

4th Grade GA Milestones Study Guide

Operations & Algebraic Thinking

20%

Interpreting Multiplication and Division

Multiplicative Comparison: $5 \times 8 = 40$: Sally is five years old. Her mom is eight times older. How old is Sally's Mom?

Unknown Product: A blue scarf costs \$3. A red scarf costs 6 times as much. How much does the red scarf cost? ($3 \times 6 = p$)

Group Size Unknown: A book costs \$18. That is 3 times more than a DVD. How much does a DVD cost? ($18 \div p = 3$ or $3 \times p = 18$)

Number of Groups Unknown: A red scarf costs \$18. A blue scarf costs \$6. How many times as much does the red scarf cost compared to the blue scarf? ($18 \div 6 = p$ or $6 \times p = 18$)

Estimation

$$329 + 175 =$$

329 is about 300 and 175 is about 200, so the answer is about 500

$$488 - 87 =$$

488 is about 500 and 87 is about 100, so the answer is about 400

Estimation

$$\begin{array}{r} 537 \\ \times 8 \\ \hline \end{array}$$

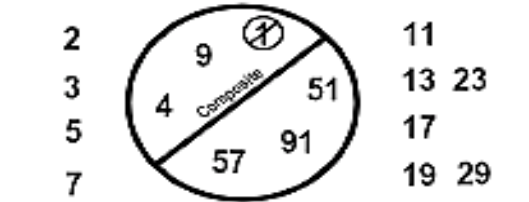
Estimate:
 $500 \times 8 = 4,000$

The product will be about 4,000

Interpreting Remainders

There are 128 students going on a field trip. If each bus held 30 students, how many buses are needed? ($128 \div 30 = b$; $b = 4$ R 8; They will need 5 buses because 4 busses would not hold all of the students)

Prime Numbers



Factors

10 - 1, 2, 5, 10
 1×10
 2×5
factor \times factor = product
 $12 \times 12 = 144$

Multiples

Skip Counting
Adding On
 $+5$ $+5$ $+5$ $+5$ $+5$ 30, ...
144 is a multiple of 12

Rainbow Method for Finding Factors



Analyzing Patterns

Pattern	Rule	Feature(s)
3, 8, 13, 18, 23, 28, ...	Start with 3; add 5	The numbers alternately end with a 3 or an 8
5, 10, 15, 20, ...	Start with 5; add 5	The numbers are multiples of 5 and end with either 0 or 5. The numbers that 3rd with 5 are products of 5 and an odd number. The numbers that end in 0 are products of 5 and an even number.

Numbers & Operations in Base Ten 20%

Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
$10 \times 100,000$	$10 \times 10,000$	$10 \times 1,000$	10×100	10×10	10×1	1

Ten thousands	thousands		hundreds	tens	ones	decimal	tenths
2	6	,	7	5	9	.	3

Twenty six thousand, seven hundred fifty nine and three tenths

$$20,000 + 6,000 + 700 + 50 + 9 + 0.3$$

$$(2 \times 10,000) + (6 \times 1,000) + (7 \times 100) + (5 \times 10) + (9 \times 1) + (3 \times 0.1)$$

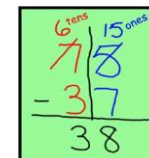
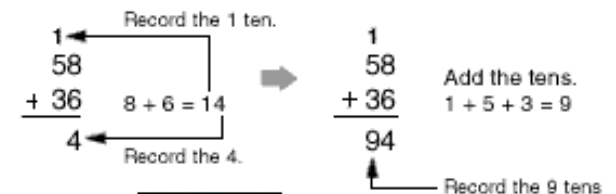
How many tens are in 750? There is a five in the tens place, but it takes 75 tens to make the number 750, so there are 75 tens in 750.

Rounding

Nearest 10	Nearest 100	Nearest 1,000
3,460	3,500	3,000

- Which 10 is it closest to? 3,461
- Which 100 is it closest to? 3,461
- Which 1,000 is it closer to? 3,461

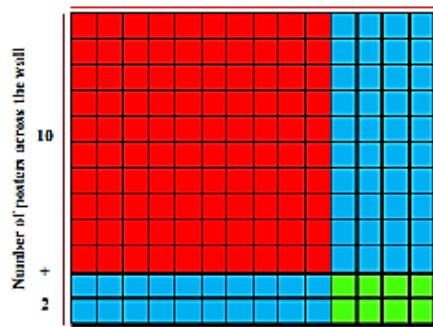
Addition & Subtraction



Multiplication of Whole Numbers (2 digit by 2 digit area model)

I am placing posters on my wall in my room. I can fit 14 posters across and 12 posters down my wall. How many posters can I put on my wall?

Number of posters across the wall
10 + 4



10 + 4

	10	4	0
10	100	40	
2	20	8	

12 is
 $10 + 2$

14 is
 $10 + 4$

168 posters

Various Strategies for Multiplication

There are 25 dozen cookies in the bakery. What is the total number of cookies at the bakery?

Student 1: I broke 12 up into 10 and 2.

$$\begin{aligned} 25 \times 10 &= 250 \\ 25 \times 2 &= 50 \\ 250 + 50 &= 300 \end{aligned}$$

Student 2: I broke 25 into 5 groups of 5.

$$\begin{aligned} 5 \times 12 &= 60 \\ \text{I have 5 groups of 5 in 25.} \\ 60 \times 5 &= 300 \end{aligned}$$

Student 3: I doubled 25 and cut 12 in half to get 50×6 .

$$50 \times 6 = 300$$

Division of Whole Numbers Fair Share Model

$$536 \div 4 = 134$$

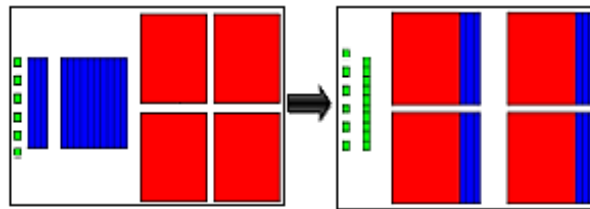
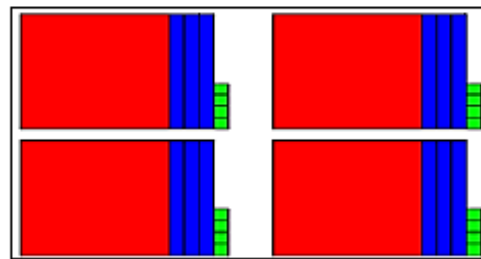


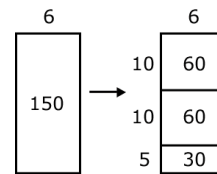
Figure 1

Figure 2



Open Array or Area Model for Division

$$150 \div 6 = 25$$



$$10 + 10 + 5 = 25$$

Using the Relationship between Multiplication & Division

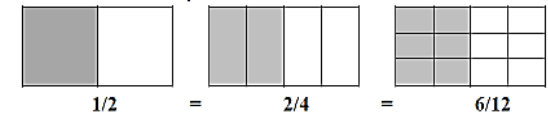
There are 592 students participating in Field Day. They are put into teams of 8 for the competition. How many teams get created?

$$\begin{aligned} \text{I want to get to 592.} \\ 8 \times 25 &= 200 \\ 8 \times 25 &= 200 \\ 8 \times 25 &= 200 \\ 200 + 200 + 200 &= 600 \\ 600 - 8 &= 592 \end{aligned}$$

I had 75 groups of 8 and took one away, so there are 74 teams.

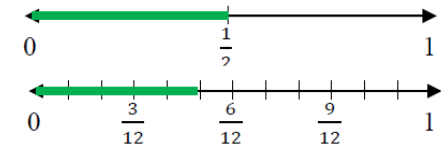
Numbers & Operations—Fractions 30%

Equivalent Fractions

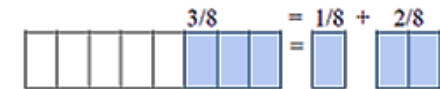
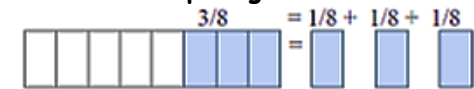


Comparing Fractions

There are two cakes on the counter that are the same size. The first cake has $1/2$ of it left. The second cake has $5/12$ left. Which cake has more left? *The second cake*



Decomposing Fractions



Adding and Subtracting Fractions with Like Denominators

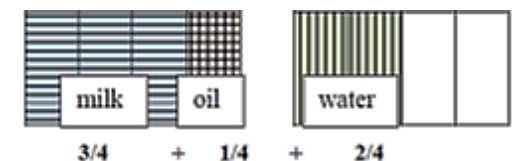
Denominators

$$3\frac{3}{4} + 2\frac{1}{4}$$

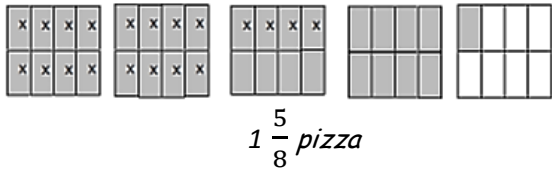


$$3 + 2 = 5 \text{ and } \frac{3}{4} + \frac{1}{4} = 1, \text{ so } 5 + 1 = 6.$$

A cake recipe calls for you to use $\frac{3}{4}$ cup of milk, $\frac{1}{4}$ cup of oil, and $\frac{2}{4}$ cup of water. How much liquid was needed to make the cake? $1\frac{2}{4}$ or $1\frac{1}{2}$



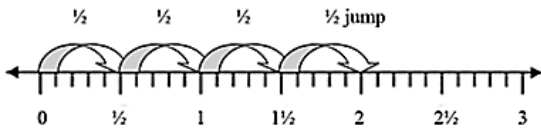
Trevor has $4\frac{1}{8}$ pizzas left over from his soccer party. After giving some pizza to his friend, he has $2\frac{4}{8}$ of a pizza left. How much pizza did Trevor give to his friend?



Multiplication of Fractions

In a relay race, each runner runs $\frac{1}{2}$ of a lap. If there are 4 team members how long is the race?

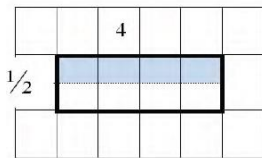
Student 1: Draws a number line of 4 jumps of $\frac{1}{2}$.



Student 2: Draws an area model showing 4 pieces of $\frac{1}{2}$ joined together to equal 2.

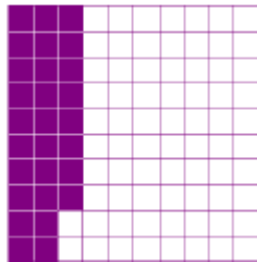


Student 3: Draws an area model representing $4 \times \frac{1}{2}$ on a grid, dividing one row into $\frac{1}{2}$ to represent the multiplier. The four halves shaded combine to make 2.



Decimals

$$\frac{28}{100} = \frac{2}{10} + \frac{8}{100}$$



Ones	.	Tenths	Hundredths
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$$0.32 = \frac{32}{100} = \leftarrow \begin{array}{c} 0.32 \\ \downarrow \\ 0 \quad 0.1 \quad 0.2 \quad 0.3 \quad 0.4 \quad 0.5 \quad 0.6 \quad 0.7 \quad 0.8 \quad 0.9 \quad 1.0 \end{array} \rightarrow$$

Comparing Decimals

Draw a model to show that $0.3 < 0.5$



Measurement and Data 20%

Capacity
The metric system is used throughout the entire world.
Capacity measures the amount an object can hold.
1,000 milliliters = 1 liter (about the volume of 2 2/3 cans of a soft drink)
1,000 liters = 1 kiloliter (the volume of water used in about 6 1/2 loads of laundry)

Length and Distance
Length is the measurement of an object, and distance is the measurement between two places.
10 millimeters = 1 centimeter (about the diameter of a AAA battery)
100 centimeters = 1 meter (about the distance from floor to door knob)
1,000 meters = 1 kilometer (about the length of seven city blocks)

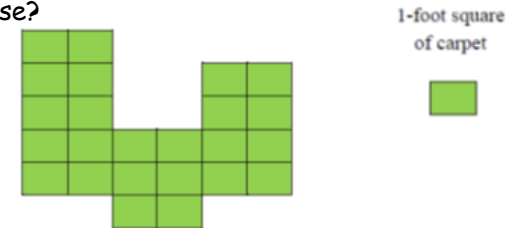
Weight
Weight measures the heaviness of something.
1,000 milligrams = 1 gram (about the weight of a paperclip)
1,000 grams = 1 kilogram (about the weight of a bag of pasta)
1,000 kilograms = 1 metric ton (about the weight of a sub-compact car)

Length	Weight
12 in = 1 ft	16 oz = 1 lb
3 ft = 1 yrd	2000 lb = 1 ton
5,280 ft = 1 mi	
1,760 yrd = 1 mi	

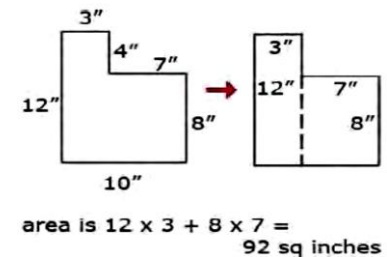
Capacity	Time
128 fl oz = 1 gal	60 sec = 1 min
2 pt = 1 qt	60 min = 1 hr
8 pt = 1 gal	24 hr = 1 day
4 qt = 1 gal	7 days = 1 wk
	52 wk = 1 yr
	12 mon = 1 yr
	365 days = 1 yr

Area and Perimeter

Mr. Rutherford is covering the miniature golf course with an artificial grass. How many 1-foot squares of carpet will he need to cover the entire course?

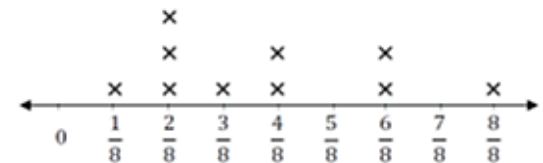


Area of Rectilinear Figures



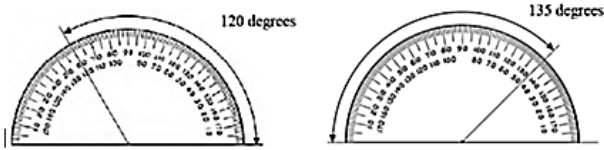
Line Plots

Items Measured to the Nearest $\frac{1}{8}$ inch



How many objects measured $\frac{1}{4}$ inch? **3 items**
 $\frac{1}{2}$ inch? **2 items** If you put all the objects together end to end what would be the total length of **all** the objects? **$4\frac{2}{8}$ or $4\frac{1}{4}$**

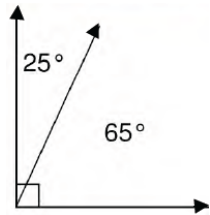
Angle Measurement



Angles are named or classified according to their size.

<p>Acute</p> <p>Smaller than 90°</p>	<p>Obtuse</p> <p>Bigger than 90° but smaller than 180°</p>
<p>Right angle</p> <p>90°</p> <p>If two lines are at right angles, they are perpendicular.</p>	<p>Straight line</p> <p>180°</p>
<p>Full circle</p> <p>360°</p>	

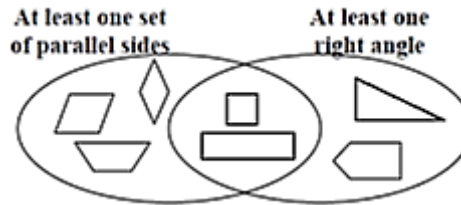
A lawn water sprinkler rotates 65° and then pauses. It then rotates an additional 25° degrees. What is the total degree of the water sprinkler rotation? $65^\circ + 25^\circ = 90^\circ$



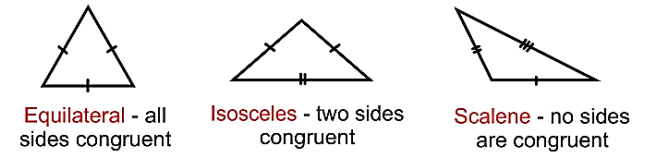
Geometry in Real Life

<p>Point</p> <ul style="list-style-type: none"> magnets counter bottle cap pushpin microwave button top of chair spire tip of a writing utensil 	<p>Line Segment</p> <ul style="list-style-type: none"> spacebar on keyboard shelf legs on a human door handle pencil edges of paper piece of chalk railings window blinds 	<p>Line</p> <ul style="list-style-type: none"> time equator prime meridian universe? toy railroad track orbit of the planets 	<p>Ray</p> <ul style="list-style-type: none"> flashlight sun rays projector arrows
<p>Intersecting Lines</p> <ul style="list-style-type: none"> hands of the clock lines of floor tile the letter X 	<p>Perpendicular Lines</p> <ul style="list-style-type: none"> floor tiles cabinet edges ceiling tiles cinder blocks grid paper window edges equator and prime meridian 	<p>Parallel Lines</p> <ul style="list-style-type: none"> bulletin board tracks railroad tracks rug edges (opposite) lines of paper lines on paneling ipad charging station slots notebook paper book covers human legs 	

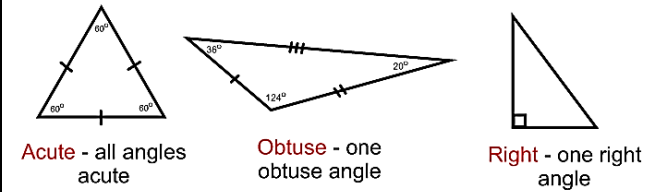
Classification of Geometric Figures



Classifying Triangles by their Sides



Classifying Triangles by their Angles



Symmetry

