THE SCHOOL DISTRICT OF PHILADELPHIA

5th Grade Learning Guide Math

Grade: 5 **Subject:** Math

Topics:

- Adding, subtracting, multiplying, and dividing decimals
- Multiplying and Dividing fractions
- Identifying attributes (features) of shapes
- Identifying fractions in models and on number lines

What Your Student is Learning:

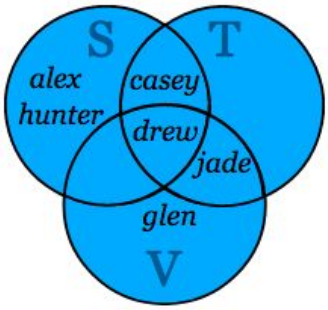
- In many of these lessons, you will see that it asks students to look for and explain patterns. This is important because it helps them to realize that math makes sense and that they can use what they know to help them with what they don't know. For example, if I can make a number line with whole numbers: 0, 1, 2, 3, 4… I can also make a number line with decimals: 0, 0.1, 0.2, 0.3, 0.4. And, if I can add whole numbers, 2 + 3 = 5, I can add decimals, 0.02 + 0.03 = 0.05. Although students need to be able to do the calculations throughout this packet without calculators, you can have a calculator handy for them to check their work. If they make a mistake, ask: Where do you think you went wrong? Can we find, fix, and learn from the mistake?
- This packet also has word problems. Do students understand **when** they should multiply and divide? In what real world situations will dividing be appropriate? Can they come up with their own story problems? Who cares if I can divide if I don't know when or why I should do it!
- There are a lot of fractions in 5th grade, and ideally students have already learned how to multiply and divide them. It is possible they will struggle with this content. Some online support resources have been suggested, but you can also look on Khan Academy for more support, if needed.

Background and Context for Parents:

Lesson	Notes
1	Throughout this packet, students will likely need extra space to work. Provide extra paper rather than having them cram it in. Part 1: The division problems can be solved mentally, so if students begin to use a written algorithm, ask them to pause and think. How could they solve? The picture for 7 x 15 could be 7 groups of 15 things, 15 groups of 7 things, or more likely, a rectangle that has the dimensions 7 and 15. Part 2: Notice that #1 is a multiplication problem and #2 is a division problem. Discuss with your student: what is happening in the problem? How did you know to multiply? Divide? If you go to this site, you will learn a lot about the progression of how students learn to multiply and divide: https://gfletchy.com/progression-videos/ In 5th grade, students know many strategies to multiply, including the standard algorithm that you learned in school. For division, they aren't intended to learn the standard way you divided until 6th grade. Here is a resource to explain another multiplication strategy: https://www.youtube.com/watch?v=WYJsQo7ZTC4 and one for division: https://www.youtube.com/watch?v=F0vb5hyzA_Q
2	Part 1: The arrows appear to be between tick marks, so there are a range of acceptable answers. It might help to label all of the tick marks first (0.1, 0.2, 0.3, etc). Part 2: Ask why they labeled the runners where they did. How did they know? A common wrong answer for the pumpkins is 4.8 because it is the fewest digits.

	You can sign up for a 30 day free trial on this site. It has some great virtual manipulatives, including this one for place value (switch to decimal view): https://app.brainingcamp.com/manipulatives/base-ten-blocks
3	Part 1: 5th grade is when students first begin to add, subtract, multiply, and divide decimals. For addition and subtraction, it is important to line up the decimal places. Ask students what patterns they notice as they subtract. Also, ask them to read the problems. For example, 0.038 - 0.025 is read as “thirty-eight thousandths minus twenty-five thousandths.” Part 2: Sum means add and difference means subtract. Students may want to use the brainingcamp website from day 2 to help them here. Ask them how thinking about whole numbers could help them when thinking about decimals. For example, I know that 3 + 4 + 1 = 8, so 0.03 + 0.04 + 0.01 = 0.08. Students should be able to subtract fractions in 5th grade. However, for this problem, you can use a calculator if you want. The focus in the problem is more on making sense of the diagram. What do they know? What do they want to find out? What is the diagram showing?
4	Part 1: If students are having trouble with the calculations, let them use a calculator and then focus on discussing what patterns they see. They can use the calculator to help them to discover the patterns. For example, I notice that with all of the versions of 43 x 2, the product has the digits 86, but the decimal place changes. Ask: how does the decimal change? How do the decimals in the factors impact the decimal in the product? Part 2: Do students know about how much a gram weighs? Often we use units like inches and feet and grams in problems, but students don’t know how big those are! www.estimation180.com is a fun website to help with estimation. Students often think we estimate because the book tells us to, rather than realizing that we estimate because sometimes we don’t have to be precise, and estimating is way easier! For each of these problems in part two, ask how the pictures, the estimates, and the solutions are similar and different.
5	Part 1: Do they understand what it means to multiply and divide? Often we assume that when we multiply, answers get bigger and when we divide, they get smaller? Is that always true? For multiplication, for example, if I multiply by a number greater than 1, yes it gets larger! If I multiply by a number less than 1, however, it gets smaller. They can use calculators to check their work. Focus on the explanations. Part 2: Have students explain all of their thinking. They can use calculators to help them with the problems, but they need to be able to explain what operation they used and why. For #2, for example, many students might see “3 times” and 45.75 x 3 instead of dividing. They need to read and make sense of the problem.
6	*Note: There is a lot of content throughout the ten lessons of this learning guide. Do not stress about getting through it all. What are students doing well on? What questions do they have? What topics and skills are difficult? If there is a particular topic where you want to slow down and focus, do it! Now, we are moving on to fractions! It might be hard to see which boxes are shaded in the diagram. There are a total

	of 5 boxes shaded, decreasing in size. This is a great problem that requires critical thinking. Ask them to explain their ideas. The same is true for the fractions at the bottom of the page. They will have to play around and explore to see where they should put the numbers. What happens when you put a large number in the numerator? What about the denominator?
7	It can be hard to think of word problems when fractions are involved. Here are a couple of examples: (1) I want to make 1 ½ batches of cookies. Each batch calls for ¾ cup of sugar. How much sugar do I need? (2) I have 1 ½ times as many feet of ribbon as my friend. She has ¾ of a foot, how much do I have? This video can help you to understand what it means to create a rectangle with those fractional dimensions, and to multiply: https://www.youtube.com/watch?v=yzzmFv37I9s If students need to use calculators for the bottom part, they can, but make sure after doing so they notice the patterns. What happens when you multiply by more than 1? Exactly 1? Less than 1? They can think about multiplying by a fraction less than 1 as finding a "part of" a number rather than as "multiple groups of" a number.
8	In 5th grade, students learn that they can multiply fractions by multiplying across, numerators times numerators, and denominators times denominators. They can rewrite a whole number as a fraction by putting it over 1. Finding a fraction OF a whole number is another way to say multiply. For the number line, do not stress about being perfectly accurate. If they mark the whole numbers 0, 1, 2, and 3, can then generally tell roughly where the fractions belong? When they think about the fractions greater than 1, like 5/3, they can think of it as FIVE thirds (three thirds is 1 whole, and 6 thirds is 2 wholes). Or, they could convert it to a mixed number: 1 ⅔. This might help with this page: https://www.mathsisfun.com/fractions_multiplication.html
9	This is a fun page that requires critical thinking. If your student is stuck, you might suggest they start with A. What fraction is A? If you know A, can you figure out B?
10	This is another interesting page that has no real wrong answers. Push students to make full and clear explanations of what they notice. Just "noticing" things in a table like this is a key mathematical skill. Can they make up mathematical questions that the table will help them to answer? Take turns making up questions and answering them. Does it help to draw pictures?
11	Try not to use the table from the previous page to get the answers. Instead, because students already have noticed patterns, they should be able to complete this independently. A question you might ask: Why is it that some of the fractions are less than 1 and some greater than 1?What situations result in fractions greater/ less than 1?

12	Hopefully, because you have already made up your own questions, these will be quick and easy! In preparation for the next page, I want to let you in on a “secret” :) - the whole point of these pages is to help students understand the relationship between fractions and division. It turns out that when we divide these candy bars among the people, the resulting amounts are our fractional quotients.
13	If students don’t understand, you might want to refer back to a couple of specific boxes: If I have 6 candy bars shared with 2 people, how many does each person get? 3? Let’s check the table -- it says 6/2 -- oh, that’s 3! When I took 6 divided by 2, I wrote it as a fraction 6/2! How about 1 candy bar split with 2 people? Each gets half, right? Yep, that’s what the table says! 1 divided by 2 is ½! Those are easy in our heads. The table can help us with the more challenging things like 3 candy bars split among 7 people -- 3/7 each!
14	Students continue the same learning from the previous page by noticing the patterns as they divide. When they move to dividing fractions by whole numbers, go ahead and let students use a calculator (show the answers as fractions, not decimals). Once they see all of the answers, they should easily be able to notice and apply the pattern!
15	You may need to clarify for students that the little tick marks indicate that the sides are equal length, and the small squares mean that there are right angles. Students may not have seen Venn Diagrams before, so you could talk about an easier example first. Imagine you asked students what sports they play: (s)occcer, (t)ennis, and (v)olleyball. What does the diagram below tell you about each student? What do Glen and Jade have in common? Which students like Soccer? Who likes soccer AND tennis? etc.  Rather than stressing about answering all of the questions on the worksheet right away, let students explore the diagram. What do they notice about the shapes? What do 1, 2, and 3 have in common? What about 2, 5, 6, and 7? Just notice and explore and describe.

Ways to support your student:

- Read the problem out loud to them.
- Remember, focus on strategies instead of answers. We want students to understand and be flexible with numbers.
- Before giving your student the answer to their question or specific help, ask them “What have you tried so far? What do you know? What might be a next step?
- After your student has solved it, and before you tell them it’s correct or not, have them explain to you

how they got their solution and if they think their answer makes sense.

Some Online Resources for Parents and Students:

- Amazing videos to show you how content progresses. Learn about the different strategies and algorithms:
  https://gfletchy.com/progression-videos/
- Games to practice Grade 5 Math
  https://www.splashlearn.com/math-skills/fifth-grade
- Area models for multiplication:
  https://www.youtube.com/watch?v=WYJsQo7ZTC4
- Area models help us to multiply whole numbers, but they also help with mixed numbers:
  https://www.youtube.com/watch?v=yzzmFv37I9s
- A strategy for division of whole numbers:
  https://www.youtube.com/watch?v=F0vb5hyzA_Q
- You can get a free 30 day trial for this site. It has some good virtual manipulatives including base-10 blocks:
  https://app.brainingcamp.com/manipulatives/base-ten-blocks

Learning Support for Mathematics

For students that are approaching grade level and have learning gaps/ differences in mathematics, provide numerous opportunities for explorations at the concrete (manipulatives) and representational (visual) levels before progressing to the abstract (numbers) level. Students that need learning supports should be provided with:

- Intensive Direct Instruction and daily guided practice
- scaffolded supports
- the use of visuals as models and aids
- numerous opportunities to think out loud
- support to help them understand the why
- use of manipulatives and tools to support understanding
- Bar Modeling Representations to decode word problems
- the use of mnemonics to enhance retention of skills
- daily practice with basic facts
- the presentation of content in varied contexts and varied levels
- opportunities to use diagrams and draw math concepts
- graph paper to support understanding
- numerous opportunities to draw pictures of word problems
- the use of smaller numbers to address number operations
- opportunities for success to build a growth mindset
- computer time to allow for needed practice
- opportunities to engage in metacognition (the building and reinforcing of thinking and reasoning) skills

See examples for each bulleted item.

- **Intensive Direct Instruction and daily guided practice**

(Intensive Direct Instruction means to explain the skill / concept to the student with several examples repeatedly to help them understand)
https://youtu.be/F_HzrRBOU7I / https://youtu.be/OJJkkUPC_yM

- **Scaffolded Supports**

(Scaffolded supports means to introduce the skill one step at a time – allowing the student to understand one section part, before moving on to
the next part) ex. 5+ 1=6, 9+1=10, 24+1=25- it is the same as "what
number comes after 5, after 9, after 24
https://youtu.be/5hWDbSx_kdo

- **Visuals as models and aides**

(Pictures of objects that can be used to help students understand the math)
https://studentsatthecenterhub.org/resource/helping-struggling-students-build-a-growth-mindset/

- **Thinking out loud**

(Allows students to talk and think about the skills they are learning, which allows them to better remember the skill)
https://youtu.be/f-4N7OxSMok

- **Understanding the why**

(When students understand why a strategy works, they will apply it to other skills) ex. 5x = 5, 45x1= 45, 320x1=320

- **Manipulatives and Tools**

(Manipulatives can be counters, beans, blocks, etc. – Tools can be rulers, calculators, scales, etc.) **https://youtu.be/uWBZF-Lyq58**

- **Bar Modeling Representations**

(Bar Modeling Representations consist of visuals that help students under the skill they are learning. Ex.

70	
35	35

https://youtu.be/TbayTZvS_bc

- **Mnemonics**

(Mnemonics consist of strategies to help students remember skills – ex.

https://youtu.be/dXvvGc9TldY

- **Basic Facts**

(Basic facts include addition, subtraction, division, multiplication facts –
ex. 8+2=10, 2+8=10, 10-2=8, 10-8=2 / 2x5=10, 5x2=10, 10/2=5, 10/5=2
https://youtu.be/TbayTZvS_bc

- **Content with varied contexts and varied levels**

Means to show student how to solve a problem different ways to allow them to use the skill that way they understand best
https://youtu.be/FVg9n0I0Gf0

- **Diagrams**

(Diagrams provide students with visuals / pictures that help them solve the problem and they help them read the problem with less words)
https://youtu.be/TbayTZvS_bc

- **Graph paper**

(Graph paper helps students to solve the problem by making it visual / easier to see the answer)
https://youtu.be/mX43cn3IASI

- **Drawing Pictures**

(Drawing pictures allow students to show they can solve the problem without using words that they may not know or be able to write)
https://youtu.be/TbayTZvS_bc

- **Smaller Numbers**

(The use of smaller numbers can helps students understand the process of a skill, so that when they move on to bigger numbers, they will see that the process is still the same, they acquire understanding of the skill) ex. 5x = 5, 45x1= 45, 320x1=320

- **Growth Mindset**

(A growth mindset is a process that helps to improve intelligence (thinking), ability (skill) and performance (actions). This means that by helping students to develop a growth mindset, we can help them to learn to think and be problem solvers. This is a process that occurs over time by helping them improve by building success over time.
https://studentsatthecenterhub.org/resource/helping-struggling-students-build-a-growth-mindset/

- **Computer Time**

(Computer time allows students to use websites, games, activities that will help them learn math skills and concepts)
mathgametime.com, pbs.com, bestkidsolutions.com, firstinmath.com, helpingkidsrise.org

- **Metacognition**

(Metacognition means to help students think about what they are thinking, the steps they are using, the words and numbers that they are using- It helps students to better focus on the skills they are using- it is a process that occurs over time) / **https://youtu.be/HKFOhd5sMEc/**
http://www.spencerauthor.com/metacognition/

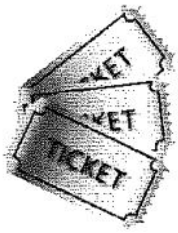
Part 1:

Solve these division problems. Explain how you got each answer: 100 / 4 40 / 4 24 / 4 4 / 4 124 / 4	Draw a picture that shows 7 x 15

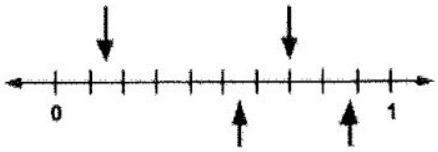
Part 2:

1) A city bus made 252 stops a day. How many stops did the bus make in 37 days?

2) Kim got a point for every 12 raffle tickets she sold. She sold 3620 raffle tickets. How many points did she get?



Part 1:

What numbers are the arrows pointing to?	How many ways can you rewrite the number 0.72?
	

Part 2:

1) The after-school sports program had a one mile race. Here are the times of seven of the runners in minutes:

Phan: 7.7	Daniel: 7.44	Patti: 7.1	
Ida: 7.501	Maisha: 7.01	Ali: 7.941	Manuel: 7.332

Show *about* where each of the numbers would be on a number line:

2) Mrs. Sanders bought 3 pumpkins. The first one weighed 4.8 kilograms, the second one weighed 4.09 kilograms, and the third one weighed 4.196 kilograms. Which pumpkin weighed the least? How do you know?

Part 1:

Decimal Subtraction Patterns: 38 – 25 3.8 – 2.5 0.38 – 0.25 0.038 – 0.025	How many expressions can you find that are equivalent to ¾ ? ¾ = ?

Part 2:

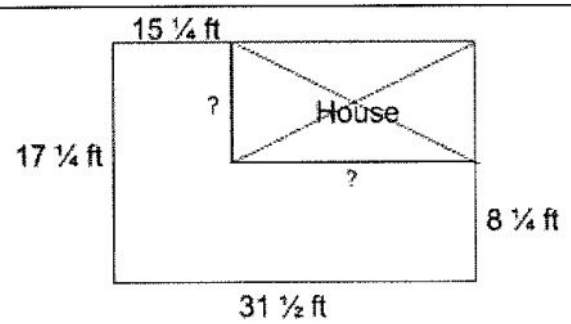
1) Name 3 decimals whose sum is 0.08:

Name 5 decimals whose sum is between 2 and 3.

Name 2 decimals with a difference of 0.35.

2) Dante's mom wants to build a fence around their yard. Here are the measurements of the yard:

What are the measurements of the missing sides of the yard? How long will the fence be?



Part 1:

What are the products? What patterns do you see?	What are the quotients? What patterns do you see?
43×2 4.3×2 4.3×20 0.43×2 0.43×20 4.3×200	$78 \div 3$ $7.8 \div 3$ $0.78 \div 3$

Part 2:

1) Kipton has a digital scale. He puts a marshmallow on the scale and it reads 7.2 grams. How much would you expect 12 marshmallows to weigh? Why?

Picture	Estimate	Solution

2) Jamaal paid \$3.74 for 2 ballpoint pens. How much did 1 pen cost?

$\$3.74 \div 2$

Tape Diagram	Record of work
Estimate	

Part 1:

Will the product be greater or less than each factor? How do you know?	Will the quotient be greater or less than the dividend? How do you know?
56.9×2.01	$56.9 \div 2.01$
14.33×0.98	$14.33 \div 0.98$

Part 2:

1) Draymond Green averaged 5.1 field goal shot attempts per game. Stephen Curry averaged 10.2 field goal shot attempts per game. How many times as many field goal shot attempts per game did Stephen Curry average as Draymond Green?

2) Luis raised $45.75 for the animal shelter, which was 3 times as much money as Anthony raised. How much money did Anthony raise?

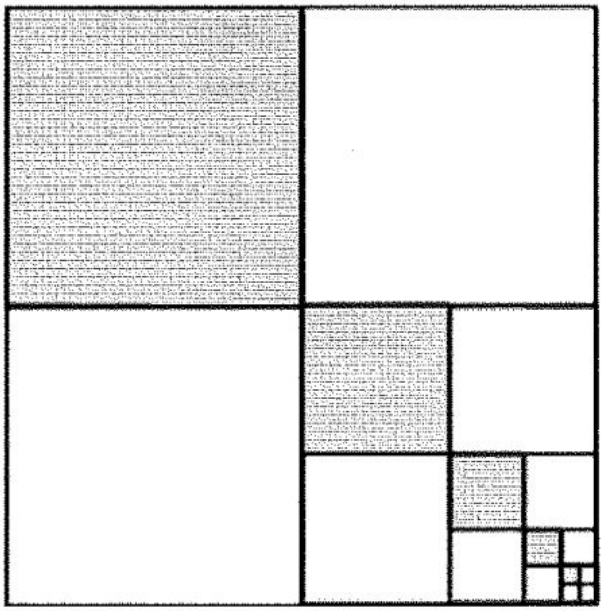
3) Use place value reasoning and the first quotient to compute the second quotient. Explain a pattern you used.

$19.2 \div 40 = 0.48$	$19.2 \div 4 =$
$39.6 \div 6 = 6.6$	$39.6 \div 60 =$

Solve on the number line.

$\frac{2}{3} \times \frac{3}{4} =$

What part of the square is shaded?



Place the numbers 1, 2, 3, and 4 into each space to try to make the **largest** possible answer and the **smallest** possible answer.

$$\frac{\square}{\square} \times \frac{\square}{\square} \qquad \frac{\square}{\square} \times \frac{\square}{\square}$$

Write a story that matches this equation:

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

Draw a rectangle with these dimensions and calculate its area:

$3\frac{2}{3} \times 2\frac{1}{3}$

Estimate the value of each expression and decide which box it goes in.

$1 \times \frac{1}{4}$	$\frac{3}{4} \times 2\frac{1}{3}$	$\frac{1}{5} \times 5$	$\frac{1}{2} \times 2$

Less than 1	Equal to 1	More than 1

Explain one of your choices.

What is...

$\frac{1}{4}$ of \$1.00_____

$\frac{1}{2}$ of \$1.00_____

$\frac{2}{4}$ of \$1.00_____

$\frac{1}{5}$ of \$1.00_____

$\frac{3}{5}$ of \$1.00_____

$\frac{3}{5}$ of \$2.00_____

What pattern do you notice?

Place the following fractions on the number line:

$\frac{4}{5}$ $\frac{1}{5}$ $1\frac{4}{5}$ $\frac{1}{3}$ $\frac{10}{3}$ $\frac{5}{3}$ $\frac{5}{4}$ $1\frac{2}{3}$ $\frac{6}{9}$ $2\frac{1}{5}$ $\frac{3}{10}$ $1\frac{2}{5}$

What is ¼ of 36? _____

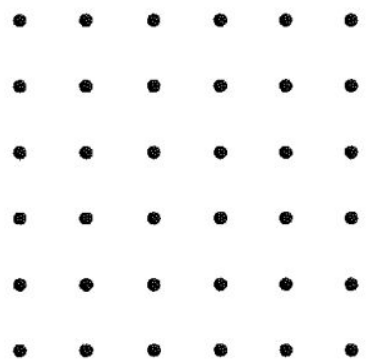
What is 2/4 of 36? _____

What is 3/4 of 36? _____

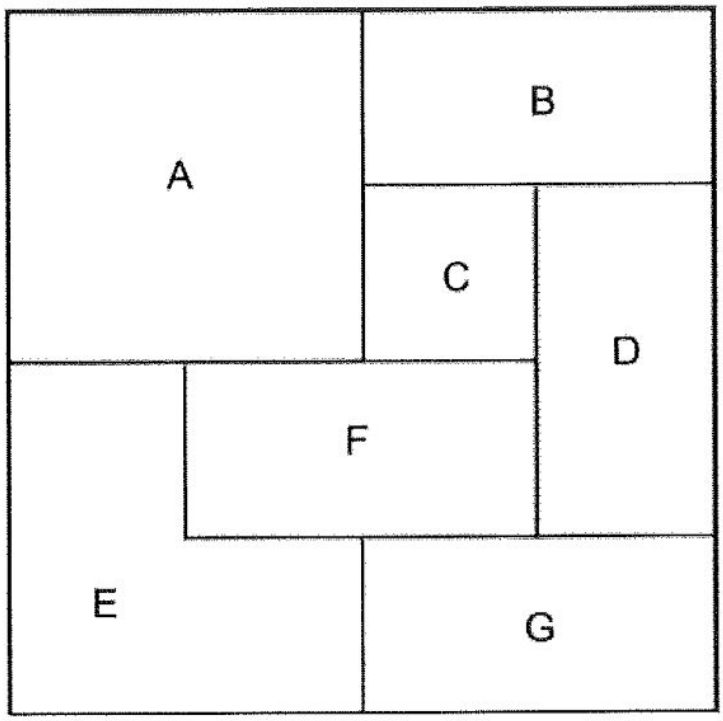
What is ⅙ of 36? _____

What is 2/6 of 36? _____

What is 5/6 of 36? _____



Choose one and describe how you know.



Pablo's birthday cake was cut into 7 pieces. What fraction of the cake is each piece?

A _____

B _____

C _____

D _____

E _____

F _____

G _____

Choose one and describe how you know.

Part 1

This table shows how a group of up to ten people can share up to ten candy bars. For example if 3 people share 1 candy bar each person gets 1/3 of the candy bar. Study the table and describe some of the patterns you notice.

I notice _____

_____

_____

_____

_____

		How many people will they invite?									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
How many candy bars will they buy?	**1**	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10
	2	2/1	2/2	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10
	3	3/1	3/2	3/3	3/4	3/5	3/6	3/7	3/8	3/9	3/10
	4	4/1	4/2	4/3	4/4	4/5	4/6	4/7	4/8	4/9	4/10
	5	5/1	5/2	5/3	5/4	5/5	5/6	5/7	5/8	5/9	5/10
	6	6/1	6/2	6/3	6/4	6/5	6/6	6/7	6/8	6/9	6/10
	7	7/1	7/2	7/3	7/4	7/5	7/6	7/7	7/8	7/9	7/10
	8	8/1	8/2	8/3	8/4	8/5	8/6	8/7	8/8	8/9	8/10
	9	9/1	9/2	9/3	9/4	9/5	9/6	9/7	9/8	9/9	9/10
	10	10/1	10/2	10/3	10/4	10/5	10/6	10/7	10/8	10/9	10/10

Part 2

Fill in the missing portions of the division table.

		How many people will they invite?									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
How many candy bars will they buy?	**1**	1/1	1/2	1/3	1/4	1/5	1/6		1/8	1/9	1/10
	2	2/1	2/2	2/3		2/5	2/6	2/7	2/8		2/10
	3	3/1		3/3	3/4	3/5	3/6		3/8	3/9	3/10
	4	4/1	4/2	4/3	4/4	4/5	4/6	4/7	4/8	4/9	
	5	5/1		5/3		5/5	5/6	5/7	5/8	5/9	5/10
	6	6/1	6/2	6/3	6/4	6/5		6/7	6/8	6/9	
	7	7/1	7/2	7/3	7/4	7/5	7/6	7/7	7/8	7/9	7/10
	8	8/1	8/2		8/4	8/5	8/6	8/7	8/8	8/9	8/10
	9	9/1		9/3	9/4	9/5	9/6	9/7	9/8	9/9	
	10	10/1	10/2	10/3	10/4	10/5		10/7	10/8	10/9	10/10

Part 3

This table shows what fraction of a candy bar each person will get.
Use the table to answer these questions:

Example:

Three people share 2 candy bars. What fraction does each get? 2/3

Four people share 5 candy bars. What fraction does each get? 5/4

1. Five people share 2 candy bars. What fraction does each get? _____
2. Six people share 3 candy bars? What fraction does each get? _____
3. Seven people share 8 candy bars? What fraction does each get? _____

		How many people will they invite?									
		1	2	3	4	5	6	7	8	9	10
How many candy bars will they buy?	1	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10
	2	2/1	2/2	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10
	3	3/1	3/2	3/3	3/4	3/5	3/6	3/7	3/8	3/9	3/10
	4	4/1	4/2	4/3	4/4	4/5	4/6	4/7	4/8	4/9	4/10
	5	5/1	5/2	5/3	5/4	5/5	5/6	5/7	5/8	5/9	5/10
	6	6/1	6/2	6/3	6/4	6/5	6/6	6/7	6/8	6/9	6/10
	7	7/1	7/2	7/3	7/4	7/5	7/6	7/7	7/8	7/9	7/10
	8	8/1	8/2	8/3	8/4	8/5	8/6	8/7	8/8	8/9	8/10
	9	9/1	9/2	9/3	9/4	9/5	9/6	9/7	9/8	9/9	9/10
	10	10/1	10/2	10/3	10/4	10/5	10/6	10/7	10/8	10/9	10/10

A friend is trying to work on his math, but he doesn't understand how this table can help him solve division problems. What would you say to help understand how to use this tool?

_____

_____

_____

_____

_____

_____

_____

Division of whole number by whole number

$3 \div 1 =$
$3 \div 2 =$
$3 \div 3 =$
$3 \div 4 =$
$3 \div 5 =$
$3 \div 6 =$
$3 \div 7 =$

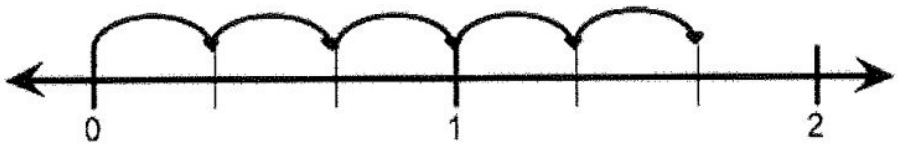
What pattern do you notice?

Division of fraction by whole number

$\frac{1}{3} \div 2 =$
$\frac{1}{3} \div 3 =$
$\frac{1}{3} \div 4 =$
$\frac{1}{4} \div 2 =$
$\frac{1}{4} \div 3 =$
$\frac{1}{4} \div 4 =$

What pattern do you notice?

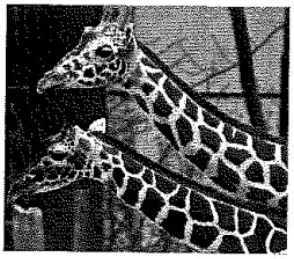
What expression might go with this number line?

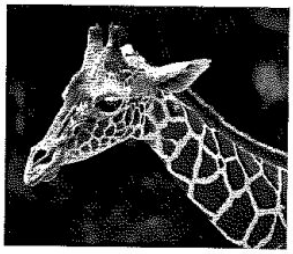


How do you know?

Part 1:

What shapes can you find in these giraffe fur designs? Angles?





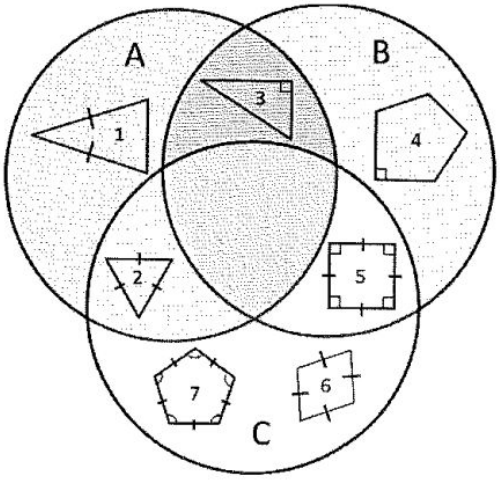
Part 2:

Look at this diagram. What are the attributes shared by shapes inside circle A? inside circle B? inside circle C?

Make sure that any shapes that have that attribute are *inside* the circle and any shapes that don't are *outside* of the circle.

Attributes of all shapes in Circle A:

Attributes of all shapes in Circle B:



Attributes of all shapes in Circle C:

Where would you place a rectangle that does not have four sides of the same length? Why?

Challenge: What shape could go in the center of the diagram?

ANSWER KEY

Grade 5 Lesson 1: Whole Number Multiplication and Division

ANSWER KEY

Part 1:

Solve these division problems. Explain how you got each answer:	Draw a picture that shows 7 x 15
100 / 4 = 25 40 / 4 = 10 24 / 4 = 6 4 / 4 = 1 124 / 4 = 31	10 5 7	70	35 | 70 + 35 = 105 I used an area model to solve

Part 2:

1) A city bus made 252 stops a day. How many stops did the bus make in 37 days?

method 1

$$\begin{array}{r} {}^{1}252 \\ \times\ 37 \\ \hline {}^{1}1764 \\ +7560 \\ \hline 9324 \end{array}$$

The bus made 9,324 stops in 37 days

method 2

	30	7
200	6000	1400
50	1500	350
2	60	14

$$\begin{array}{r} {}^{1}6000 \\ 1500 \\ 1400 \\ 350 \\ 60 \\ +\ 14 \\ \hline 9324 \end{array}$$

2) Kim got a point for every 12 raffle tickets she sold. She sold 3620 raffle tickets. How many points did she get?

Method 1

$$\begin{array}{r} 301\ R.8 \\ 12\overline{)3620} \\ -36\downarrow\downarrow \\ \hline 020 \\ -12 \\ \hline 8 \end{array}$$

$301\frac{8}{12} = 301\frac{2}{3}$ Points

Method 2

$12x = 3620$

$\frac{12x}{12} = \frac{3620}{12}$

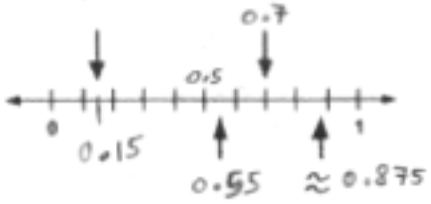
$x = 301.666\ldots$

$x = 301.\overline{6}$ or 301.67 points

Grade 5 Lesson 2: Decimal Number System

Part 1:

What numbers are the arrows pointing to?



How many ways can you rewrite the number 0.72?

$0.72 = \frac{72}{100} = \frac{36}{50} = \frac{18}{25}$

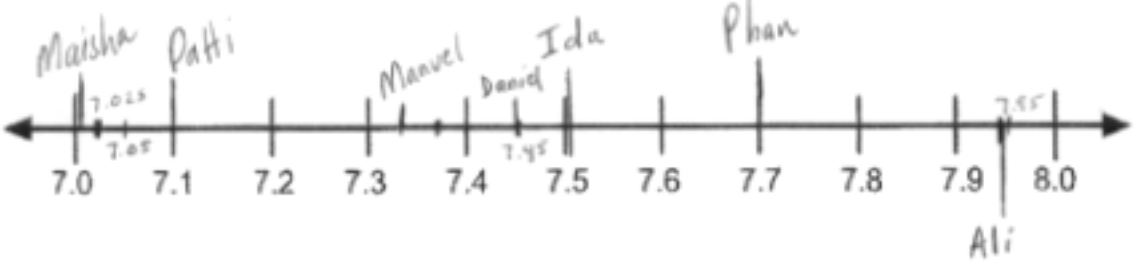
Part 2:

1) The after-school sports program had a one mile race. Here are the times of seven of the runners in minutes:

Phan: 7.7 ✓ Daniel: 7.44 ✓ Patti: 7.1 ✓

Ida: 7.501 ✓ Maisha: 7.01 ✓ Ali: 7.941 ✓ Manuel: 7.332 ✓

Show *about* where each of the numbers would be on a number line:



2) Mrs. Sanders bought 3 pumpkins. The first one weighed 4.8 kilograms, the second one weighed 4.09 kilograms, and the third one weighed 4.196 kilograms. Which pumpkin weighed the least? How do you know?

1st 4.8 most
2nd 4.09 least
3rd 4.196

The second pumpkin weighed the least because when I compared the place values, zero tenths was less than one tenth and less than eight tenths

Grade 5 Lesson 3: Addition and Subtraction of Decimals and Fractions

Part 1:

Decimal Subtraction Patterns:	How many expressions can you find that are equivalent to ¾?
38 - 25 = 13 3.8 - 2.5 = 1.3 0.38 - 0.25 = 0.13 0.038 - 0.025 = 0.013	Three fourths, or, three quarters ¾ = ? 0.75, 75%, $\frac{75}{100}$, $\frac{30}{40}$, $\frac{6}{8}$, $\frac{12}{16}$

Part 2:

1) Name 3 decimals whose sum is 0.08:

	OR
0.08 = 0.01 + 0.02 + 0.05	0.1 + (-0.01) + (-0.01) = 0.08

Name 5 decimals whose sum is between 2 and 3.

	OR
0.5 + 0.5 + 0.5 + 0.5 + 0.5 = 2.5	0.25 + 0.75 + 0.25 + 0.75 + 0.5 = 2.5

Name 2 decimals with a difference of 0.35.

	OR
0.7 - 0.35 = 0.35	0.93 - 0.58 = 0.35

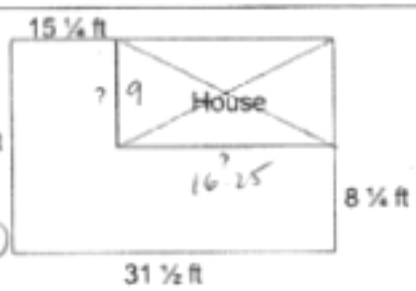
2) Dante's mom wants to build a fence around their yard. Here are the measurements of the yard:

What are the measurements of the missing sides of the yard? How long will the fence be?

missing length = 31.5 - 15.25 = 16.25 ft

missing width = 17.25 - 8.25 = 9 ft

length of fence = 17.25 + 15.25 + 9 + 16.25 + 8.25 + 31.5 = 97.5 ft



Grade 5 Lesson 4: Multiplying and Dividing Decimals by Whole Numbers

Part 1:

What are the products? What patterns do you see?	What are the quotients? What patterns do you see?
$43 \times 2 = 86$ $4.3 \times 2 = 8.6$ $4.3 \times 20 = 86$ $0.43 \times 2 = 0.86$ $0.43 \times 20 = 8.6$ $4.3 \times 200 = 860$ I see that if I move the decimal one place to the left, my product is ten times less.	$78 \div 3 = 26$ $7.8 \div 3 = 2.6$ $0.78 \div 3 = 0.26$ when I divide, I notice the same pattern as I did in multiplication

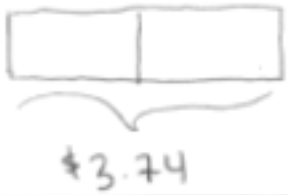
Part 2:

1) Kipton has a digital scale. He puts a marshmallow on the scale and it reads 7.2 grams. How much would you expect 12 marshmallows to weigh? Why?

Picture	Estimate	Solution
	$7.2 \approx 7$ $7 \times 12 = 84g$	12 7 | 84 0.2 | 2.4 $84 + 2.4 = 86.4g$

2) Jamaal paid $3.74 for 2 ballpoint pens. How much did 1 pen cost?

$3.74 ÷ 2

Tape Diagram	Record of work
	$1.87 2 | 3.74 −2 17 −16 14 −14 0 One pen costs $1.87
Estimate	
$3.74 \approx 4$ $4 \div 2 = 2$	

Grade 5 Lesson 5: Multiplying and Dividing Decimals by Decimals

Part 1:

Will the product be greater or less than each factor? How do you know?	Will the quotient be greater or less than the dividend? How do you know?
56.9 × 2.01 → greater product (each factor is greater than one)	56.9 ÷ 2.01 → quotient is less than dividend because the divisor is greater than one
14.33 × 0.98 → lesser product (2nd factor is less than one, so product will be less than the first factor)	14.33 ÷ 0.98 ↓ quotient is greater than dividend because the divisor is less than one

Part 2:

1) Draymond Green averaged 5.1 field goal shot attempts per game. Stephen Curry averaged 10.2 field goal shot attempts per game. How many times as many field goal shot attempts per game did Stephen Curry average as Draymond Green?

Stephen Curry averaged twice as many shot attempts as Draymond Green.

2) Luis raised $45.75 for the animal shelter, which was 3 times as much money as Anthony raised. How much money did Anthony raise?

$3\overline{)45.75}$ = 15.25

Anthony raised $15.25 for the animal shelter.

3) Use place value reasoning and the first quotient to compute the second quotient. Explain a pattern you used.

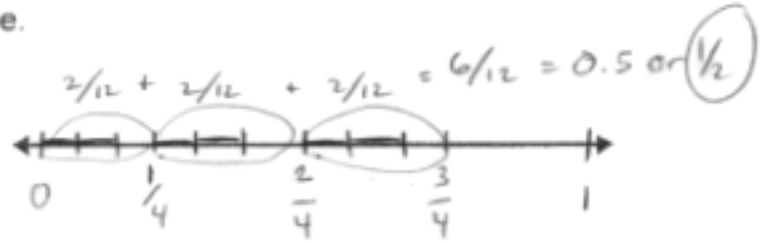
19.2 ÷ 40 = 0.48	19.2 ÷ 4 = 4.8
39.6 ÷ 6 = 6.6	39.6 ÷ 60 = 0.66

If the divisor is ten times smaller, then ~~[illegible]~~ the quotient will be ten times larger when dividing

If the divisor becomes ten times larger, then the quotient will become ten times smaller

Solve on the number line.

$\frac{2}{3} \times \frac{3}{4} =$



What part of the square is shaded?

check → $\frac{2}{3} \times \frac{3}{4} = \frac{6}{12}$

25
+ 6.25
+ 1.5625
+ 0.3906
+ 0.097

33.3001

≈ 33.3

≈ 1/3 is shaded in

Place the numbers 1, 2, 3, and 4 into each space to try to make the **largest** possible answer and the **smallest** possible answer.

smallest

largest

$$\frac{2}{4} \times \frac{1}{3} \qquad \frac{4}{1} \times \frac{3}{2}$$

Write a story that matches this equation:

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

Al is buying 3/4 of a pound of cheese that costs $1.5 per pound. Al really likes cheese.

Draw a rectangle with these dimensions and calculate its area:

$3\frac{2}{3} \times 2\frac{1}{3}$

$3^{2}/_{3}$

Area = ≈ 8.6 units^2

$2\,^{1}/_{3}$

$3\frac{2}{3} \times 2\,^{1}/_{3}$

$\frac{11}{3} \times \frac{7}{3} = \frac{77}{9} = 8.\overline{55}$

≈ 8.6 units^2

Estimate the value of each expression and decide which box it goes in.

$1 \times \frac{1}{4}$	$\frac{3}{4} \times 2\frac{1}{3}$	$\frac{1}{5} \times 5$	$\frac{1}{2} \times 2$

Less than 1	Equal to 1	More than 1
$1 \times {}^{1}/_{4}$	${}^{1}/_{2} \times 2$, ${}^{1}/_{5} \times 5$	$3/_{4} \times 2\,^{1}/_{3}$

Explain one of your choices.

one quarter of one is 0.25, which is less than one

both are equal to one

3/4 of 2 is 1.5, which is more than one, so 3/4 of $2\,^{1}/_{3}$ must be greater than one

What is...

$\frac{1}{4}$ of \$1.00 = 0.25¢

$\frac{1}{2}$ of \$1.00 = 0.50¢

$\frac{2}{4}$ of \$1.00 = 0.50¢

$\frac{1}{5}$ of \$1.00 0.20¢

$\frac{3}{5}$ of \$1.00 0.60¢

$\frac{3}{5}$ of \$2.00 1.20¢

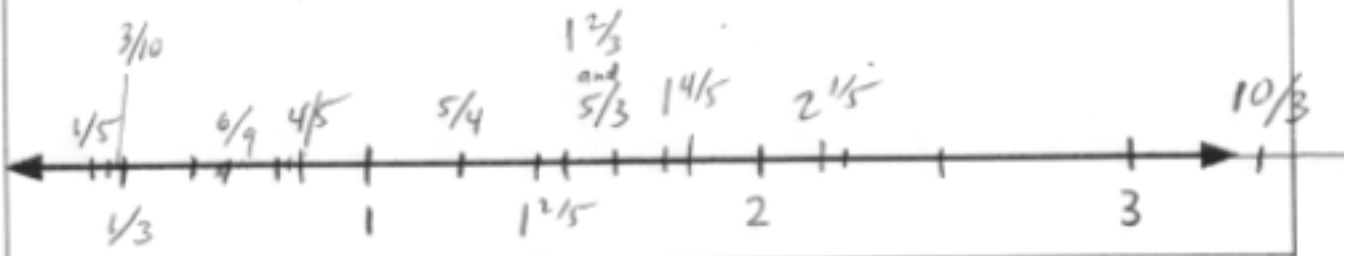
What pattern do you notice?

I notice when the denominator is larger I have more money. When I found 3/5 of \$1, I doubled my answer to find 3/5 of 2.

Place the following fractions on the number line:

.8 .2 1.8 0.$\overline{3}$ 3.$\overline{3}$ 1.$\overline{6}$ 1.25 1.$\overline{6}$.$\overline{6}$ 2.2 .3 1.4

$\frac{4}{5}$ $\frac{1}{5}$ $1\frac{4}{5}$ $\frac{1}{3}$ $\frac{10}{3}$ $\frac{5}{3}$ $\frac{5}{4}$ $1\frac{2}{3}$ $\frac{6}{9}$ $2\frac{1}{5}$ $\frac{3}{10}$ $1\frac{2}{5}$



What is ¼ of 36? 9

What is 2/4 of 36? 18

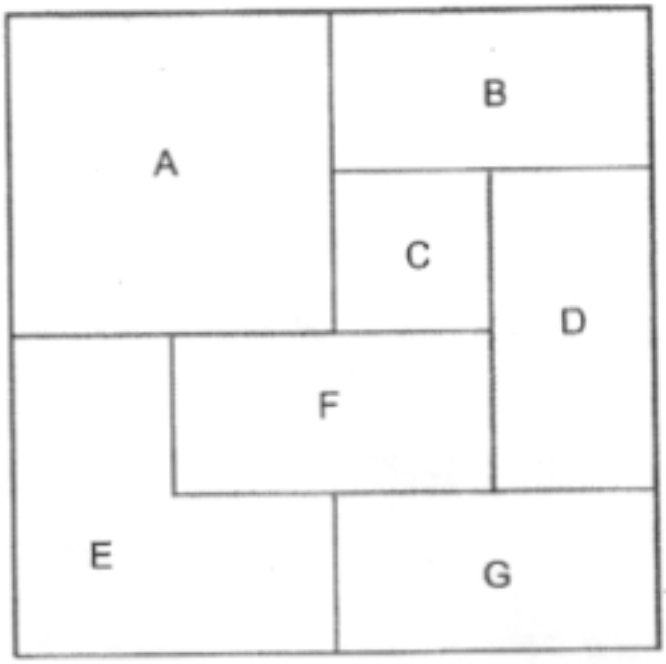
What is 3/4 of 36? 27

What is ⅙ of 36? 6

What is 2/6 of 36? 12

What is 5/6 of 36? 30

Choose one and describe how you know.



Pablo's birthday cake was cut into 7 pieces. What fraction of the cake is each piece?

A 25% = 1/4 = 4/16

B 12.5% = 1/8 = 2/16

C 6.25% = 1/16 = 1/16

D 12.5% = 1/8 = 2/16

E 18.75% = ? = ?/16 → 3/16

F 12.5% = 1/8 = 2/16

G 12.5% = 1/8 = 2/16

13/16 + 3/16 = 16/16 = 1 whole cake

Choose one and describe how you know.

I know fraction "A" is 1/4 of the cake, because it can be split into four even parts. "C" is half of "A", so it is 1/8 of the cake. "B", "D", "G" and "F" are both twice the size of "C", and 1/2 the size of "A", so they are 1/8 of the cake. "E" is "C" and another 1/8 slice together, or 3/16 of the cake.

Part 1

This table shows how a group of up to ten people can share up to ten candy bars. For example if 3 people share 1 candy bar each person gets 1/3 of the candy bar. Study the table and describe some of the patterns you notice.

I notice - the more people I share with, the less I get, as the fraction, or piece, gets smaller.

- the more bars we buy, the more everyone will get

How many candy bars will they buy?	How many people will they invite?									
	1	2	3	4	5	6	7	8	9	10
1	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10
2	2/1	2/2	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10
3	3/1	3/2	3/3	3/4	3/5	3/6	3/7	3/8	3/9	3/10
4	4/1	4/2	4/3	4/4	4/5	4/6	4/7	4/8	4/9	4/10
5	5/1	5/2	5/3	5/4	5/5	5/6	5/7	5/8	5/9	5/10
6	6/1	6/2	6/3	6/4	6/5	6/6	6/7	6/8	6/9	6/10
7	7/1	7/2	7/3	7/4	7/5	7/6	7/7	7/8	7/9	7/10
8	8/1	8/2	8/3	8/4	8/5	8/6	8/7	8/8	8/9	8/10
9	9/1	9/2	9/3	9/4	9/5	9/6	9/7	9/8	9/9	9/10
10	10/1	10/2	10/3	10/4	10/5	10/6	10/7	10/8	10/9	10/10

Part 2

Fill in the missing portions of the division table.

		How many people will they invite?									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
How many candy bars will they buy?	**1**	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10
	2	2/1	2/2	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10
	3	3/1	3/2	3/3	3/4	3/5	3/6	3/7	3/8	3/9	3/10
	4	4/1	4/2	4/3	4/4	4/5	4/6	4/7	4/8	4/9	4/10
	5	5/1	5/2	5/3	5/4	5/5	5/6	5/7	5/8	5/9	5/10
	6	6/1	6/2	6/3	6/4	6/5	6/6	6/7	6/8	6/9	6/10
	7	7/1	7/2	7/3	7/4	7/5	7/6	7/7	7/8	7/9	7/10
	8	8/1	8/2	8/3	8/4	8/5	8/6	8/7	8/8	8/9	8/10
	9	9/1	9/2	9/3	9/4	9/5	9/6	9/7	9/8	9/9	9/10
	10	10/1	10/2	10/3	10/4	10/5	10/6	10/7	10/8	10/9	10/10

Part 3

This table shows what fraction of a candy bar each person will get.
Use the table to answer these questions:

Example:

Three people share 2 candy bars. What fraction does each get? 2/3

Four people share 5 candy bars. What fraction does each get? 5/4

1. Five people share 2 candy bars. What fraction does each get? 2/5
2. Six people share 3 candy bars? What fraction does each get? 3/6, or 1/2
3. Seven people share 8 candy bars? What fraction does each get? 8/7 or one whole each, plus 1/7

How many candy bars will they buy?	How many people will they invite?									
	1	2	3	4	5	6	7	8	9	10
1	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10
2	2/1	2/2	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10
3	3/1	3/2	3/3	3/4	3/5	3/6	3/7	3/8	3/9	3/10
4	4/1	4/2	4/3	4/4	4/5	4/6	4/7	4/8	4/9	4/10
5	5/1	5/2	5/3	5/4	5/5	5/6	5/7	5/8	5/9	5/10
6	6/1	6/2	6/3	6/4	6/5	6/6	6/7	6/8	6/9	6/10
7	7/1	7/2	7/3	7/4	7/5	7/6	7/7	7/8	7/9	7/10
8	8/1	8/2	8/3	8/4	8/5	8/6	8/7	8/8	8/9	8/10
9	9/1	9/2	9/3	9/4	9/5	9/6	9/7	9/8	9/9	9/10
10	10/1	10/2	10/3	10/4	10/5	10/6	10/7	10/8	10/9	10/10

A friend is trying to work on his math, but he doesn't understand how this table can help him solve division problems. What would you say to help understand how to use this tool?

If the numerator is greater than the denominator, then everyone gets more than one candy bar.

If they order one bar per person, each person gets one whole bar.

Division of whole number by whole number

$3 \div 1 =$ 3
$3 \div 2 =$ 3/2 = 1.5
$3 \div 3 =$ 1
$3 \div 4 =$ 0.75
$3 \div 5 =$ 0.6
$3 \div 6 =$ 0.5
$3 \div 7 =$ 0.42...

What pattern do you notice?

The larger the divisor becomes the smaller the quotient. when I divide by a whole number.

Division of fraction by whole number

$\frac{1}{3} \div 2 =$ 0.1666...
$\frac{1}{3} \div 3 =$ .11111
$\frac{1}{3} \div 4 =$ ~~1.2333~~... $0.08\overline{3}$
$\frac{1}{4} \div 2 =$ 0.125
$\frac{1}{4} \div 3 =$ $0.08\overline{3}$
$\frac{1}{4} \div 4 =$ 0.0625

What pattern do you notice?

When the dividend is a fraction, the quotients get smaller and smaller as the divisors increase in value.

What expression might go with this number line?

$+1/3 + 1/3 + 1/3 + 1/3 + 1/3 = 1\frac{2}{3}$ or $\frac{5}{3}$

How do you know? Each whole number is split into thirds and the jumping arrow moves 1/3 at a time.

Grade 5 Lesson 10: Classifying 2-D Figures

Part 1:

What shapes can you find in these giraffe fur designs? Angles?

- triangles
- polygons
- rhombus
- trapezoid

(answers may vary)

Part 2:

Look at this diagram. What are the attributes shared by shapes inside circle A? inside circle B? inside circle C?

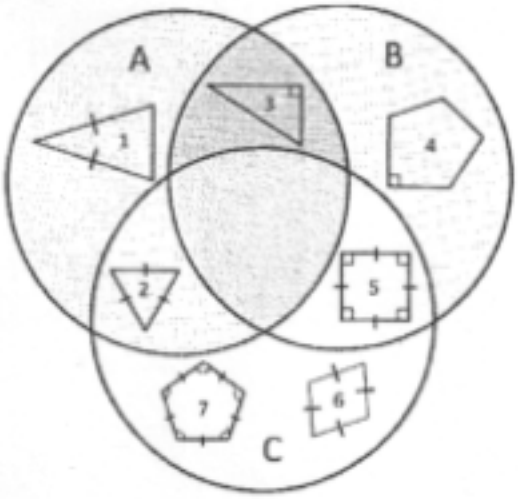
Make sure that any shapes that have that attribute are *inside* the circle and any shapes that don't are *outside* of the circle.

Attributes of all shapes in Circle A:

- all have angles less than 90°

Attributes of all shapes in Circle B:

- all ~~[illegible]~~ have one right angle (90°)



Attributes of all shapes in Circle C:

- all have congruent side lengths

Where would you place a rectangle that does not have four sides of the same length? Why?

B

Can't go in C, as all of C's side lengths are the same.

Challenge: What shape could go in the center of the diagram?

Can't go in A, as some angles must be less than 90°.