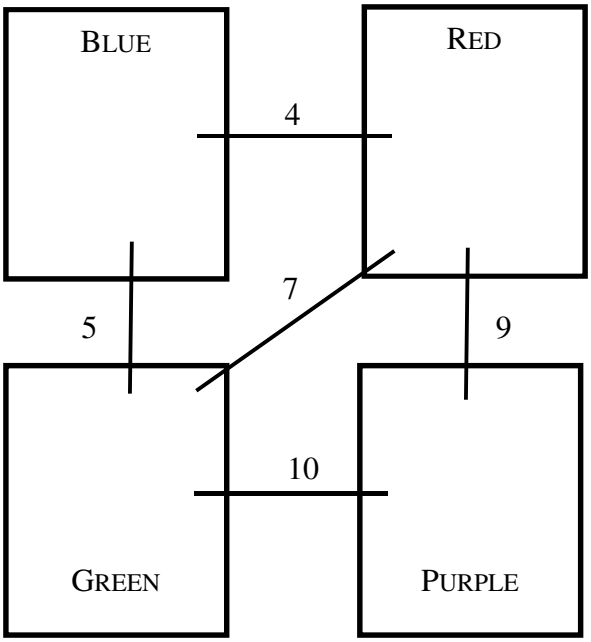

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