Think It & Show It!

(7th Grade)

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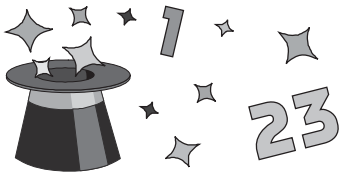
#TCMSTL



NUMBER TRICKS

In the column titled "Your number," write the results of each step of the number trick listed on the left. Once other solutions are shown by your classmates, you may copy down two of the solutions in the two columns titled "Another Number." Analyze these three solutions, and make a conjecture to what you think the final result of the number trick will always be. Finally, in the fourth column, write the algebraic expression that represents the cumulative steps of the number trick. On the second to last line of this column should be the complete expression; then write the simplified version.

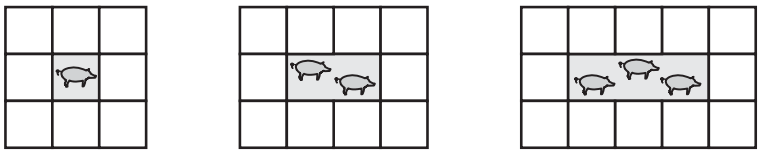
		Your Number	Another Number	Another Number	Algebraic Expression
TRICK #1	Pick a number	_____	_____	_____	_____
	Multiply by 2	_____	_____	_____	_____
	Add 3	_____	_____	_____	_____
	Subtract twice the original number	_____	_____	_____	_____
	Common Result: _____			**Simplified Expression**:	_____
TRICK #2	Pick a number	_____	_____	_____	_____
	Add 4	_____	_____	_____	_____
	Multiply by 2	_____	_____	_____	_____
	Subtract 7	_____	_____	_____	_____
	Subtract twice the original number	_____	_____	_____	_____
	Common Result: _____			**Simplified Expression**:	_____
TRICK #3	Pick a number	_____	_____	_____	_____
	Add 2	_____	_____	_____	_____
	Multiply by 3	_____	_____	_____	_____
	Subtract 6	_____	_____	_____	_____
	Subtract twice the original number	_____	_____	_____	_____
	Common Result: _____			**Simplified Expression**:	_____
TRICK #4	Pick a number	_____	_____	_____	_____
	Add 5	_____	_____	_____	_____
	Multiply by 2	_____	_____	_____	_____
	Subtract 9	_____	_____	_____	_____
	Subtract the original number	_____	_____	_____	_____
	Common Result: _____			**Simplified Expression**:	_____

ASSIGNMENT

Create a number trick similar to those shown above. The trick must be unique. Demonstrate the solution with three different numbers, and then show the algebraic expression that represents each step of the number trick. Finally, write the simplified expression that represents the result of each trick. The higher the degree of difficulty, the higher the grade.

Pig Pen Algebra

Farmer John is making a pig pen. He is short on materials so he is making the pen out of bales of hay. These bales are shaped as cubes. Farmer John likes to keep things simple, so whenever he gets another pig, he just extends the pen as shown below. Your job is to help Farmer John write a formula to tell him how many bales of hay he will need for a given number of pigs.



1. How would you move the existing bales to make room for another pig?

2. In the space above, draw pens that would hold 4 and 5 pigs respectively.

3. How many bales of hay must be added to an existing pen, to make room for the next pig?

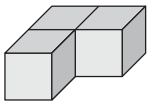
4. Without anymore drawings, complete the chart below for P number of pigs and B number of bales.

P (pigs)	1	2	3	4	5	6	7	8	9	10	20	50
B (bales)	8	10	12									

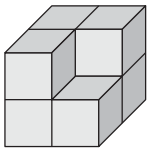
5. How did you figure out your answers for 20 and 50 pigs?

6. According to the pattern in the chart, how many bales would you predict are needed for no pigs?

7. Write an equation that represents the number of bales B needed to pen P number of pigs.



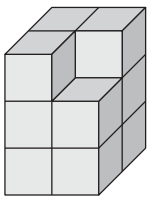
8. Show how to use your new equation to find how many bales are needed for 100 pigs.



9. How many pigs could be penned by 96 bales of hay?

ASSIGNMENT

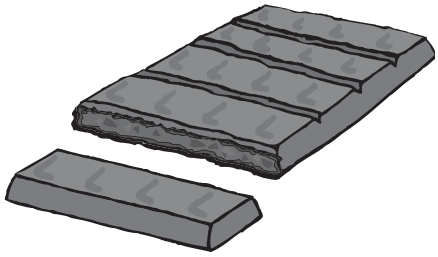
A tower is built up as shown on the right. Write an equation that represents the number of blocks T needed to build a tower S stories tall.

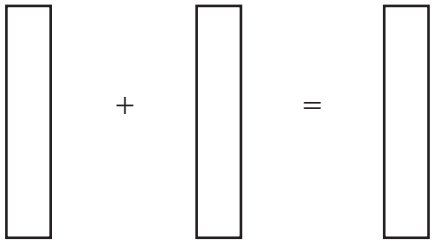


CANDY BARS: ADDING FRACTIONS

Your friend shares a candy bar equally with you. Another friend shares the same kind of candy bar among three of you.

1. a) Show in the first bar below your portion of the first candy bar.
   b) Show in the second bar your portion.
   c) Show in the third bar, how much you have total.
   d) How much more do you need in order to eat a whole candy bar?

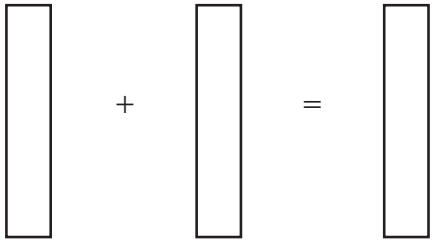




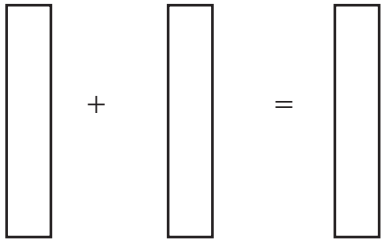
e) Is there an easier way to figure this out, without drawing the diagrams? Show it.

2. Show how both methods above can be used to solve the following problems.

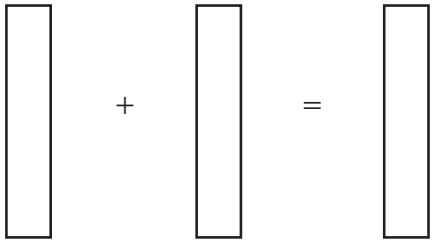
a) $\frac{2}{3} + \frac{1}{6} =$



b) $\frac{3}{5} + \frac{1}{2} =$



c) $1\frac{1}{4} + 1\frac{1}{2} =$



3. Practice:

a) $\frac{2}{3} + \frac{1}{2} =$

b) $\frac{3}{2} + \frac{1}{4} =$

c) $2\frac{1}{4} + 1\frac{1}{3} =$

4. Generalization:

$\frac{a}{b} + \frac{c}{d} =$

BROWNIES: MULTIPLYING FRACTIONS

1. With multi-link cubes...
   a) Show $\frac{1}{2}$ b) Show $\frac{1}{2}$ of $\frac{1}{2}$ c) Show $\frac{3}{4}$ d) Show $\frac{1}{2}$ of $\frac{3}{4}$

2. Is there an easier way to represent this, without drawing the diagrams? Show this symbolic method.
   a) $\frac{1}{2} \bullet \frac{1}{2}$ b) $\frac{1}{2} \bullet \frac{3}{4}$

3. Show how both methods above can be used to solve the following problem:
   a) Show $\frac{5}{6}$ b) Show $\frac{2}{3}$ times $\frac{5}{6}$

4. What is the outcome of $\frac{a}{b} \bullet \frac{c}{d}$?

5. Your friend shares a brownie equally with you. You share your portion of the brownie among you and two friends (three portions). One of the friends says "No thank you," so you keep his portion.
   a) Show, horizontally, the first portion that you receive.
   b) Show, vertically, the portion of it that you keep.
   c) What operation with fractions does this represent.

6. Represent the solution to the following problems both geometrically and symbolically.
   a) $\frac{1}{3} \bullet \frac{1}{5}$ b) $\frac{1}{3} \bullet \frac{3}{5}$ c) $\frac{1}{4} \bullet \frac{4}{5}$ d) $\frac{2}{3} \bullet \frac{3}{4}$

BEEF JERKY: DIVIDING FRACTIONS

1. You have 5 sticks of beef jerky. To how many friends can you give half of a stick of jerky?

   a) Use multi-link cubes to model the 5 beef jerky sticks. Record your multi-link models below.

   b) On only one stick of jerky in the diagram, shade the portion that you wish to share with each person.

   c) Circle as many shares of that portion that you think the 5 sticks will yield. How many is that?

   d) This model is traditionally represented and solved in the following manner:

   $5 \div \frac{1}{2} = 5 \bullet \frac{2}{1} = \frac{10}{1} = 10$

   What does the first 10 represent? What does the 1 represent?

2. a) Represent the following division problem with the cubes and record that model below: $6 \div \frac{2}{3}$
   Be sure to shade the $\frac{2}{3}$ then circle as many of those $\frac{2}{3}$ portions as possible.

   b) This model is traditionally represented and solved in the following manner:

   $6 \div \frac{2}{3} = 6 \bullet \frac{3}{2} = \frac{18}{2} = 9$

   What does the 18 represent? What does the 2 represent?

3. Represent the following division problems with the cubes and record those models below. Be sure to shade the appropriate portions and circle as many of those portions as possible.

   a) $4 \div \frac{2}{5}$ b) $3 \div \frac{2}{5}$ c) $\frac{4}{5} \div \frac{1}{3}$ d) $\frac{1}{2} \div \frac{2}{3}$

The Clothesline

Name: _____
Date: _____

For each set, record the given values, expressions or drawings. After the discussion of their placement on the clothesline, record them on the number line.

1. _____, _____, _____

2. _____, _____, _____

3. _____, _____, _____