5th Grade GA Milestones Study Guide

Operations & Algebraic Thinking 10%

Evaluating Expressions

$$2\{ 5[12 + 5(500 - 100) + 399]\}$$

- The first step would be to subtract 500 – 100 = 400.
- Then multiply 400 by 5 = 2,000.
- Inside the bracket, there is now [12 + 2,000 + 399]. That equals 2,411.
- Next multiply by the 5 outside of the bracket. 2,411 × 5 = 12,055.
- Next multiply by the 2 outside of the braces. 12,055 × 2= 24,110.
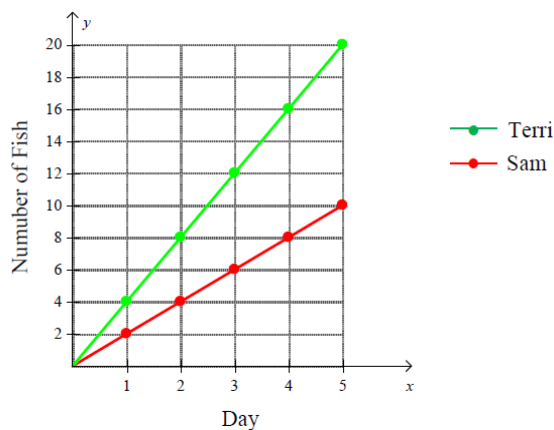
Writing Expressions
Write expression "*double five and then add 26*"

$$(2 \times 5) + 26$$

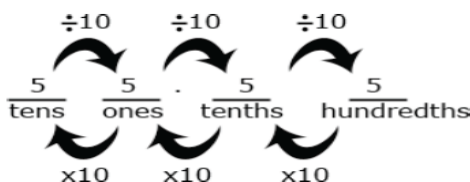### Numerical Patterns & Ordered Pairs on a Coordinate Plane

Days	Sam's Total Number of Fish	Terri's Total Number of Fish
0	0	0
1	2	4
2	4	8
3	6	12
4	8	16
5	10	20

Catching Fish

Numbers and Operations in Base Ten 25%

Powers of 10

- $36 \times 10 = 36 \times 10^1 = 360$
- $36 \times 10 \times 10 = 36 \times 10^2 = 3600$
- $36 \times 10 \times 10 \times 10 = 36 \times 10^3 = 36,000$
- $36 \times 10 \times 10 \times 10 \times 10 = 36 \times 10^4 = 360,000$

$$350 \div 10^3 = 350 \div 1,000 = 0.350 = 0.35$$

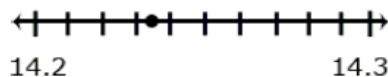|	
$^{350}/_{10} = 35$	$(350 \times {}^1/_{10})$
$^{35}/_{10} = 3.5$	$(35 \times {}^1/_{10})$
$^{3.5}/_{10} = 0.35$	$(3.5 \times {}^1/_{10})$

Decimals in Expanded Form
$$347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$$

Comparing Decimals
0.207 and 0.26

A student might think, "*Both numbers have 2 tenths, so I need to compare the hundredths. The second number has 6 hundredths and the first number has no hundredths so the second number must be larger.*"
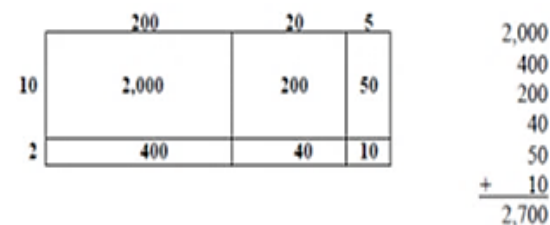
Rounding Decimals

14.2   14.3

- **Round 14.235 to the nearest tenth.**
- Students recognize that the possible answer must be in tenths thus, it is either 14.2 or 14.3. They then identify that 14.235 is closer to 14.2 (14.20) than to 14.3 (14.30).
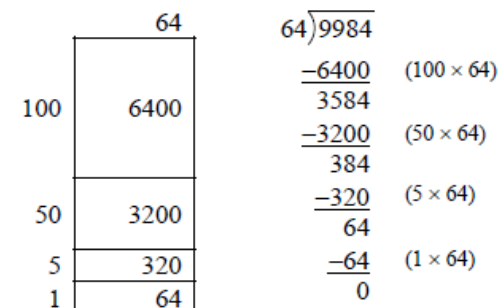
Multiplication with Whole Numbers

$$\begin{array}{r} 96 \\ \times\ 32 \\ \hline 192 \\ 2880 \\ \hline 3072 \end{array}$$

- 192 ⟵ this is 96 x 2
- 2880 ⟵ this is 96 x 30
- 3072 ⟵ this is 96 x 32

Area Model 225 × 12

	200	20	5
10	2,000	200	50
2	400	40	10

2,000
400
200
40
50
+ 10
2,700

Area Model for Division

100	6400
50	3200
5	320
1	64

$$64)\overline{9984}$$
−6400 (100 × 64)
3584
−3200 (50 × 64)
384
−320 (5 × 64)
64
−64 (1 × 64)
0

100+50+5+1=156

### Using Expanded Notation
2682 ÷ 25 = (2000 + 600 + 80 + 2) ÷ 25

Using understanding of the relationship between 100 and 25, a student might think:
- I know that 100 divided by 25 is 4 so 200 divided by 25 is 8 and 2000 divided by 25 is 80.
- 600 divided by 25 has to be 24.
- Since 3 x 25 is 75, I know that 80 divided by 25 is 3 with a reminder of 5. (Note that a student might divide into 82 and not 80.)
- I can't divide 2 by 25 so 2 plus the 5 leaves a remainder of 7.
- 80 + 24 + 3 = 107. So, the answer is 107 with a remainder of 7.

Operations with Decimals

Subtraction: 4 - 0.3

- 3 tenths subtracted from 4 wholes. One of the wholes must be divided into tenths.
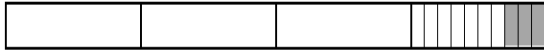
- The solution is 3 and $^7/_{10}$ or 3.7.

Addition: A recipe for a cake requires 1.25 cups of milk, 0.40 cups of oil, and 0.75 cups of water. How much liquid is in the mixing bowl?

- *I saw that the 0.25 in the 1.25 cups of milk and the 0.75 cups of water would combine to equal 1 whole cup. That plus the 1 whole in the 1.25 cups of milk gives me 2 whole cups. Then I added the 2 wholes and the 0.40 cups of oil to get 2.40 cups.*

.25 + .75 + 1 + .40 = 2.40

0   50   1   1.5   2   2.5   3
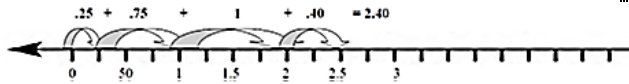
Multiplication: A gumball costs $0.22. How much do 5 gumballs cost? Estimate the total, and then calculate. Was your estimate close?
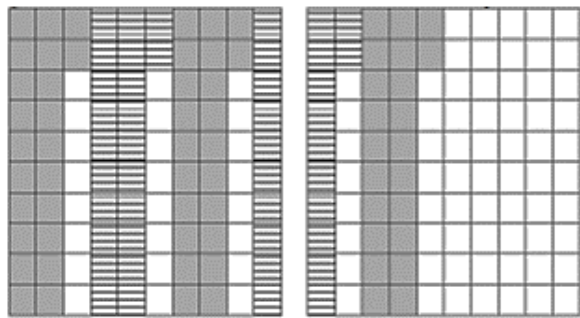
I estimate that the total cost will be a little more than a dollar. I know that 5 20's equal 100 and we have 5 22's. I have 10 whole columns shaded and 10 individual boxes shaded. The 10 columns equal 1 whole. The 10 individual boxes equal 10 hundredths or 1 tenth. My answer is $1.10. My estimate was a little more than a dollar, and my answer was $1.10. I was really close.

2.4
x 1.3
.12
.60
.40
+ 2.00
3.12
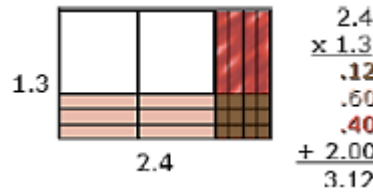
Division: Joe has 1.6 meters of rope. He has to cut pieces of rope that are 0.2 meters long. How many can he cut? *8 pieces*

1.6 m

1 m   1.6 m 2 m
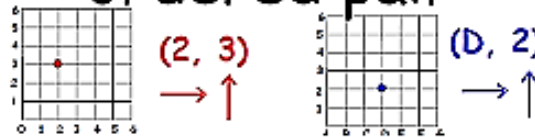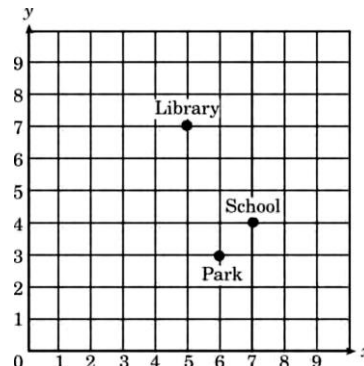
1 m   1.6 m 2 m
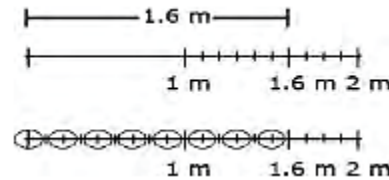
2.4 ÷ 4 = 0.6

0.6 0.6 0.6 0.6

Geometry 15%

## ordered pair

(2, 3)   (D, 2)

Using the coordinate grid, which ordered pair represents the location of the school? *(7, 4)*

- **quadrilateral** – a four-sided polygon.
- **parallelogram** – a quadrilateral with two pairs of parallel and congruent sides.
- **rectangle** – a quadrilateral with two pairs of congruent, parallel sides and four right angles
- **rhombus** – a parallelogram with all four sides equal in length
- **square** – a parallelogram with four congruent sides and four right angles.

Hierarchy Diagram

Quadrilateral

Parallelogram

Rectangle   Rhombus

Square
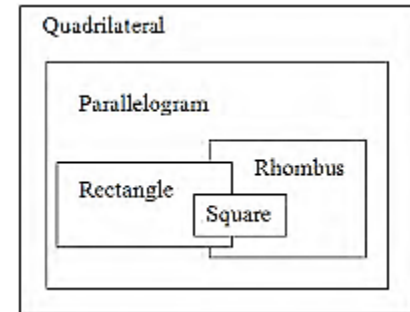
Measurement & Data   20%

Measurement Metric

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 2¾ cans of a soft drink)

1,000 liters = 1 kiloliter (the volume of water used in about 6½ 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)

I think it's 23 kilometers as the crow flies.

Weight
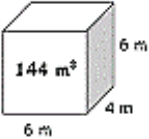
Weight measures the heaviness of something.

1,000 milligrams = 1 gram (about the weight of a a paperclip)

1,000 clips = 1 bag

1,000 grams = 1 kilogram (about the weight of a bag of pasta)

1,000 bags = 1 car

1,000 kilograms = 1 metric ton (about the weight of a sub-compact car)

Line Plots
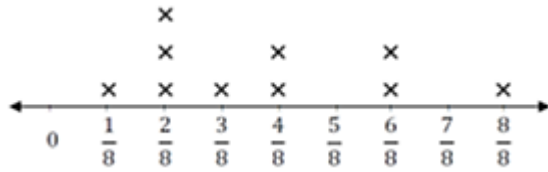
Items Measured to the Nearest 1/8 inch
How many objects measured 1/4 inch? **3 items**

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 $\frac{1}{4}$**

volume
in³
ft³
yd³
cm³
m³
Three dimensional size of an object – how much space a container occupies

one layer   five layers fill the box
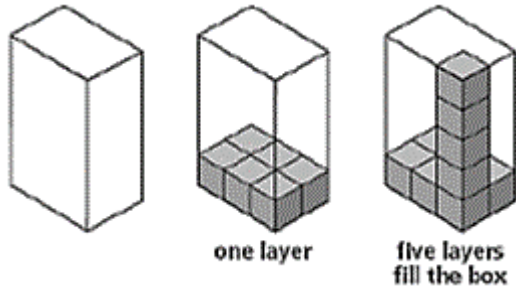
- (3 × 2) represents the number of blocks in the first layer
- (3 × 2) × 5 represents the number of blocks in 5 layers
- 6 × 5 represents the number of block to fill the figure
- **30 blocks fill the figure**
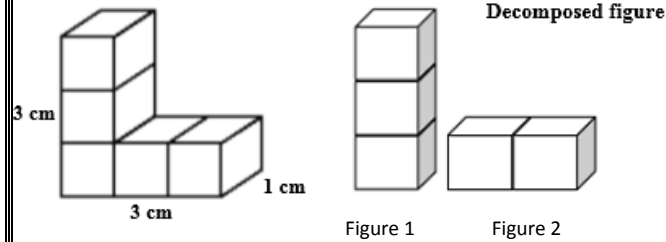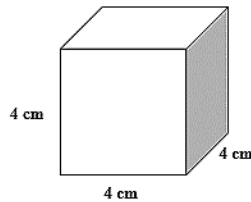
Finding the Volume of Composite Figures

Decomposed figure
Figure 1   Figure 2

Figure 1: $3 \times 1 \times 1 = 3\ cm^3$
Figure 2: $2 \times 1 \times 1 = 2\ cm^3$
Total Volume: $3\ cm^3 + 2\ cm^3 = 5\ cm^3$

$V = l \times w \times h$
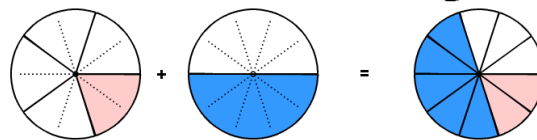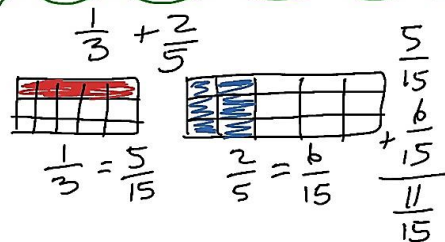$V = 4 \times 4 \times 4 = 64\ cm^3$
 OR
$V = B \times h$
$V = 16 \times 4 = 64\ cm^3$

Numbers & Operations-Fractions 30%

Adding & Subtracting Fractions with Unlike Denominators

$\frac{1}{5}$ + $\frac{1}{2}$ = $\frac{7}{10}$

2/10 + 5/10 = 7/10

If Mary ran $3\,^1/_6$ miles every week for 4 weeks, she would reach her goal for the month. The first day of the first week she ran $1^3/_4$ miles. How many miles does she still need to run the first week?

This model shows $1\,^3/_4$ subtracted from $3\,^1/_6$ leaving $1 + ^1/_4 + ^1/_6$ which you can then change to $1 + ^3/_{12} + ^2/_{12} = 1\,^5/_{12.}$

1   1 $\frac{1}{4}$ $\frac{1}{6}$
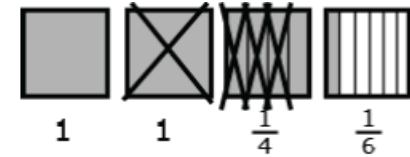
### Estimating Sums and Differences

Your teacher gave you $^1/_7$ of the bag of candy. She also gave your friend $^1/_3$ of the bag of candy. If you and your friend combined your candy, what fraction of the bag would you have? Estimate your answer.

$^1/_7$ is close to $^1/_6$ but less than $^1/_6$. $^1/_3$ is equivalent to $^2/_6$. So $^1/_7 + ^1/_3$ is a little less than $^3/_6$ or $^1/_2$.

Jerry was making two different types of cookies. One recipe needed $^3/_4$ cup of sugar and the other needed $^2/_3$ cup of sugar. How much sugar did he need to make both recipes?

$1\frac{5}{12}$
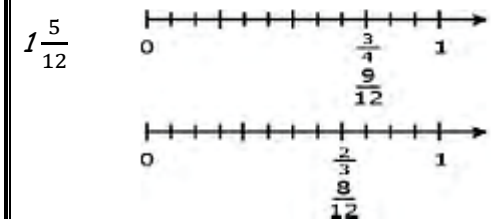
Solution:
$1\frac{5}{12}$ cups
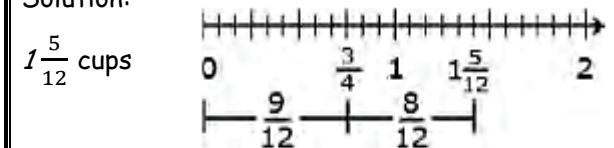
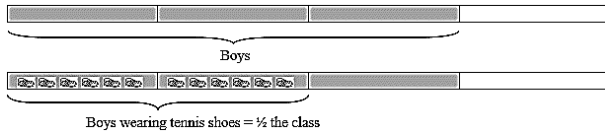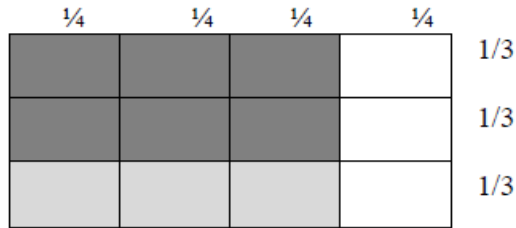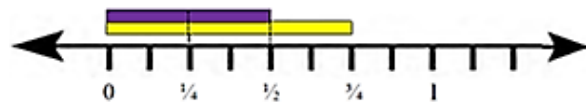## Multiplication of Fractions

Three-fourths of the class is boys. Two-thirds of the boys are wearing tennis shoes. What fraction of the class are boys wearing tennis shoes? $\frac{1}{2}$ *of the class*
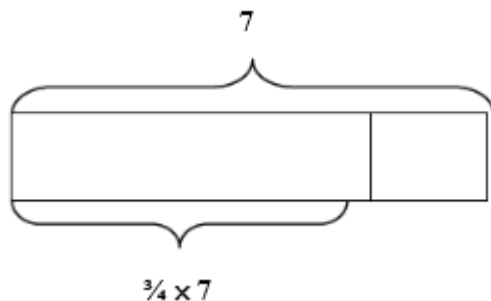
Boys

Boys wearing tennis shoes = ½ the class

OR…

¼	¼	¼	¼	
				1/3
				1/3
				1/3

OR…

0   ¼   ½   ¾   1

Multiplication as Scaling

$2^2/_3 \times 8$ *must be more than 8 because 2 groups of 8 is 16 and* $2^2/_3$ *is almost 3 groups of 8. So the answer must be close to, but less than 24.*
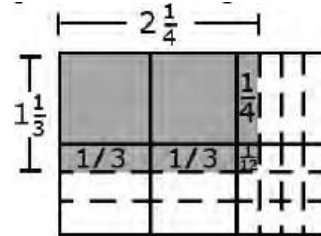
OR…

$\frac{3}{4}$ *is less than 7 because 7 is multiplied by a factor less than 1 so the product must be less than*
7.

7

¾ × 7

Multiplication of Mixed Numbers

Mary and Joe determined that the dimensions of their school flag needed to be $1^1/_3$ ft. by $2^1/_4$ ft. What will be the area of the school flag?

$2\frac{1}{4}$

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

1/3   1/3 $\frac{1}{12}$

- First, I am going to multiply $2^1/_4$ by 1 and then by $^1/_3$.
- When I multiply $2^1/_4$ by 1, it equals $2^1/_4$.
- Now I have to multiply $2^1/_4$ by $^1/_3$.
- $^1/_3$ times 2 is $^2/_3$.
- $^1/_3$ times $^1/_4$ is $^1/_{12}$.
- So the answer is $2^1/_4 + {}^2/_3 + {}^1/_{12}$ or $2^3/_{12} + {}^8/_{12} + {}^1/_{12} = 2^{12}/_{12} = 3$

Division of Fractions

Four students sitting at a table were given $^1/_3$ of a pan of brownies to share. How much of a pan will each student get if they share the pan of brownies equally? $\frac{1}{12}$ *of the pan*

$\frac{1}{3}$

$\frac{1}{12}$
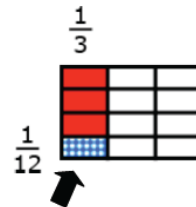
The bowl holds 5 Liters of water. If we use a scoop that holds $^1/_6$ of a Liter, how many scoops will we need in order to fill the entire bowl?

I created 5 boxes. Each box represents 1 Liter of water. I then divided each box into sixths to represent the size of the scoop. My answer is the number of small boxes, which is 30. That makes sense since 6 × 5 = 30