

LETTER HOME

Multiplication, Division, and Volume

Dear Family Member:

In this unit, students will return to the study of multiplication and division. Students solve problems involving multiplying two-digit by one-digit numbers, for example, 73×5 . They also extend their division skills.

In the previous multiplication units, students developed their understanding of *what* multiplication is and *when* it can be used to solve a problem. Here, our focus is on *how* to multiply. There are three important types of computing: mental, calculator, and paper and pencil. This unit introduces a paper-and-pencil method.

The all-partials method for multiplying taught here is different from the traditional method. For example, many people solve a problem like 37×4 as shown by the compact method. In the all-partials method, every product is written down:

compact method

$$\begin{array}{r} ^2 \\ 37 \\ \times 4 \\ \hline 148 \end{array}$$

all-partials method

$$\begin{array}{r} 37 \longrightarrow \text{Think "30 + 7"} \quad \text{Step 1} \\ \times 4 \\ \hline 120 \longleftarrow \text{Multiply } 4 \times 30 \quad \text{Step 2} \\ + 28 \longleftarrow \text{Multiply } 4 \times 7 \quad \text{Step 3} \\ \hline 148 \longleftarrow \text{Add } 120 + 28 \quad \text{Step 4} \end{array}$$

By showing each step, students further develop their understanding of the multiplication process.

Students apply their knowledge of the four operations as they learn to measure volume using a graduated cylinder.

Help your child at home:

Solve Problems. Talk about problems that come up in everyday life. For example, “If gas costs \$3.50 per gallon, how much does 5 gallons cost?” or “If eggs cost 99¢ cents a dozen, about how much do 3 dozen cost?” Encourage your child to develop mental methods such as $99¢ \times 3$ is the same as $100¢ \times 3 - 3¢$ or \$2.97.

Volume Hunt. Ask your child to help you find containers that hold cups, pints, quarts, or gallons.

Write Multiplication Stories for Larger Numbers. Ask your child to write a multiplication story and draw a picture for that story. Have them use mental math strategies to solve it.

Math Facts and Mental Math

This unit concludes the systematic review and assessment of the multiplication facts in Grade 3.

Multiplication Facts. Students review the last six multiplication facts (4×6 , 4×7 , 4×8 , 6×7 , 6×8 , 7×8) to increase fluency and to learn to apply multiplication strategies to larger numbers. Students are also assessed on their fluency with all the multiplication facts.

You can help your child review these facts using the flash cards that are sent home or by making a set of flash cards from index cards or scrap paper. Study facts in small groups each night. As your child goes through the flash cards, put the cards in three stacks: Facts I Know Quickly, Facts I Can Figure Out, and Facts I Need to Learn.

For Facts I Need to Learn, work on strategies for figuring them out.

Good strategies include:

Doubling. To solve 4×6 , think $2 \times 6 + 2 \times 6 = 12 + 12$, so $4 \times 6 = 24$.

Skip Counting. To solve 5×4 , count: 5, 10, 15, 20.

Reasoning From Known Facts. To solve 6×7 , I used 6×6 . $6 \times 6 = 36$ and 6×7 is 6 more. $36 + 7 = 42$, and $6 \times 7 = 42$.

For Facts I Can Figure Out, use the flash cards to practice the facts for fluency.

For Facts I Know Quickly, help your child use mental math strategies to multiply 10s and 100s: $40 \times 8 = 3200$, $700 \times 8 = 5600$, $6 \times 700 = 4200$.

Thank you for taking the time to talk with your child about what he or she is doing in math.

Sincerely,

Unit 13: Home Practice

Part 1 Triangle Flash Cards: Review All Facts

Study for the quiz on the multiplication facts. Take home your Triangle Flash Cards for all the facts and the list of facts you need to study. Ask a family member to choose one flash card at a time. He or she should cover the biggest number. This is the answer in a multiplication problem. Solve the multiplication fact with the two uncovered numbers.

Your teacher will tell you when the quiz on the multiplication facts will be.

Part 2 Using Estimation

Use your estimation skills to help you solve the following problems.

46 81 33 78

- Which two numbers above should you add if you want an answer:
 - close to 100? _____
 - over 150? _____
 - close to 75? _____
- Explain your strategy for Question 1C.
- Which two numbers should you subtract if you add if you want an answer:
 - close to 50? _____
 - close to 0? _____
 - close to 10? _____
- Explain your strategy for Question 3C.

Part 3 Using Strategies to Add, Subtract, and Multiply

Tell whether the sum of each is more than 600, less than 600, or equal to 600.

1. A. $300 + 300$ _____ B. $318 + 264$ _____
 C. $268 + 295$ _____ D. $329 + 282$ _____
 E. $240 + 360$ _____ F. $363 + 302$ _____

Fill in the blanks below so each number sentence equals 1000.

2. A. _____ + _____ + 300 = 1000
 B. _____ + 150 + _____ = 1000
 C. $335 +$ _____ + _____ = 1000

3. Complete each problem using strategies you have learned.

A.	B.	C.	D.	E.	F.
$\begin{array}{r} 79 \\ + 69 \\ \hline \end{array}$	$\begin{array}{r} 979 \\ - 430 \\ \hline \end{array}$	$\begin{array}{r} 75 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 32 \\ \times 9 \\ \hline \end{array}$	$\begin{array}{r} 60 \\ \times 4 \\ \hline \end{array}$	$\begin{array}{r} 83 \\ \times 7 \\ \hline \end{array}$

4. Find two 3-digit numbers whose sum is 251.

5. Find two numbers whose difference is 79.

Part 4 Thinking About Multiplication

1. Skip count by fives backwards from 80. Record the numbers below as you say them.
2. Skip count by fours backwards from 60. Record the numbers.
3. $4 \times 3 =$ _____
4. $4 \times 30 =$ _____
5. $4 \times 300 =$ _____
6. Explain how you would find the answer to 4×29 .

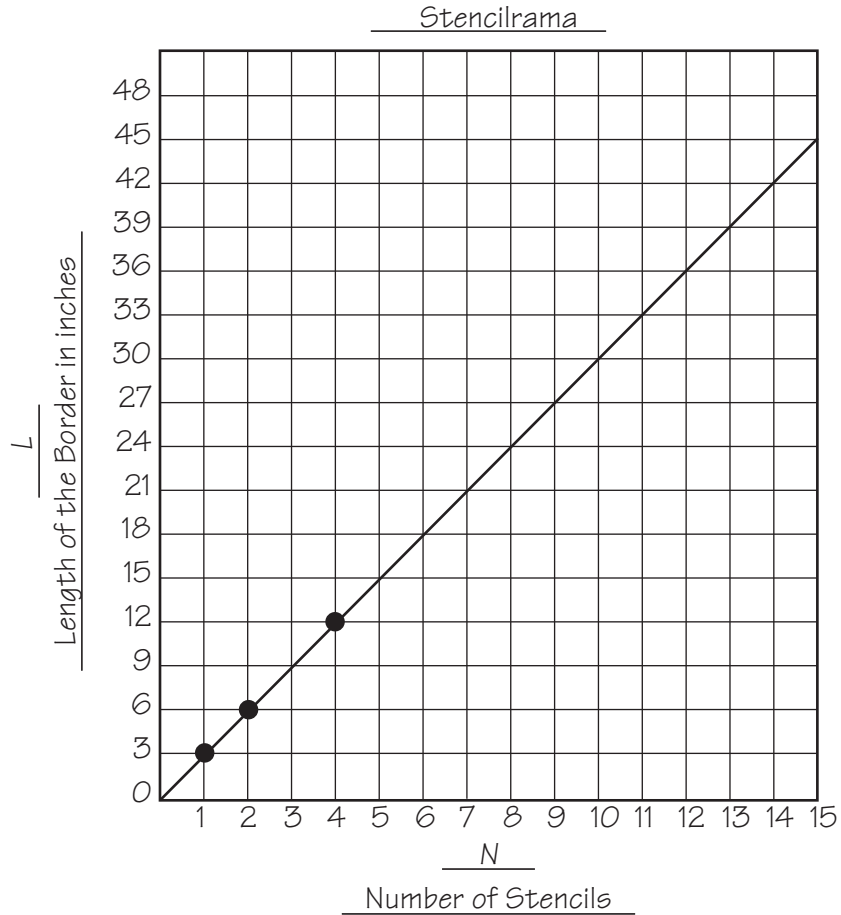
Part 5 Money Matters

Use what you know about quarters to solve these problems. How much money do you have?

1. You have 25¢ more than \$2.50. _____
2. You have 25¢ less than \$2.50. _____
3. You have 50¢ more than \$2.50. _____
4. You have \$1.50 more than \$3.50. _____
5. You have \$2.00 less than \$3.75. _____

Part 6 Using a Graph

Use the Stencilrama graph to answer the Questions. Show your work on the graph.



1. What two variables does the graph compare?
2. What is the unit used to measure each stencil?
3. Find the length of 3 stencils.
4. Rosa is making a border that is 36 inches long. How many stencils will she need?
5. Luis used 7 stencils to make a border. How long is his border?
6. Find the number of stencils in a border that is 48 inches long.

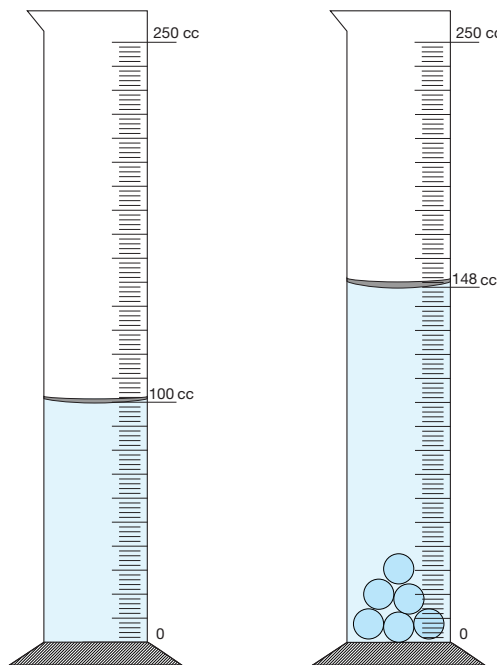
Part 7 Practice with Volume

1. Complete the table by filling in the missing volume for each object.

	Volume of the Water in the Cylinder	Volume of the Water and Object	Volume of the Object
A.	50 cc	166 cc	
B.	65 cc	89 cc	
C.	100 cc	225 cc	
D.	50 cc	117 cc	

E. Show or tell how you found the volume of the object in Question C.

2. Fran poured 100 cc of water in a graduated cylinder. She added 6 marbles, each the same size. The volume of the water and the marbles was 148 cc. What was the volume of each marble? Show or tell how you found your answer.



Part 8 Story Solving

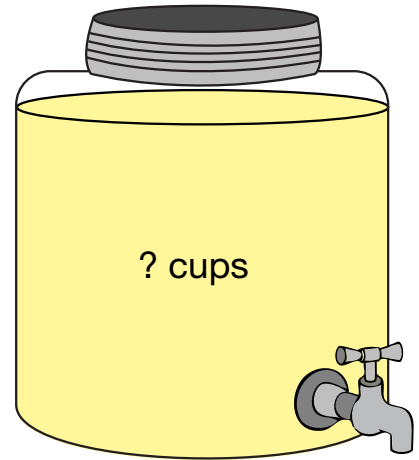
1. **A.** Tara is making lemonade in a large container for a picnic. Help her find out how many cups the large container will hold. She has a one-cup measuring cup and a 2-quart pitcher. There are 8 cups in each 2-quart pitcher. She fills the 2-quart pitcher three times and the one-cup measuring cup 6 times in order to fill the large container.



1 Cup



2 quarts



- B.** Show or tell how you found the volume of the large container. Include a number sentence in your explanation.

2. Josh wrote a number mystery about his visit to the farm. Solve Josh's number mystery. Show or tell how you found the answer.

I saw cows in the field and counted 96 legs. How many cows were in the field?

3. Write a story and draw a picture for 18×3 .

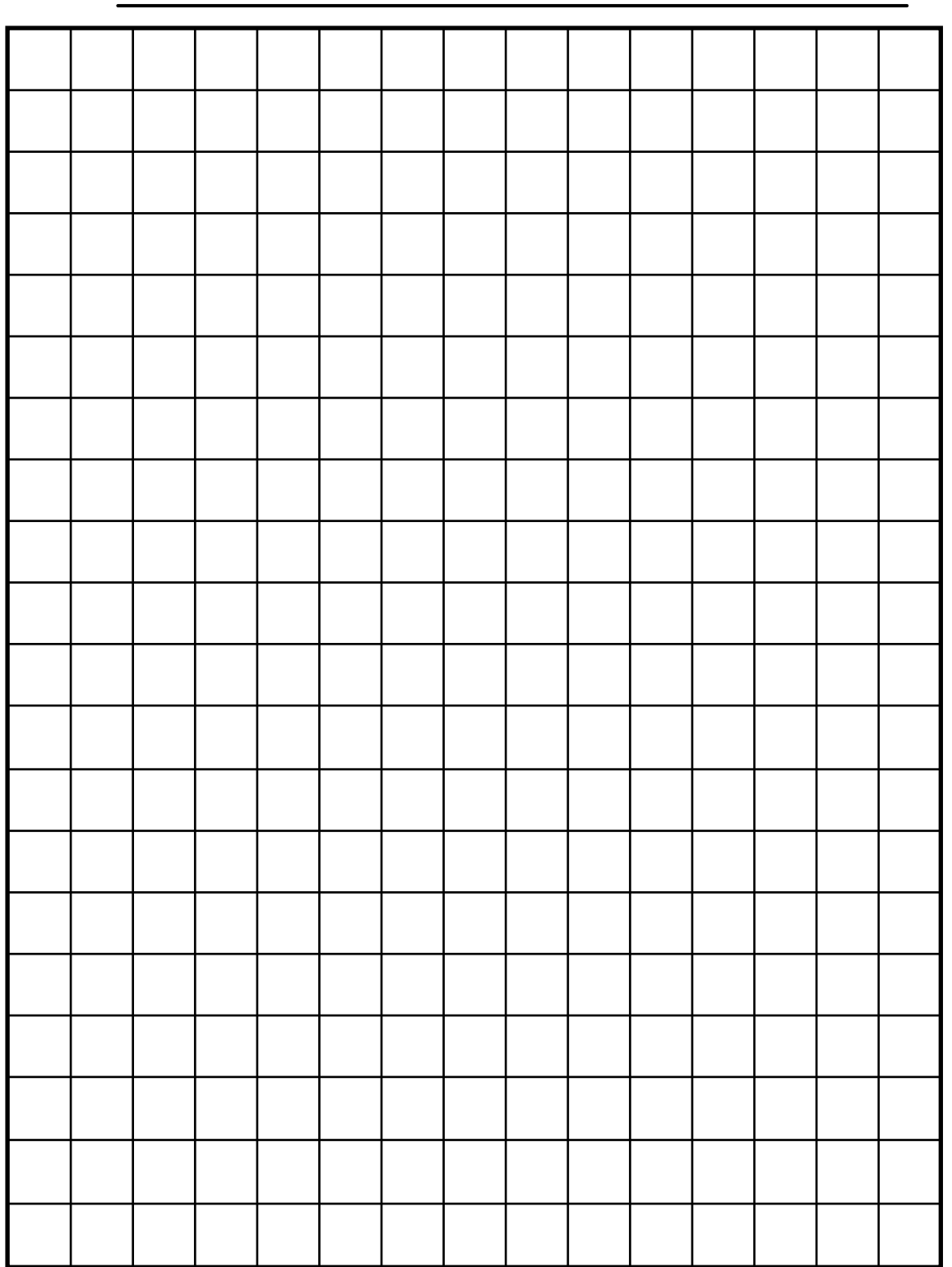
Multiplication Facts I Know

- Circle the facts you know well.
- Keep this table and use it to help you multiply.
- As you learn more facts, you may circle them too.

×	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

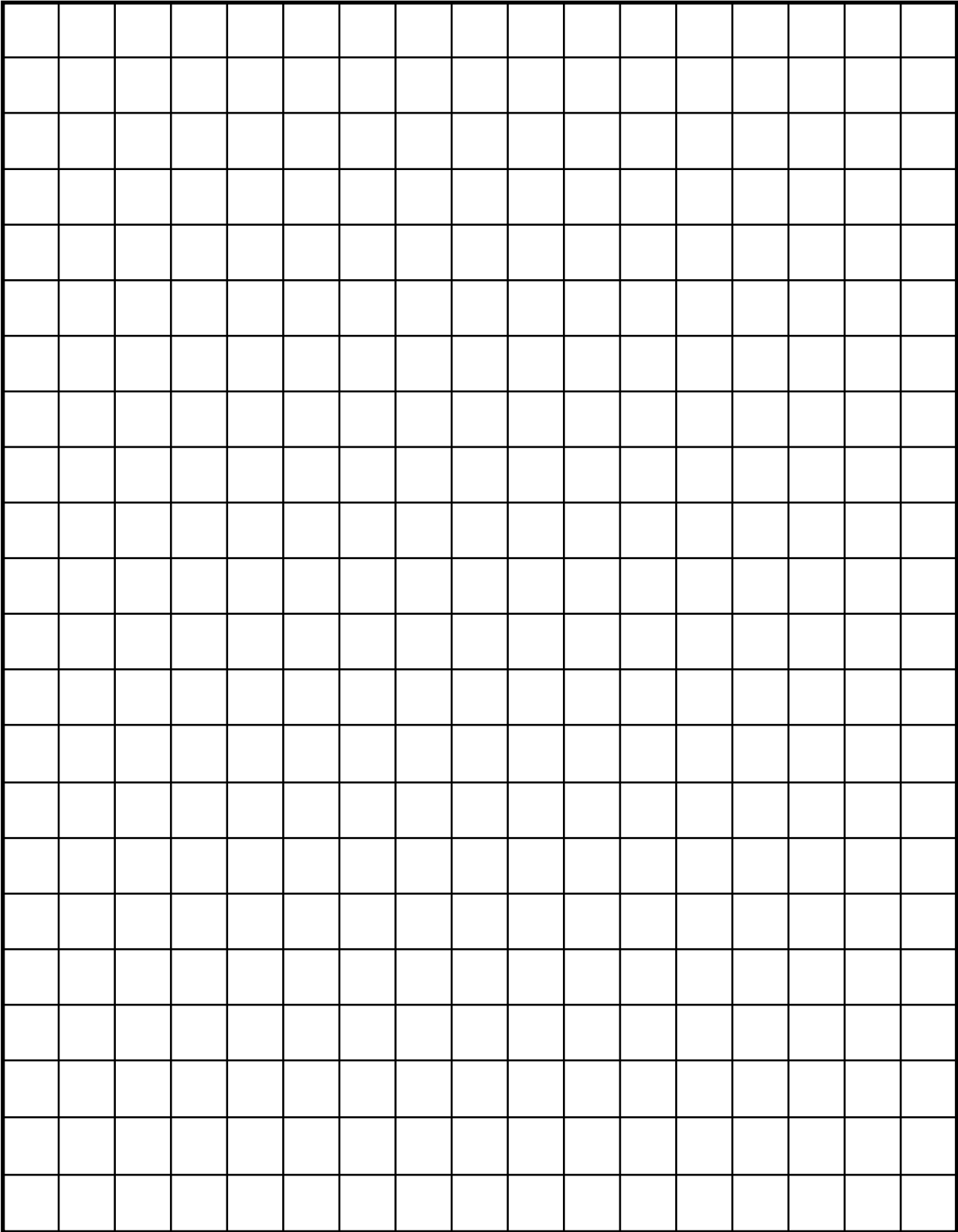
Name _____

Date _____



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Date _____

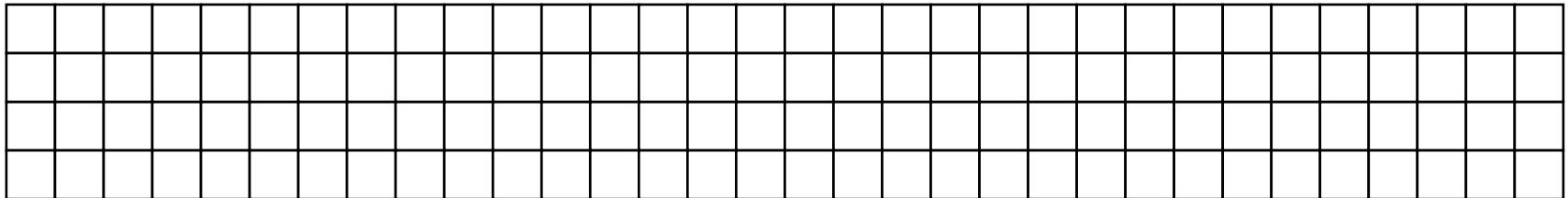
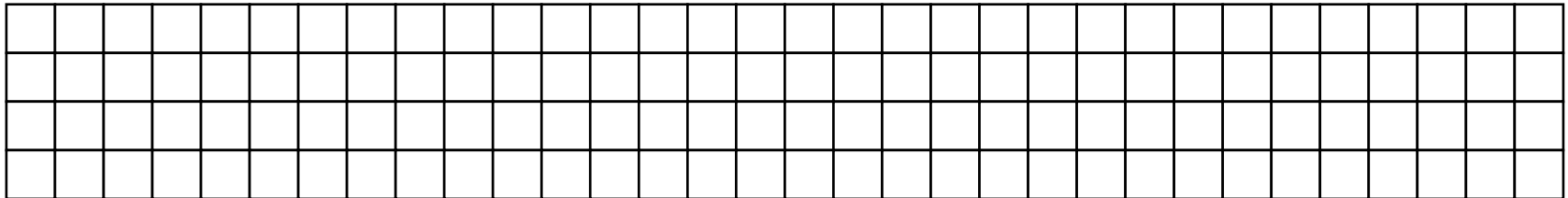
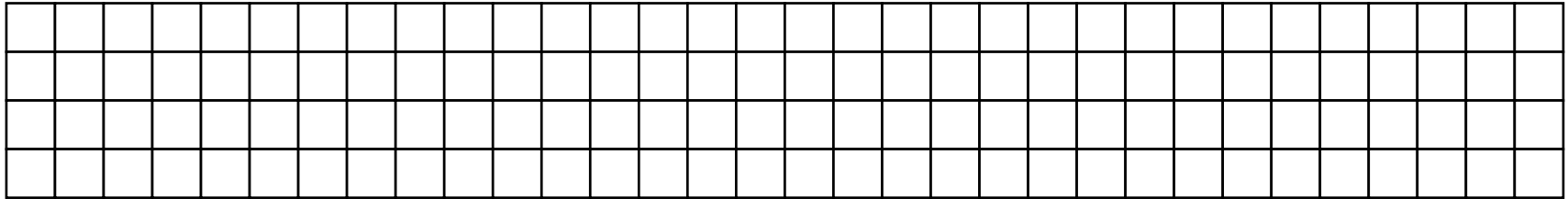


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Roberto's Chart

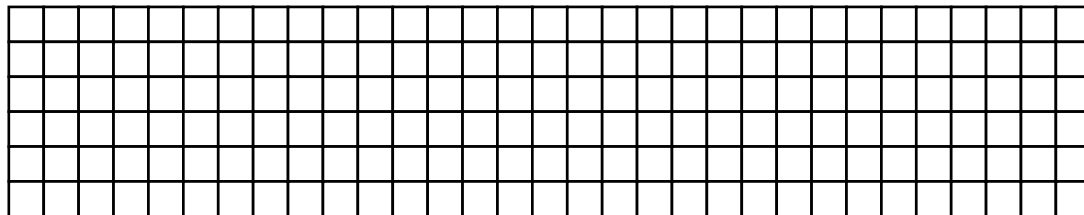
Problem: <u>Products to Calculate</u>	<u>Calculations</u>
<u>Story</u>	<u>Picture</u>

Professor Peabody's Hallway

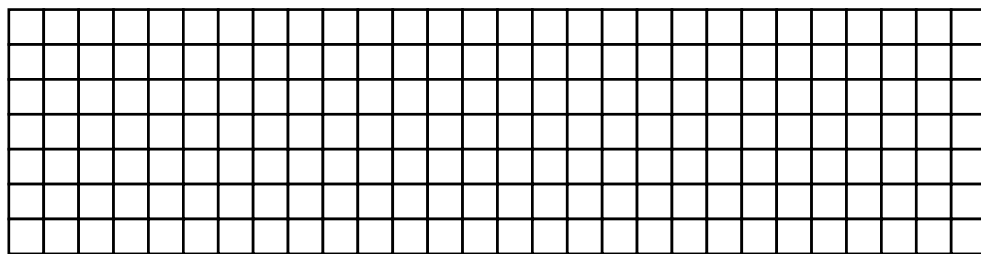


Rectangle Models

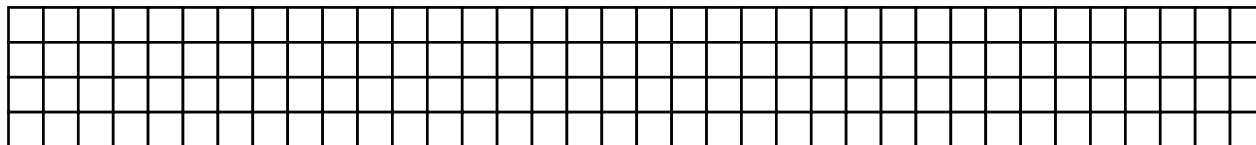
Rectangle A: 6×31



Rectangle B: 7×28



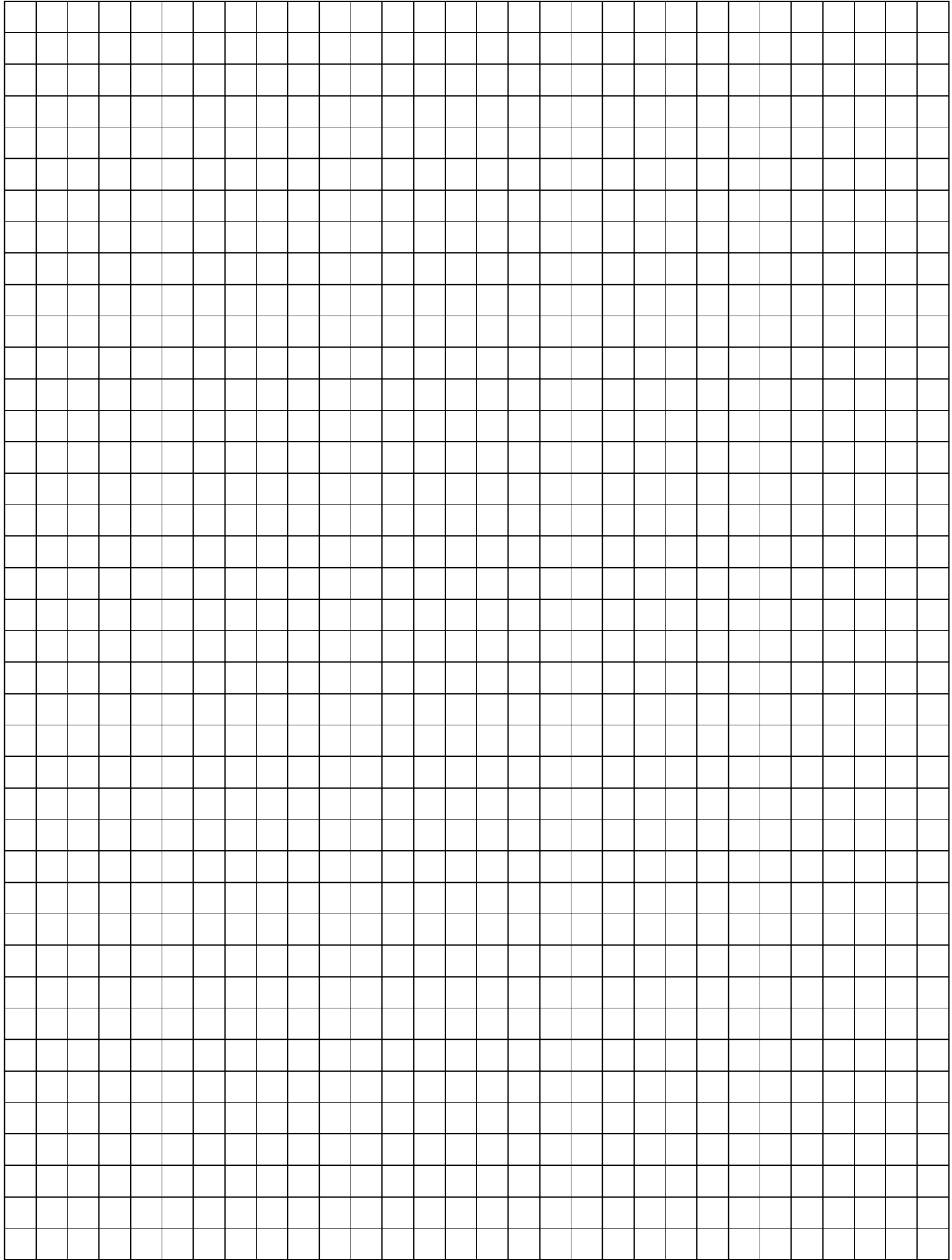
Rectangle C: 4×36



Name _____

Date _____

Half-Centimeter Grid Paper



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Name _____

Date _____

Ways to Divide 30

Size of Groups	Number of Groups	Remainder	Number Sentence

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Name _____

Date _____

Solving Problems with Multiplication and Division

Check-In: Q# 13–17 Feedback Box

	Expectation	Check In	Comments
Represent 2-digit by 1-digit multiplication and multidigit division problems using counters, tiles, rectangular arrays, drawings, stories, and number sentences. (Q# 13–17)	E1		
Solve multidigit multiplication problems using mental math strategies (e.g., composing and decomposing, and doubling and halving). (Q# 13–17)	E3		
Solve multidigit division problems using mental math strategies (e.g., thinking multiplication, repeated subtraction, using turn-around facts). (Q# 13–17)	E4		
Interpret remainders of multidigit division problems. (Q# 14, 17)	E6		
Solve multistep word problems involving the four operations. (Q# 13–17)	E8		

	Yes ...	Yes, but ...	No, but ...	No ...
<p>MPE1. Know the problem. I read the problem carefully. I know the questions to answer and what information is important. [Q# 15, 17]</p>				
<p>MPE2. Find a strategy. I choose good tools and an efficient strategy for solving the problem. [Q# 15, 17]</p>				
<p>MPE5. Show my work. I show or tell how I arrived at my answer so someone else can understand my thinking. [Q# 15, 17]</p>				
<p>MPE6. Use labels. I use labels to show what numbers mean. [Q# 15, 17]</p>				

Earning Money Problem

Carla, Luis, and Julia earned five dollars babysitting for the Browns. Mrs. Brown gave the three sitters one five-dollar bill. If they share the money equally, how much should each babysitter get? Share as much of the \$5 as possible. Explain how you solved the problem. If there is a remainder, tell what you will do with it.

Earning Money Problem Feedback Box

	Expectation	Check In	Comments
Represent multidigit division problems using counters, drawings, and number sentences.	E1		
Interpret remainders of multidigit division problems.	E6		
Solve multistep word problems involving the four operations.	E8		

Kim's Work

Didn't Work		
Julia	Carla	Luis
\$1.70	\$1.70	\$1.70
\$1.60	\$1.60	\$1.60
Worked		
Julia	Carla	Luis
\$1.65	\$1.65	\$1.65
\$1.66	\$1.66	\$1.66

O 10
 R 0
 5R
 2R

\$1.66 R2 / \$1.66 and 2¢ remaining to give to charity or something like that. I found my remainder by fidgeting around in my head, finding the answer and figuring out there's some remaining and I added \$1.66 3 times and 2 remained.

$$\$1.66 \times 3 = \$4.98$$

It gave me \$4.98 and I knew $\$4.98 + 2 = \5.00 so, there was 2 remaining.

Marco's Work

$$\begin{array}{r} \$3.65 \\ \times \quad 3 \text{ kids} \\ \hline \end{array}$$

three dollars and sixty-five cents times three kids, and five dollars minus one dollar and forty-five cents equals four dollars.

$$\begin{array}{r} \$5.00 \\ - \$1.45 \\ \hline \end{array}$$

~~\$4.00~~ ← not good

I didn't use the money, but I used a calculator.

$$\begin{array}{r} 75\text{¢} \\ 75 \\ 75 \\ \hline 225 \end{array}$$

$$\begin{array}{r} \$4.50 \\ \times \\ \hline \$1.50 \end{array}$$

$$\begin{array}{r} 165 \\ \times 3 \\ \hline 4.95 \end{array}$$

$$\begin{array}{r} \$1.70 \\ \times 3 \\ \hline \$5.10 \end{array}$$

$$\begin{array}{r} 1.67 \\ \times 3 \\ \hline 5.01 \end{array}$$

$$\begin{array}{r} 1.69 \\ \times 3 \\ \hline 5.07 \end{array}$$

$$\begin{array}{r} 3 \\ \$1.10 \\ \$1.10 \\ + \$1.10 \\ \hline \$3.30 \end{array}$$

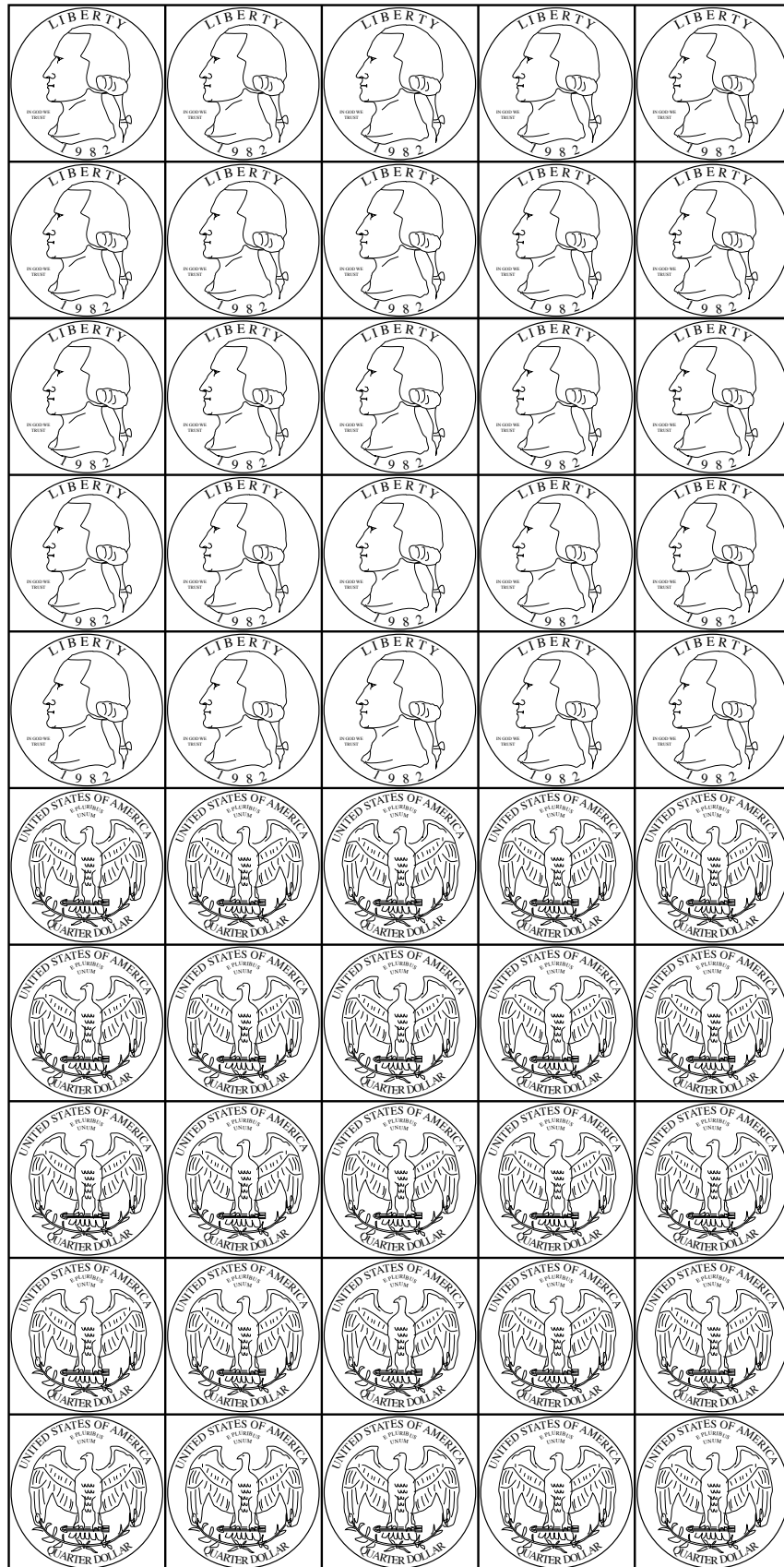
$$\begin{array}{r} 3.13 \\ \times 3 \\ \hline 3.39 \end{array}$$

$$\begin{array}{r} 1.66 \\ \times 3 \\ \hline 4.98 \end{array}$$

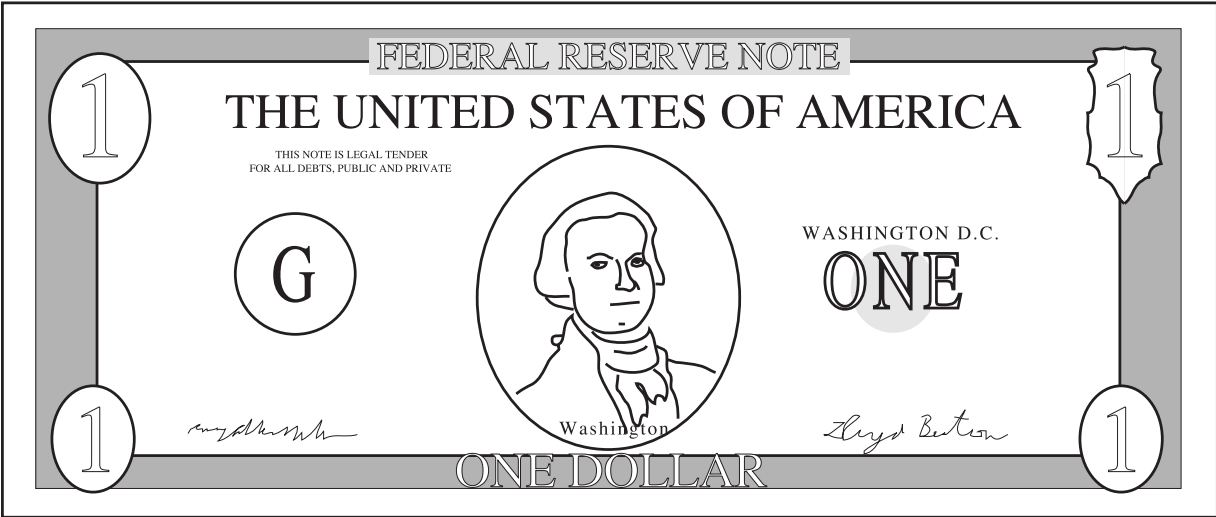
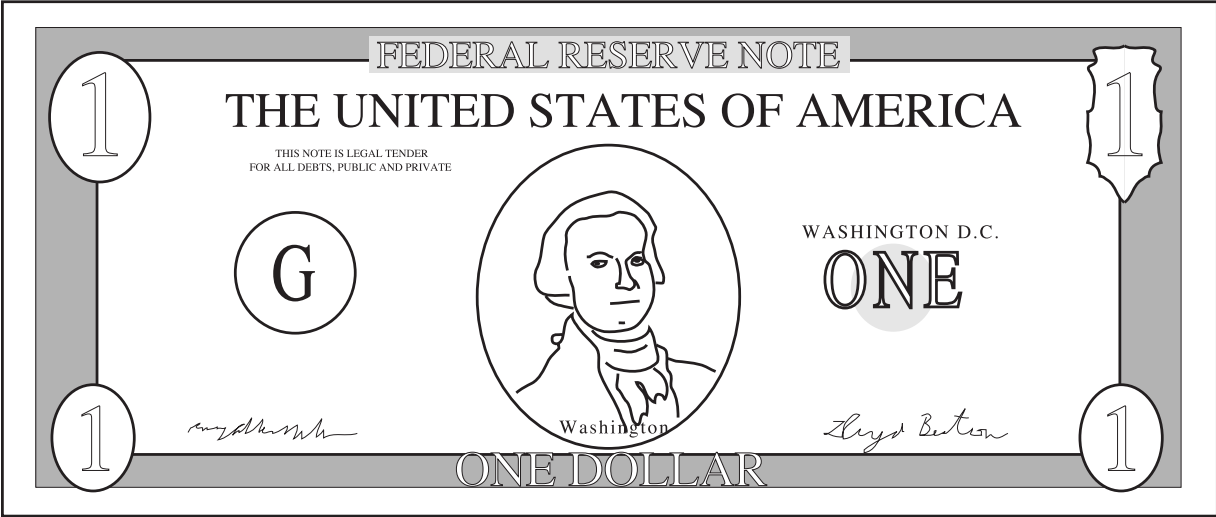
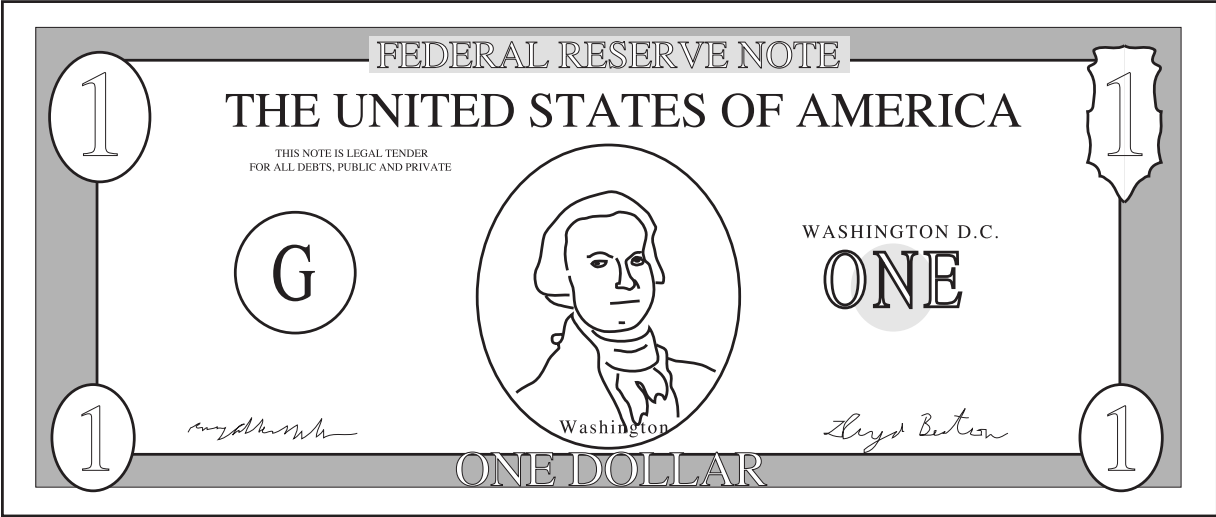
Jayne's Work

- 1.) Each person should get \$1.66 and .2 left over. I got five dollars in change and I divided the money up between them. I got \$1.66 for each person, and two cents left over.
- 2.) If you try on the calculator ($5 \div 3$) you would get 1.6666667. So I think it's much better to use play money or your head. The reason why you can't do it on the calculator is because the calculator will cut the coin up in half.
- 3.) You can check your answer by the calculator you can put $\$1.66 + \$1.66 + \$1.66 + \$0.02 = \$5.00$.
- 4.) This problem can help me solve other problems because it will help me divide money (if it involves money.)
- 5.) A way to find how much is left $\$5.00 - \$1.66 - \$1.66 - \$1.66 = \$0.02$.

Quarters

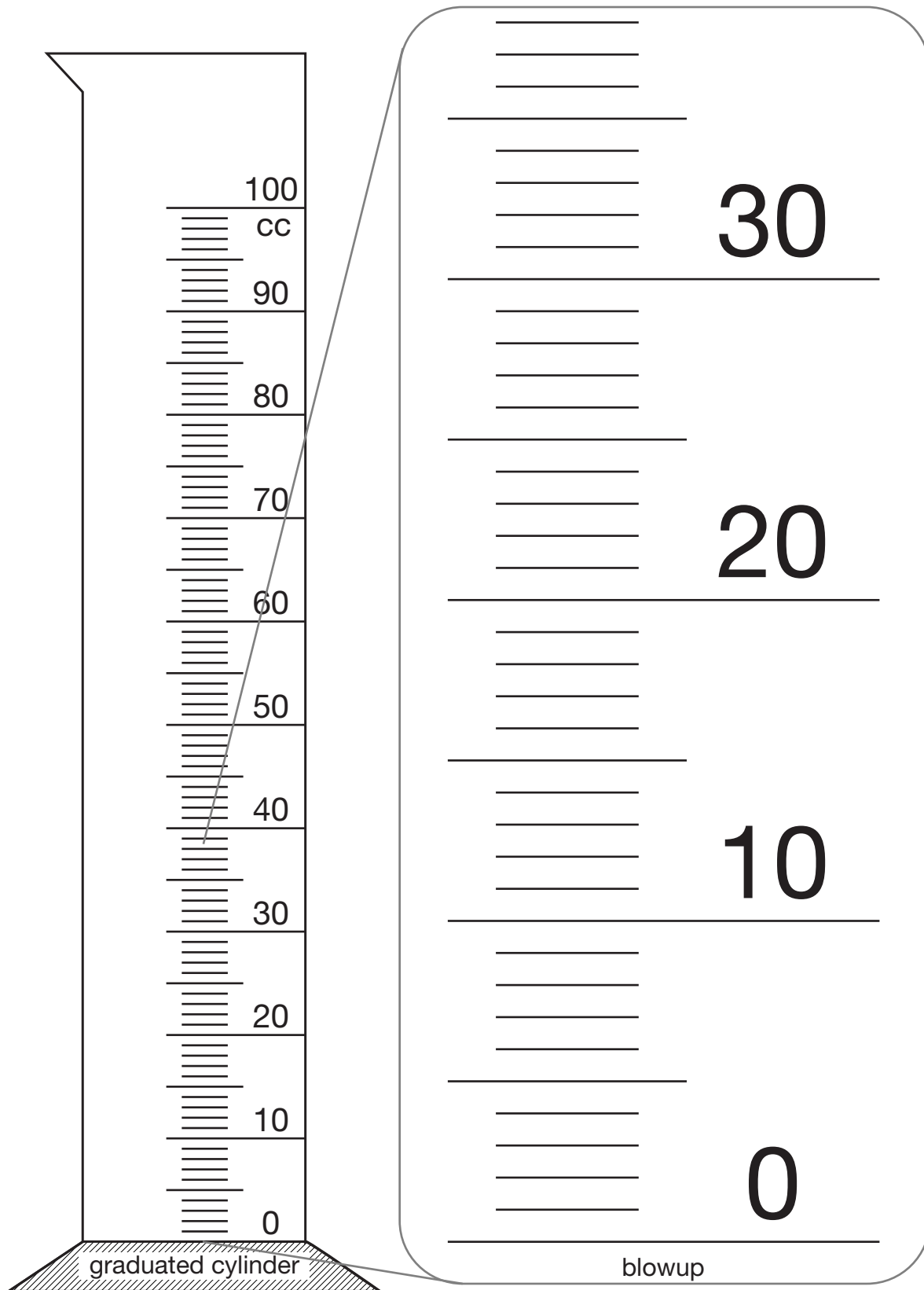


Dollars



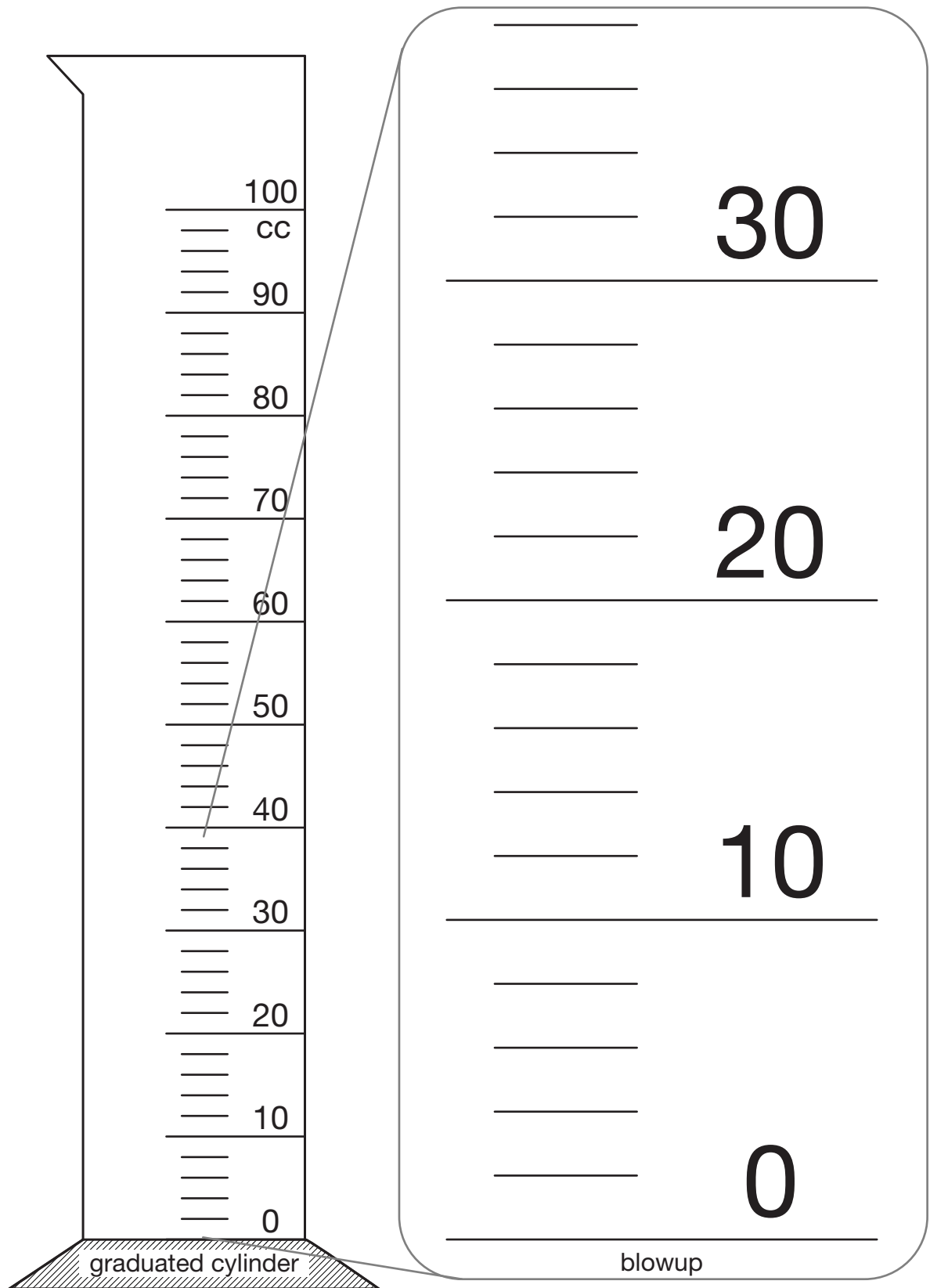
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Scale 1 with Blowup



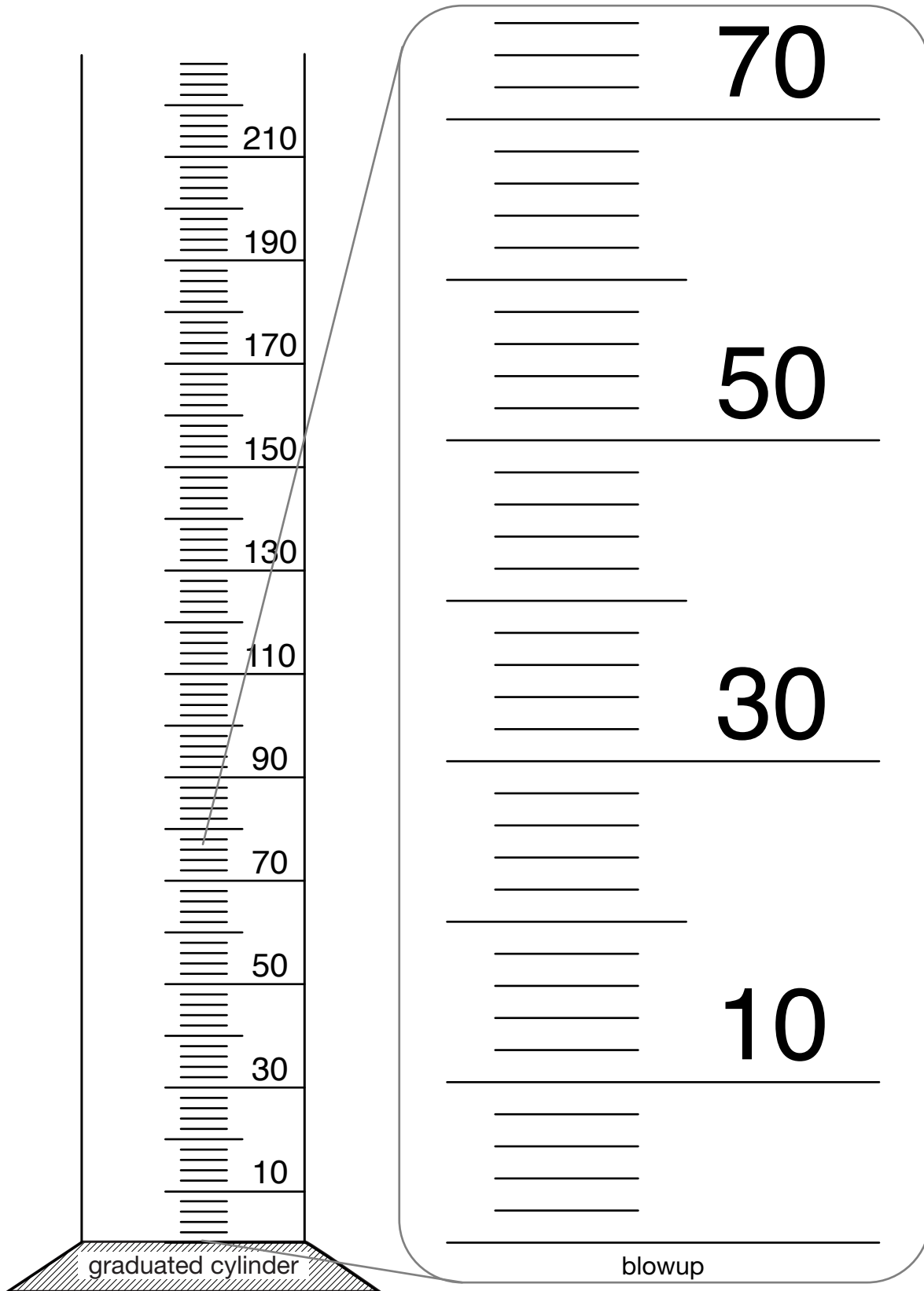
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Scale 2 with Blowup



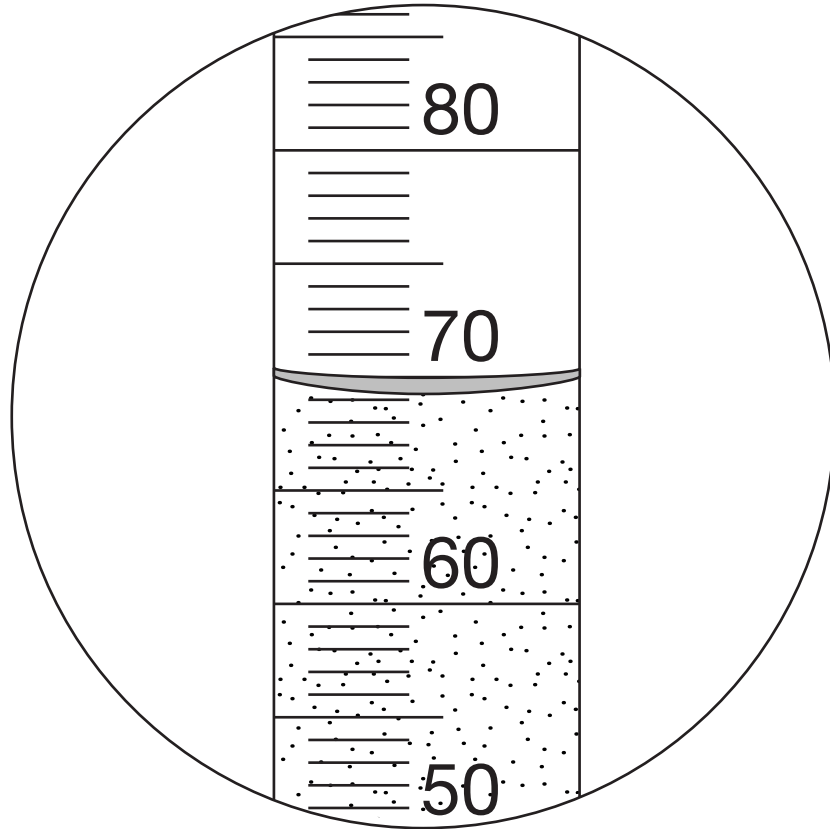
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Scale 3 with Blowup



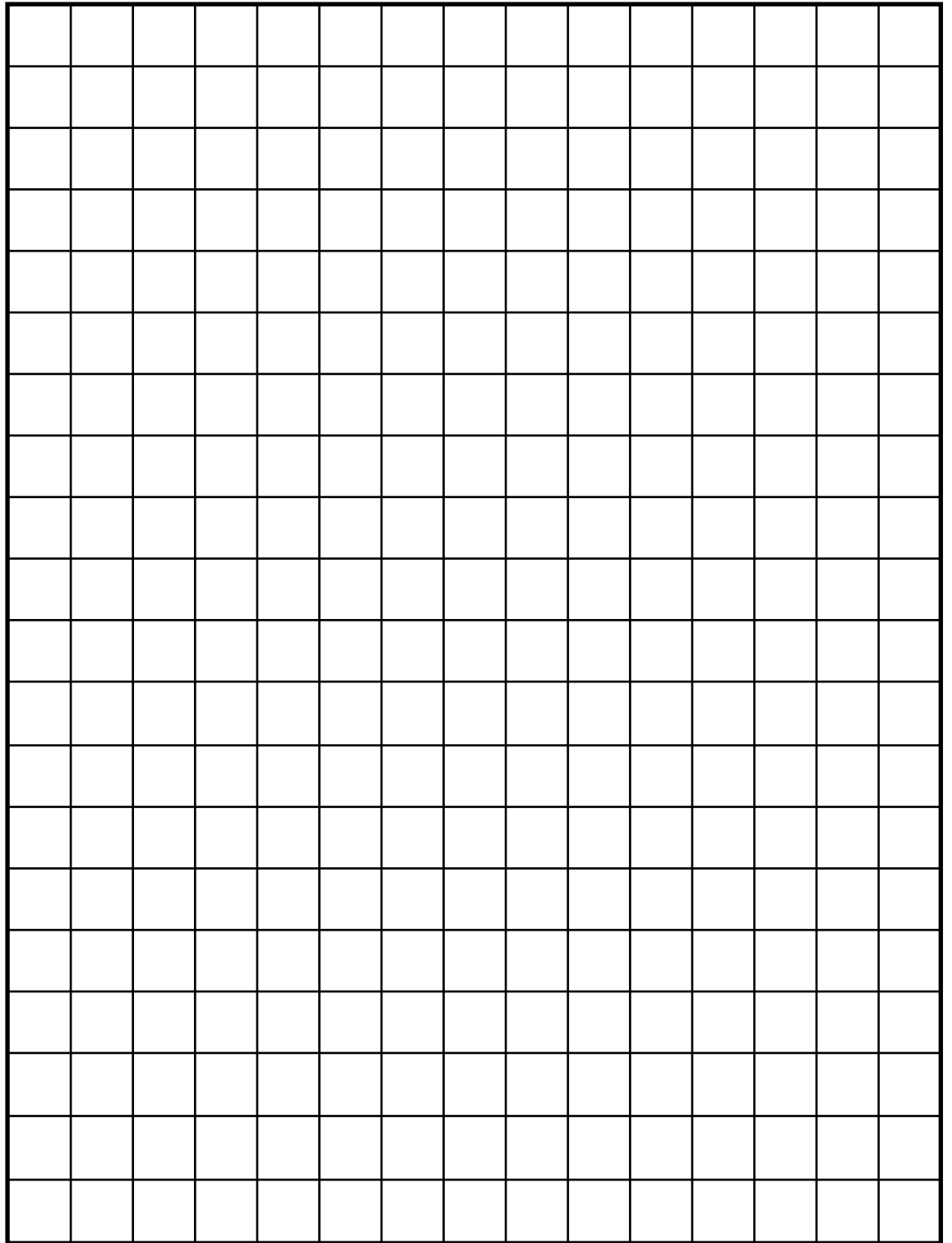
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Meniscus

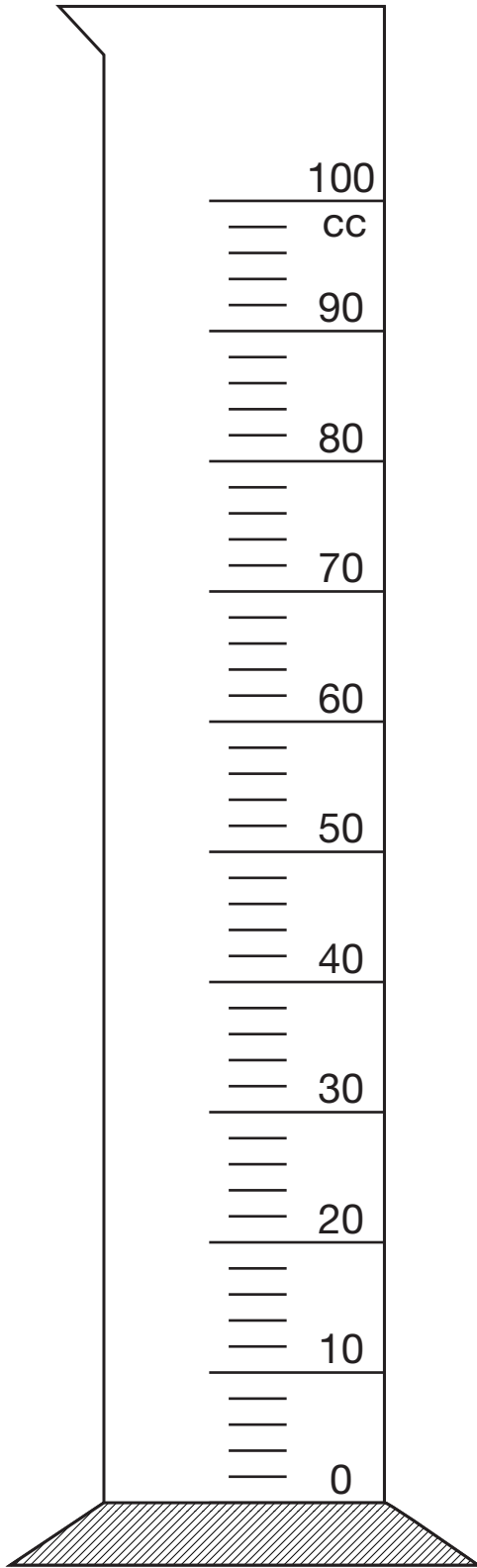


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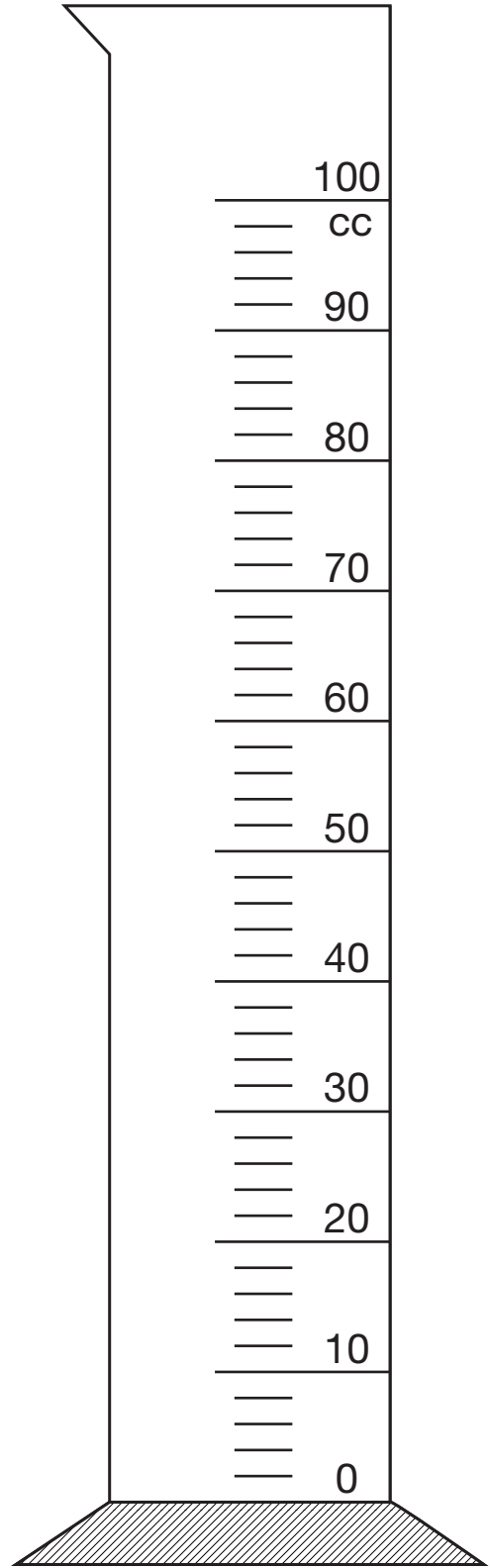
Date _____



Graduated Cylinders



Before



After

Name _____ Date _____

Yolanda Measures Volume by Displacement Feedback Box	Expect- ation	Check In	Comments
Measure volume to the nearest cubic centimeter. [Q# 3]	E10		
Estimate volume by counting cubic centimeters. [Q# 1]	E11		

	Yes ...	Yes, but ...	No, but ...	No...
MPE2. Find a strategy. I choose good tools and an efficient strategy for solving the problem. [Q# 2]				
MPE5. Show my work. I show or tell how I arrived at my answer so someone else can understand my thinking. [Q# 2]				
MPE6. Use labels. I use labels to show what numbers mean. [Q# 2]				

End-of-Year Test

Part 1

Solve the following problems. You may use the tools you used in class including the *Student Guide Reference* section.

1. Professor Peabody is planting a garden. He buys packets of seeds. There are 38 seeds in each packet. How many seeds are in 4 packets? Show or tell how you know.

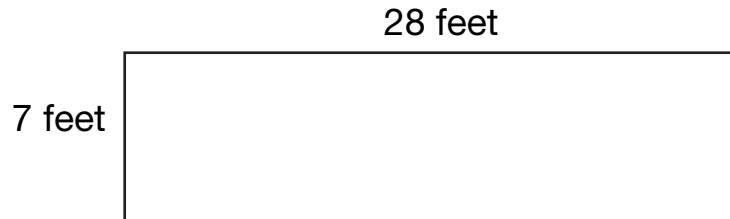
2. **A.** Each packet of seeds costs 92 cents. Show how you estimate the cost of 4 packets.

B. Find the exact amount. Show your work.

C. How do you know your answer is reasonable?

D. Professor Peabody pays with a \$5 bill. How much change will he receive?

3. **A.** The garden is shaped like a rectangle. It is 7 feet wide and 28 feet long. Show how to find the area of the garden.



- B.** The professor wants to put a fence around the garden. Show how to find the perimeter of the garden.

4. **A.** Professor Peabody gets thirsty when he works in the garden. He has a 32-ounce jug of water.

How many 6-ounce cups of water can he fill? _____ How much is left over?

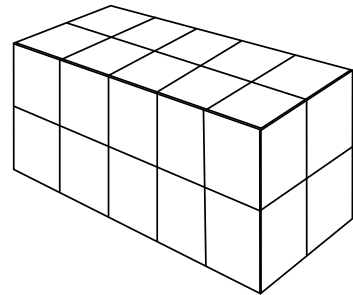
- B.** Check for reasonableness by solving the problem another way.

Part 2

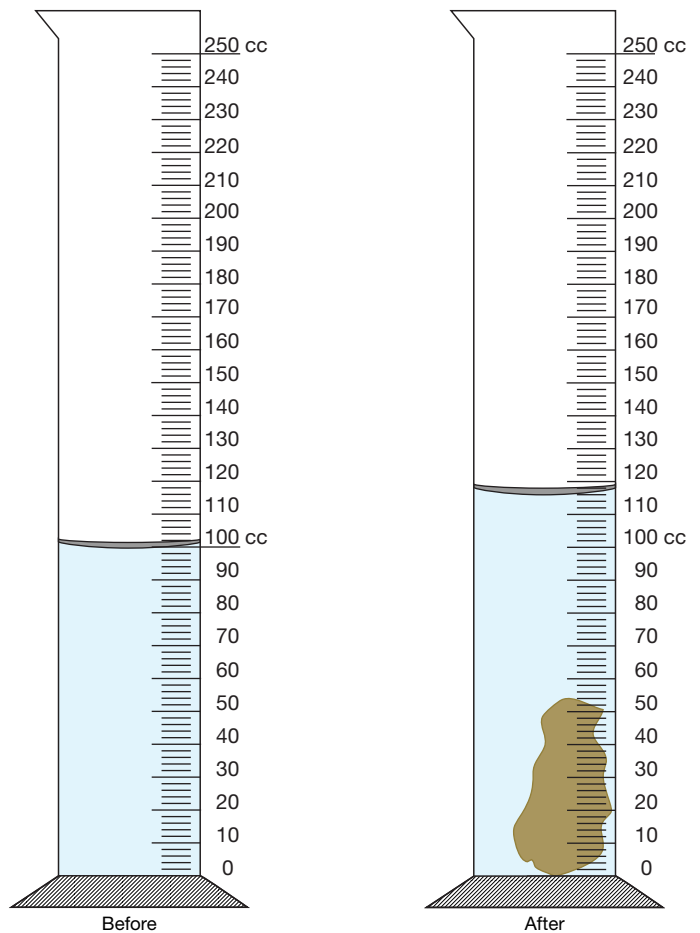
Solve the following problems. You may use the tools you used in class such as a ruler, fraction circle pieces, individual clocks, centimeter connecting cubes, and the *Student Guide Reference* section.

5. **A.** Darius built a model of a rock with centimeter connecting cubes so he could estimate the rock's volume.

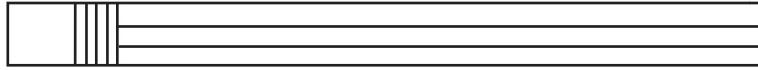
What is the volume of the cube model? _____



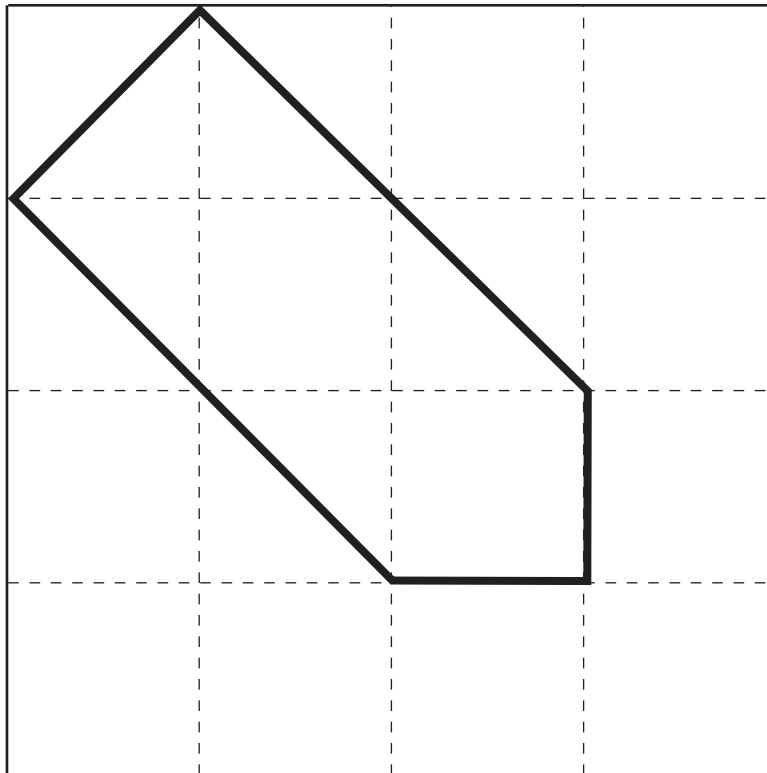
- B.** Darius used a graduated cylinder and the displacement method to find the rock's actual volume. He started by filling the cylinder with 100 cc of water. Then he slid the rock into the cylinder. Use the pictures to find the volume of the rock.



6. Use a ruler to measure the length of the pencil to the nearest centimeter. Include units. _____



7. The shape below is drawn on a square-inch grid. Measure lengths to the nearest half inch.
- A. What is its area? _____
- B. What is its perimeter? _____



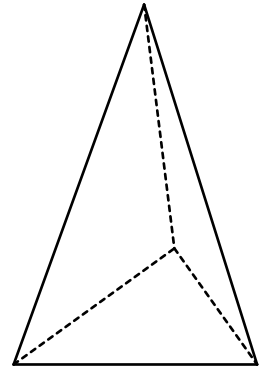
- C. How many sides does the shape have? _____
- D. How many vertices does it have? _____
- E. How many right angles does it have? _____

8. Look at this shape:

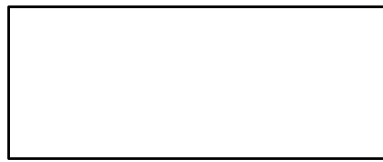
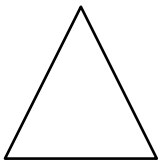
A. How many vertices does it have? _____

B. How many faces does it have? _____

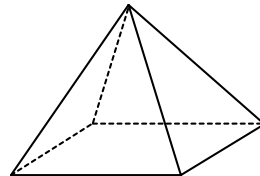
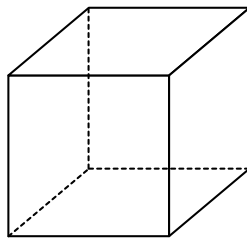
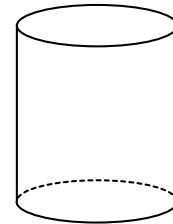
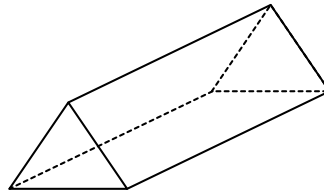
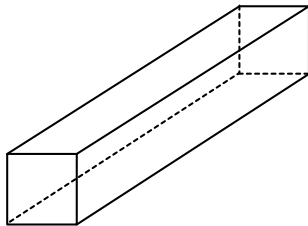
C. How many edges does it have? _____



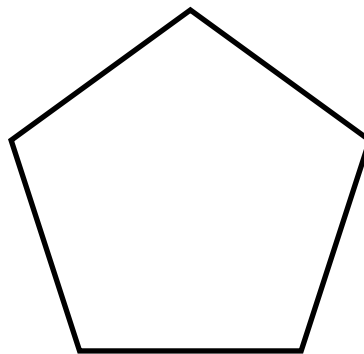
9. Josh traced the faces of a three-dimensional shape.



Which 3-D shape does Josh have? Circle the shape.

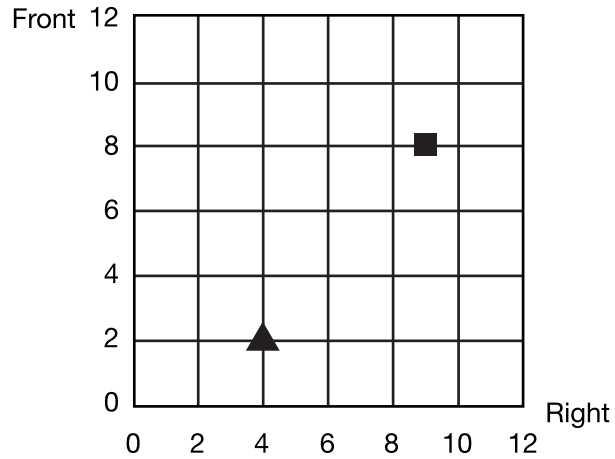


10. Draw two or more lines of symmetry.

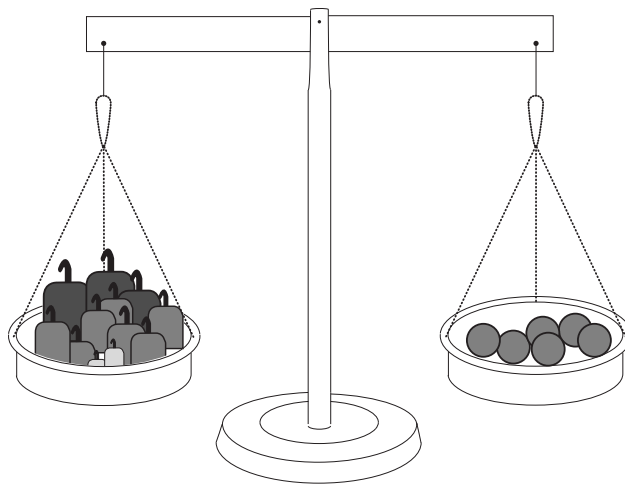


- 11. A.** At 8:18 AM, Josh started walking his dog, Buddy. He finished at 8:44 AM. How long was the walk?
- B.** Later in the day, Buddy took a nap. He fell asleep at 11:55 AM and slept for 45 minutes. What time did Buddy wake up? Was it AM or PM?
- 12. A.** Write the coordinates of the triangle and square on the data table.
- B.** Draw the circle at the correct point on the map.

Object	Right	Front
■	9	8
▲	4	2
●	6	5



- 13.** Mara put some marbles in one pan of a two-pan balance. She balanced the pans with three 10-gram masses, seven 5-gram masses, and two 1-gram masses. What is the marbles' mass? Show or tell how you found your answer.



For Questions 14–15 you will use the following symbols:

< less than = equal to > greater than

14. Write T next to the true number sentences and F next to the false number sentences.

A. $(3 \times 10g) + (2 \times 5g) = (8 \times 5g)$ _____

B. $(3 \times 5g) > (4 \times 10g)$ _____

C. $(2 \times 20g) < (7 \times 5g) + (2 \times 10g)$ _____

15. A. Compare these fractions to $\frac{1}{2}$ and sort them on the table.

$\frac{2}{3}$ $\frac{2}{4}$ $\frac{1}{8}$ $\frac{3}{4}$ $\frac{5}{6}$ $\frac{4}{8}$ $\frac{6}{8}$ $\frac{1}{4}$

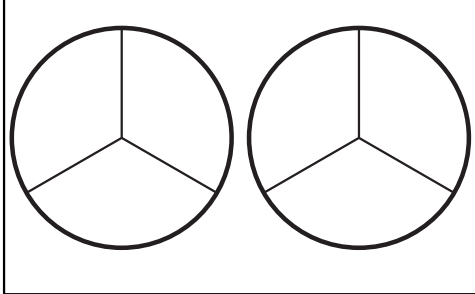
Fractions < $\frac{1}{2}$	Fractions = $\frac{1}{2}$	Fractions > $\frac{1}{2}$

B. How did you know where to place $\frac{2}{3}$?

16. Show the fraction on the number line in four more ways.


number

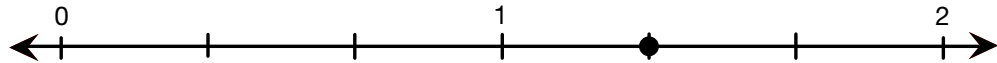
words



drawing

one whole fraction strip one whole fraction strip





17. If this

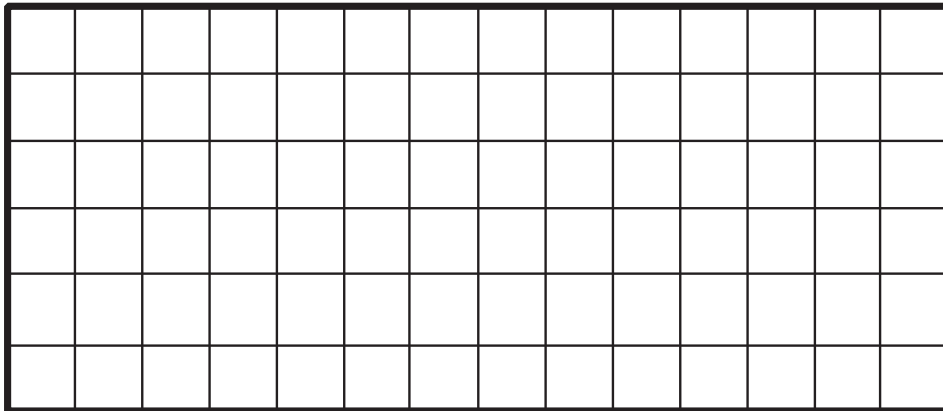
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 is $\frac{1}{3}$, then draw one whole.

18. Joe and Moe Smart are making punch. The recipe calls for $\frac{1}{4}$ cup sugar and $\frac{1}{4}$ gallon lime soda. Joe thinks the recipe says that they should put more lime soda into the punch bowl than sugar, but Moe disagrees. Moe says, "The recipe says that we should put the same amount of lime soda into the bowl as sugar. $\frac{1}{4}$ is the same as $\frac{1}{4}$." Who do you agree with and why?

19. A. Divide the rectangle into two smaller rectangles. Choose a way that will make it easy for you to find the product of 6×14 .

B. Write number sentences on your rectangles.



C. Complete the number sentences.

$$\begin{aligned} 6 \times 14 &= \underline{\quad} \times \underline{\quad} + \underline{\quad} \times \underline{\quad} \\ &= \underline{\quad} + \underline{\quad} \\ &= \underline{\quad} \end{aligned}$$

Part 3

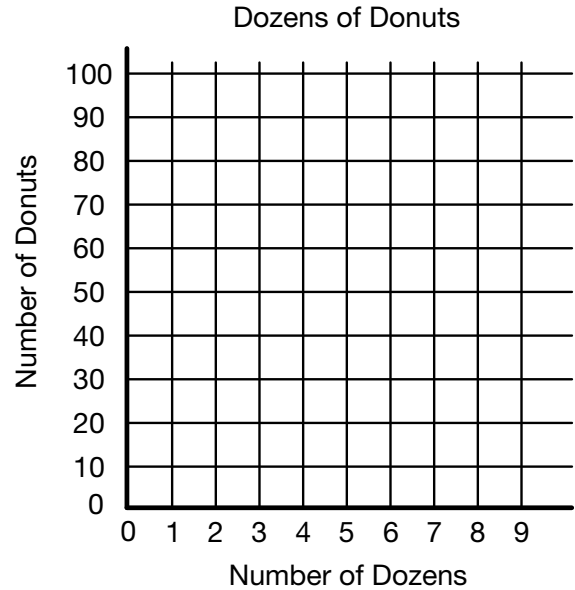
20. Ms. Alfonso’s class is selling donuts for the school fundraiser.

A. Complete the table.

Dozens of Donuts

Number of Dozens	Number of Donuts
1	12
2	24
4	
6	
	96

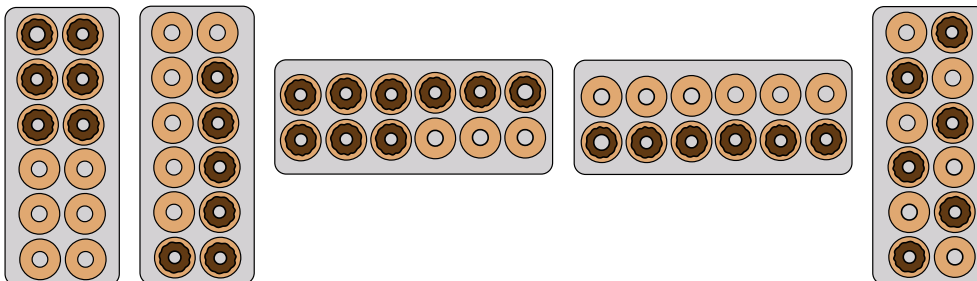
B. Make a graph using data from the table. Draw a best-fit line.



C. How many donuts are in 10 dozen? Show or tell how you know.

D. Mr. Martinez bought 80 donuts for the teachers. One dozen donuts fit into one box. How many boxes are needed so that he can carry them all to the teachers’ lunchroom? Explain how you decided.

E. Circle the boxes of donuts in which $\frac{1}{2}$ of them are chocolate.



Name _____ Date _____

**End-of Year Test
Feedback Box**

Yes ...

Yes, but ...

No, but ...

No...

<p>MPE1. Know the problem. I read the problem carefully. I know the questions to answer and what information is important. [Q# 1–4]</p>				
<p>MPE2. Find a strategy. I choose good tools and an efficient strategy for solving the problem. [Q# 1–4]</p>				
<p>MPE3. Check for reasonableness. I look back at my solution to see if my answer makes sense. If it does not, I try again. [Q# 2C, 4B]</p>				
<p>MPE4. Check my calculations. If I make mistakes, I correct them. [Q# 4B]</p>				
<p>MPE5. Show my work. I show or tell how I arrived at my answer so someone else can understand my thinking. [Q# 1, 2A–B, 3A–B]</p>				
<p>MPE6. Use labels. I use labels to show what numbers mean. [Q# 1–4]</p>				