Smiley Face Math

Rising 4th Graders

Prepared by the University of South Florida Saint Petersburg

For a copy of these materials, go to www.cdnportfolio.net/smileyfacemath

Acknowledgements

These materials were developed during a *Problem Solving for Elementary Teachers* class at the University of South Florida Saint Petersburg (USFSP) during the spring of 2009. The worksheets were field tested by the teachers in their own classrooms.

The project was conceived and directed by Dr. Charles A. (Andy) Reeves. Dr. Reeves previously developed the Superstars, Superstars II, and Sunshine Math packages of supplementary materials for grades K-8. Dr. Reeves is particularly interested in problem solving and in algebraic thinking.

The writers and field testers

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Technical Assistance

Dr. Zafer Unal, Assistant Professor of Early Childhood Education, USFSP, prepared these materials for the internet. Dr. Unal's interests include technology in teacher education, institutional and program assessment, e-portfolios, parental involvement and classroom management.

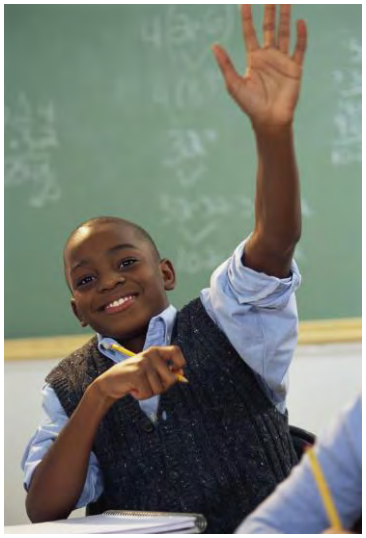
CONTENTS

Your child can begin the school year with confidence, with the use of this material during the summer.

Section 1

Overview of the *Next Generation Sunshine State Standards in Mathematics, K-8*, adopted by the State Board of Education in September, 2007.

The Florida Board of Education adopted new mathematics standards in 2007. The standards were developed by Florida teachers, supervisors, and university faculty. The main goal was to reduce the number of standards listed each year so that teachers could focus on fewer topics, but teach those topics in-depth. This emphasis reflects a national trend and our work was based on the National Council of Teachers of Mathematics' publication *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics*. (NCTM 2006) The total number of math standards that a K-8 teacher is responsible for covering has been reduced from an average of 87 per grade level, to 18. So teachers will definitely have more time to teach in an in-depth fashion.



Each grade level has three *Big Ideas* and each *Big Idea* contains several benchmarks under it, usually three or four. There are also *Supporting Ideas* for each grade level that round out the curriculum and maintain two strands—algebraic thinking and problem solving—over a several-year span. This strategy combines an in-depth look at the *Big Ideas* in a given year, with topics that students should work on *every* year.

The *Big Ideas* for Grade 4 are:

> **BIG IDEA 1:** Develop quick recall of multiplication facts and related division facts and fluency with whole number multiplication.
>
> **BIG IDEA 2:** Develop an understanding of decimals, including the connection between fractions and decimals.
>
> **BIG IDEA 3:** Develop an understanding of area and determine the area of two-dimensional shapes.

This means that 4th graders are going to spend much of their math time (1) mastering the basic multiplication and division facts and using them in problem-solving situations, including solving real-world problems, (2) learning in-depth about decimals as an extension of the base-ten number system, and the relationship of decimals to fractions, and (3) extending their knowledge of two-dimensional shapes to measuring these shapes using both customary and metric tools, and using real-world area problems to justify the formula for the area of a rectangle as "area = base × height."

The *Supporting Ideas* for Grade 4 come from the *Algebraic Thinking* strand, the *Measurement* strand, and the *Number and Operations* strand. From the *Algebraic Thinking* strand, students will generate algebraic rules using all four operations to describe patterns; use expressions, equations, and visual representations to describe relationships; and recognize and write algebraic expressions for functions with two operations. In *Measurement*, they will classify angles of two-dimensional shapes using benchmark angles (i.e. 45°, 90°, 180°, and 360°); understand the results of translations, reflections, and rotations of 45°, 90°, 180°, 270°, and 360°, including figures with line and rotational symmetry; and build a three-dimensional object from a two-dimensional representation of the object and vice versa. In the *Number and Operations* strand, they will use numbers up through millions in various contexts, including estimation of relative sizes of amounts or distances; use models to represent division as the inverse of multiplication, as partitioning, and as successive subtraction; generate equivalent fractions and simplify fractions; determine factors and multiples for specified whole numbers;

relate halves, fourths, tenths, and hundredths to decimals and percents; and estimate and describe reasonableness of estimates, as well as determine the appropriateness of an estimate versus an exact answer.

In short, your child will be learning much more about fewer math topics than in the past. This shift in emphasis will produce a curriculum that is much more in-depth about very basic ideas, so that re-teaching in future years will be unnecessary. What is necessary, however, is that the ideas learned in one year be used and reinforced in later years. Some have said that the math curriculum will go from a "mile-wide, inch-deep" curriculum, to an "inch-wide, mile deep" curriculum. The truth lies somewhere between those two extremes.

Reference

National Council of Teachers of Mathematics, *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics.* Reston, VA: 2006.

How to Use these Materials with Your Child

The worksheets to follow are designed to be used during the summer prior to a student entering 4th grade. The worksheets are similar to Florida's popular *Sunshine Math* program where students accumulate stars for doing extra problems. The answers and how to help your child, without giving too much help, are in the back of this package. The directions below are written for the individual parent, but can be adapted by schools, churches, or other community groups sponsoring summer camps for youth groups. The worksheets are each two pages in length so that, if copied front-to-back, they will each use one sheet of paper.

Do not feel that you have to "teach" these problems to your child. That's the job of the school system next year. But many times children learn things incidentally, by talking with others. If you simply talk through the problems with your child, perhaps he or she will remember that type of problem when it's encountered in 4th grade, and therefore be more successful with it.

Give out one worksheet a week during the summer. You might read all the problems with your child the first night, being sure each problem is well understood, but not trying to solve the problems. You should ask for any ideas your child has about how to solve the problems. Then he or she can have all week to complete the worksheet.

When the week is up, have a "help session" with your child in which he or she explains how the problems were solved. Help the child understand the problems that were not solved because similar problems will be seen later during the summer and all next year. Each problem is worth 1-4 *smileys*, depending on how hard it is. You can give partial credit for problems if the child understood how to proceed but made a mistake, and you can give a single *smiley* if the problem was tried but completely missed, assuming he or she now understands the problem.

Your child's reward for doing this extra work is that accumulating *smiley faces* on a chart—you'll need to make one of those and keep up with it each week. The chart needs to occupy a prominent place in your house, where the child and others will see it regularly. You

might consider adding some extra incentives for reaching certain levels. For example, once 10 *smileys* are earned, he or she might get a book of their choice. For reaching 25 *smileys* a movie might be appropriate. For reaching 50 *smileys*, a trip to the beach or a sleepover with friends might be earned. The basic idea is that your child can earn enjoyable rewards by doing some extra math problems. He or she will also know that next year's math class will be made much easier by knowing how to do these tasks.

SMILEY FACE MATH

Markus has this many smiley faces: ☻ ☻ ☻ ☺ ☺ ☺ ☺ ☺ ☺

Key: ☻ = 10☺

Note: The process of making the smiley face chart is a math task in itself, one from which your child can learn. You—or your child—can make a chart easily using a word processing program by going to the "insert symbol" menu on a PC, and finding the *smiley face* symbol. As the number of *smileys* on the chart becomes large, you can use a key such as ☻ = 10☺'s and your child will have learned something else about mathematics—how to construct a useful chart to display data.

Correlation of the Problems and the *Next Generation Sunshine State Standards in Mathematics* for Fourth Grade

Big Idea 1: Develop quick recall of multiplication facts and related division facts and fluency with whole number multiplication.	
BENCHMARK CODE	**BENCHMARK**
MA.4.A.1.1	Use and describe various models for multiplication in problem-solving situations, and demonstrate recall of basic multiplication and related division facts with ease. I 2, 3, 4, 8; II 4, 6, 7; III 4, 7; IV 4, 6; V 4; VIII 3; X 1, 4
MA.4.A.1.2	Multiply multi-digit whole numbers through four digits fluently, demonstrating understanding of the standard algorithm, and checking for reasonableness of results, including solving real-world problems. I 2, 4; II 4; IV 1, 2, 9; V 2, 8; VII 4, 7

Big Idea 2: Develop an understanding of decimals, including the connection between fractions and decimals.	
BENCHMARK CODE	**BENCHMARK**
MA.4.A.2.1	Use decimals through the thousandths place to name numbers between whole numbers. I 5; II 2; III 8; IV 5; VI 3, 6; VII 2, 5; IX 2; X 7
MA.4.A.2.2	Describe decimals as an extension of the base-ten number system. II 2; IV 5; VII 5
MA.4.A.2.3	Relate equivalent fractions and decimals with and without models, including locations on a number line. I 5; II 5; III 1; V 3; VII 2, 5
MA.4.A.2.4	Compare and order decimals, and estimate fraction and decimal amounts in real-world problems. I 7; V 1; VIII 6; IX 1, 5; X 7

Big Idea 3: Develop an understanding of area and determine the area of two-dimensional shapes.	
BENCHMARK CODE	**BENCHMARK**
MA.4.G.3.1	Describe and determine area as the number of same-sized units that cover a region in the plane, recognizing that a unit square is the standard unit for measuring area. II 6; IV 6; V 1; X 2
MA.4.G.3.2	Justify the formula for the area of the rectangle "area = base × height". II 6; IV 6; VII 3; X 2
MA.4.G.3.3	Select and use appropriate units, both customary and metric, strategies, and measuring tools to estimate and solve real-world area problems. III 5; IV 3; VII 1, 3, 7; X 2

Supporting Idea 4: Algebra	
BENCHMARK CODE	**BENCHMARK**
MA.4.A.4.1	Generate algebraic rules and use all four operations to describe patterns, including nonnumeric growing or repeating patterns. I 1; V 6; VI 1
MA.4.A.4.2	Describe mathematics relationships using expressions, equations, and visual representations. II 3, 7; III 7; IV 4; IV 8; IV 9; VI 5, 8; X 3
MA.4.A.4.3	Recognize and write algebraic expressions for functions with two operations. III 7; V 6, 7; VI 8; X 6

Supporting Idea 5: Geometry and Measurement	
BENCHMARK CODE	**BENCHMARK**
MA.4.G.5.1	Classify angles of two-dimensional shapes using benchmark angles (45°, 90°, 180°, and 360°) I 6; VI 2; VIII 2, 7; IV 3; IX 3
MA.4.G.5.2	Identify and describe the results of translations, reflections, and rotations of 45, 90, 180, 270, and 360 degrees, including figures with line and rotational symmetry. II 1; VI 4; VII 6, 8; IX 4; IX 4, 7
MA.4.G.5.3	Identify and build a three-dimensional object from a two-dimensional representation of that object and vice versa. III 2; X 5

Supporting Idea 6: Number and Operations	
BENCHMARK CODE	**BENCHMARK**
MA.4.A.6.1	Use and represent numbers through millions in various contexts, including estimation of relative sizes of amounts or distances. IV 2; V 8; VIII 1
MA.4.A.6.2	Use models to represent division as: • the inverse of multiplication • as partitioning • as successive subtraction IV 4; VI 7; VIII 7; IX 6, 8

MA.4.A.6.3	Generate equivalent fractions and simplify fractions. II 5; III 6; VIII 4, 5
MA.4.A.6.4	Determine factors and multiples for specified whole numbers. I 2; III 3; IV 7; V 4; VIII 6
MA.4.A.6.5	Relate halves, fourths, tenths, and hundredths to decimals and percents. IV 5; V 3, 5; VII 5
MA.4.A.6.6	Estimate and describe reasonableness of estimates; determine the appropriateness of an estimate versus an exact answer. IV 1, 2; V 8

Section 2

Smiley Face Math **Name: _____**
Grade 4, Worksheet I

☺ ☺ 1. Write the missing numbers in the pattern.

88, 84, 85, 81, 82, 78, 79, 75, 76, ___, 73, 69, ___, ___, ___, 63, ...

Describe the pattern above—tell how to get from one term to the next:

☺ ☺ ☺ 2. The school is selling yearbooks. Each yearbook costs $5 to make and is sold for $11. The school paid for 300 yearbooks, and has now sold 250 of them. How much profit has been made? Circle your answer.

A. $250 C. $1,500

B. $1,250 D. $2,750

☺ ☺ ☺ 3. Four cups = 1 quart and four quarts = 1 gallon. If your Mom buys two gallons of milk for a party, and each kid gets 1 cup with their cookies, how many kids could have milk?

Answer: _____ kids

☺ ☺ ☺ 4. Jack mows lawns during the summer. He receives $9 for every lawn he mows. If he mows 4 lawns per week for 12 weeks, how much would Jack earn? Explain how you got your answer.

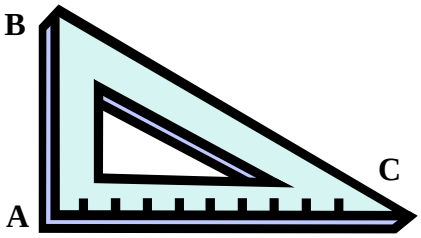
Answer: Jack would make _____.

Explanation:

☺ ☺ 5. Tyler ate ½ of his birthday cake. Show that amount as a decimal.

Answer: Tyler ate _____ of his birthday cake.

☺ 6. What is the measure of angle A in the figure below—45°, 90°, 180°, or 360°? Then explain about how many degrees angles B and C are, from knowing angle A's measure.



Answer: Angle A is _____. Angles B and C are probably about _____ and _____ degrees because:

☺ ☺ ☺ 7. Kristen, Joey, Alyssa and Lee ran a race at their school Olympics. Their times are in the chart below. Who received the first place medal? The second place medal? The third place medal? Then explain how you know.

Student	Time
Kristen	0.79 min
Joey	0.77 min
Alyssa	0.8 min
Lee	0.67 min

Answer: First place: _____

Second place: _____

Third place: _____

Explain how you can tell who came in 1st, 2nd, and 3rd:

_____

_____

☺ 8. Martha wants to plant 45 flowers in 5 flower beds. She decides to plant the same number in each flower bed. How many does she plant in each?

Draw a picture if you need help knowing what to do. Write a complete number sentence for your answer:

Answer: _____

Smiley Face Math **Name: _____**
Grade 4, Worksheet II

☺ ☺ 1. Classify each of the following figures as having **line symmetry** or **rotational and line symmetry.**

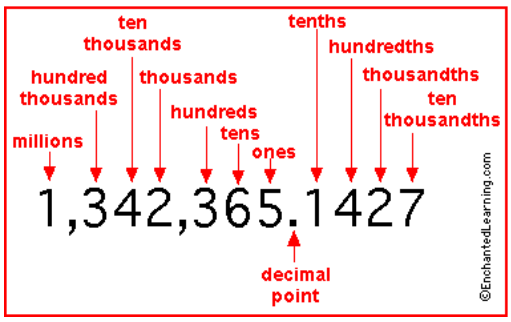
_____

_____

_____

_____

☺ 2. A big shark might weigh 433.38 pounds. Write the number **433.38** in word form. Use the chart below to help you.



Answer: _____

_____

☺ ☺ 3. 72 oranges distributed equally into *b* number of bags gives 9 oranges per bag. Circle the equation that matches the words.

A. $9 \div 72 = b$ B. $72 \div b = 9$ C. $9 - b = 72$ D. $9 \div b = 72$

☺ ☺ ☺ 4. The Perez family is taking a summer trip across the United States. They plan to go 150 miles each day and then camp out at night. They leave on June 1st.

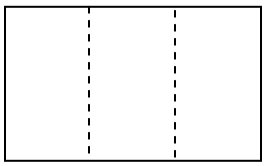
a. By June 7th, how far will they have traveled? _____

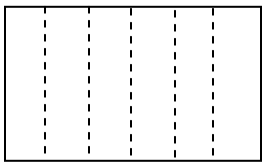
b. By June 17th, how far will they have traveled? _____

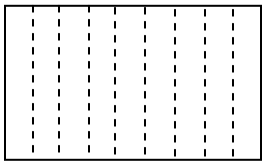
c. By the end of June, how far will they have traveled? _____

☺ ☺ ☺ 5. Below is a pan of brownies. Divide and shade the rectangle to its right to show 2/3 of a pan of brownies. Then shade the next rectangle to show 4/6 of a pan. Then shade the last rectangle to show 6/9 of a pan. What can you conclude?

Answer: ____ = ____ = ____







☺ ☺ 6. Some artists pride themselves on painting very small pictures. What is the *area* of this tiny picture, in square centimeters?

Answer: ____ square centimeters

(Hint:  is a square centimeter.)

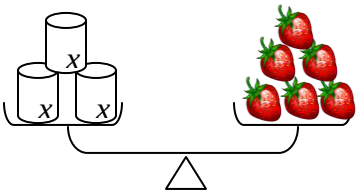
4 cm

3 cm

☺ ☺ ☺ 7. Write an equation to show the relationship on the balance scale below. Each strawberry weighs 10 grams. Solve the equation to find the weight of one can.

Answer: Equation: _____

Solution: x = ___ grams



Smiley Face Math **Name: _____**
Grade 4, Worksheet III

☺ ☺ 1. Rebecca and her friends ate parts of their candy bars. Draw a line from the fraction of the candy bar to the decimal it represents.

Remaining candy bar

A. ½ 0.75

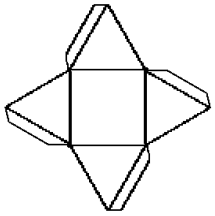
B. ¼ 0.50

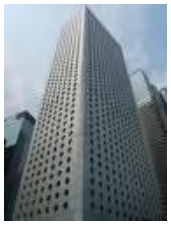
C. ¾ 0.25

☺ ☺ ☺ 2. Circle the building that could be made from this *net*.

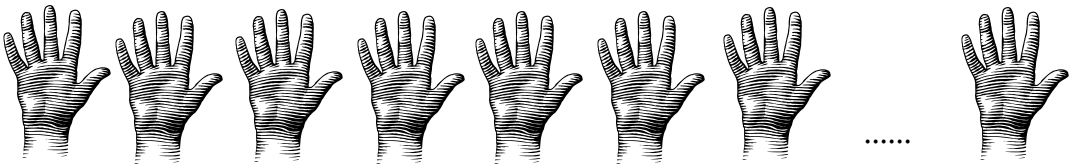
Buildings:

Net:





☺ ☺ 3. Write the first seven multiples of 5. Then write the 10th multiple of 5.



___, ___, ___, ___, ___, ___, ___, ... ___,

☺ ☺ 4. Robert is selling candy bars for a school fund-raiser. He sells a total of 56 candy bars to 8 neighbors. Each neighbor buys the same number of candy bars. How many candy bars does each buy?

Answer: _____ candy bars

Peter

☺ ☺ 5. A. What tool would you use to measure Peter's height? _____

B. Circle the unit of measure you would use.

Answer:

feet or
pounds or
square inches or
degrees Celsius

☺ ☺ 6. A. Circle the fraction that is equivalent to 3/12.

A. 1/2 C. 3/4

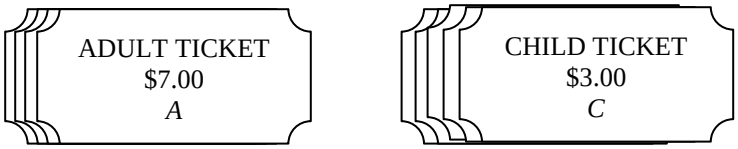
B. 1/4 D. 12/3

B. Write about it. Tell how you know that fraction is equivalent to 3/12.

_____

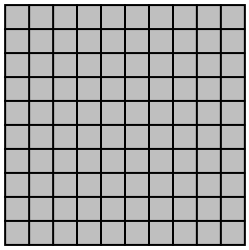
_____

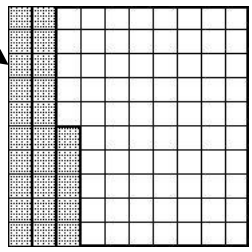
☺ ☺ ☺ 7. George buys 4 adult fair tickets at $7 each and 5 child tickets at $3 each. Write an algebraic expression to find the total cost. Use *A* to stand for the cost of an adult ticket and *C* the cost for a child's ticket.



Answer: The expression for the cost is: _____.

The actual total cost is _____.

☺ 8. If  = 1 whole, what decimal represents the shaded part below?



Answer:_____

Smiley Face Math **Name: _____**
Grade 4, Worksheet IV

☺ ☺ 1. Michael wanted to buy 5 videogames for $24 each off the internet. He has $125 in his piggy bank. Estimate to see if he has enough money. Explain how you know.

Answer:

☺ ☺ ☺ 2. The fair averages about 3850 people in attendance each week day, and about 5100 on Saturday and again on Sunday. Estimate to the nearest thousand about how many people attend the fair each week.

Answer: _____

☺ ☺ ☺ ☺ 3. Compare the two animals.

A. Does Brian the Bee or Cassie the Cow weigh more? _____

B. What tool would you use to find out? _____

C. Would you weigh Brian the Bee in ounces or in pounds? _____

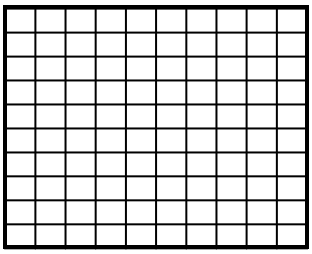
D. Would you weigh Cassie the Cow in ounces or in pounds? _____

☺ ☺ 4. Brian has 72 baseball cards in his collection. He wants to put his collection in an album. Each page holds 8 cards. Write an equation to tell how to solve the problem. Solve the equation to find the answer.

Answer: equation for the problem: _____

Solution to the equation: _____

☺ ☺ 5. Shade in 0.86 on this grid. Think of the grid itself as 1 whole.

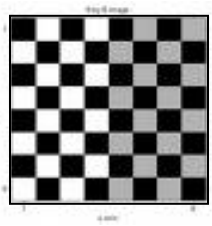


What are two names for the shaded part?

One name is: ____ *tenths* and ____ *hundredths*

Another name is: _____ *hundredths*

☺ ☺ ☺ 6. Look at the checkerboard below.



A. How many black, white, or gray squares are in each row? ____

B. How many squares are in each column? ____

C. If each square is 1 *square inch* in size, what is the *area* of the checkerboard? _____ square inches

☺ ☺ ☺ 7. Sarah has 24 jelly beans. She wants to give them to her friends. How many friends could she give them to so they all got the same number, with no jelly beans left over?

Answer: She could give them to these numbers of friends:

____, ____, ____, ____, ____, ____, ____, ____

☺ ☺ ☺ 8. Nick is playing a bongo drum. He taps the drum with his right hand 4 times, his left hand 2 times, then his right hand 3 times. He repeats this pattern 6 times during a song. How many times does he tap the drum?

Answer:_____

☺ ☺ 9. During a basketball game, Marcia scored 7 points and Ann scored 5 points. Juanita scored 3 times as many points as Marcia and Ann together. How many points did Juanita score?

Answer: _____

Smiley Face Math
Grade 4, Worksheet V

Name: _____

☺ ☺ ☺ 1. A scientist has a jar with 4.8 liters of acid in it. She pours 1.9 liters of acid into another jar. To the nearest liter, about how much acid is left in the first jar?

Answer: _____ liters

☺ ☺ 2. Three race cars are driving around a 4-mile track 110 times. Find the total number of miles the three cars travel. Explain how you got your answer.

Answer: _____ miles

Explanation:

☺ ☺ 3. Omar has 4/10 of a dollar in change. All of his coins are dimes. Circle the way to write his amount of money as a decimal.

A. $0.04

B. 0.40¢

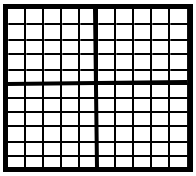
C. $0.40

D. 0.10¢

☺ ☺ ☺ 4. Joe was in charge of making a rectangular parking lot for 36 cars. He could make 1 row of 36 cars but that would be a strange parking lot. Tell all the different ways that Joe could design the lot. How many ways are there?

Answer: *Joe could make a 1 row-by-36 car lot as below; or a 2 row-by-___ car lot; or a 3 row-by-___ car lot; or a 4 row-by-__car lot; or a 6 row-by-___ car lot; or a 9 row-by-___ car lot; or a 12 row-by-___ car lot; or an 18 row-by-___ car lot; or a 36row-by-___ car lot. There are ___ ways all together.*

1 2 3 4 5 6 36



☺ ☺ 5. Shade in ¼ of the rectangle to the right. Then circle the letter with the equivalent decimal and percent for ¼.

A. 0.25 and 25% B. 0.04 and 4% C. 25 and 25% D. 0.4 and 40%

☺ ☺ ☺ 6. Identify the rule for each input-output table and complete the table. Then explain the relationship between the two tables.

a. Rule: _____

Input	Output
1	3
4	12
6	18
7	
9	
x	?

b. Rule: _____

Input	Output
3	1
12	4
18	6
21	
27	
x	?

Explain: _____

_____

☺ ☺ ☺ 7. Sylvia spends 150 minutes each morning and 85 minutes each night, 3 days a month, on the Internet. Write an equation to show how much time each month Sylvia spends on the Internet. Let *t* represent the total time she spends on the Internet. Then find a value for *t*.

Answer: equation: _____

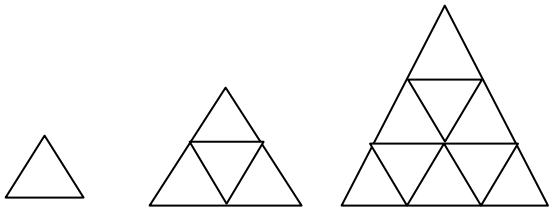
Total time per month: _____ minutes

☺ ☺ ☺ ☺ 8. A song is played at a fast tempo of 180 beats per minute. If the song lasts 3 minutes and 58 seconds, <u>about</u> how many beats are there in the song?

Answer: about ____ beats

Smiley Face Math **Name: _____**
Grade 4, Worksheet VI

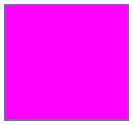
☺ ☺ ☺ ☺ 1. a. Draw the 4th and 5th figures to follow the pattern of triangles below.



1st 2nd 3rd 4th 5th

b. How many little triangles would be in the 6th and 7th figures? Tell how you know without drawing the figures.

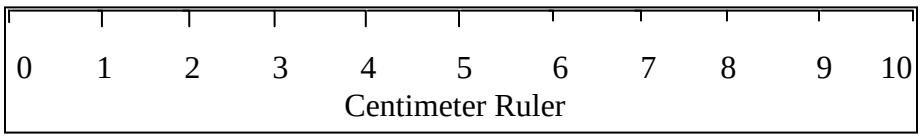
☺ ☺ 2. What is the sum of the degrees of the angles in a square?



Answer: _____°

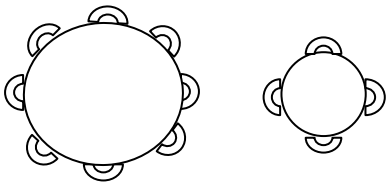
☺ ☺ 3. Below is a centimeter ruler. Mark on the ruler about where these pencils would end, if measured with this ruler.

Pencil A: 5.7 centimeters **Pencil B**: 7.3 centimeters **Pencil C**: 9.2 centimeters



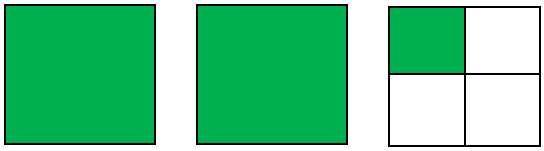
☺ ☺ ☺ 4. Show that this object has *rotational symmetry*. Show that you can trace over it, and turn the tracing less than a full turn, and it matches itself.

☺ ☺ ☺ 5. Sue is planning a picnic for 70 people. Eight people can sit around the large picnic tables. The small tables seat four people. There are only four large tables and they are all full. Sue thinks she needs nine small tables to seat the rest of the guests. Is she right? If not, how many small tables will she need? Draw a diagram to show your thinking.



Answer and explanation:

☺ 6. Write a decimal that matches the shaded area of the picture. Each large box is 1 square inch.



Answer: The shaded area shows _____ square inches total.

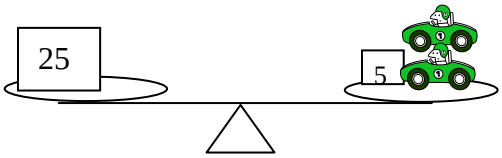
☺ ☺ 7. Kelly painted eggs for an egg hunt. She can paint an egg in 10 minutes. If she painted for two hours, how many eggs did she paint?

Kelly's start time: 

Kelly's end time: 

Answer: Kelly painted ____ eggs.

☺ ☺ ☺ 8. Hank was working with a balance scale. He balanced two toy cars and one 5-gram block with a 25-gram weight. He let *w* stand for the weight of one car, and he said that *w* = 7 grams. Was he correct? ____ If not, how much did each toy car weigh? ___

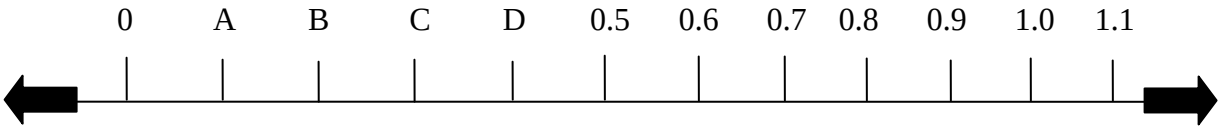


Smiley Face Math **Name: _____**
Grade 4, Worksheet VII

☺ ☺ 1. Start with a standard 8½ inch-by-11 inch sheet of paper. Use an inch-ruler to mark off inches around the edges and draw lines to divide the paper into square inches. Count the square inches, including whole square inches and 1/2 square inches. What is the total *area* of the paper?

____ square inches

☺ ☺ 2. Write the decimal for each letter on the number line below.

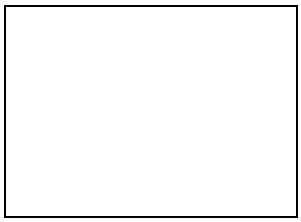


A:_____ B:_____ C:_____ D:_____

☺ ☺ ☺ 3. The fourth-grade class is preparing to paint a mural on one interior wall of the school. First the students need to paint the entire wall pink. The wall is 15 feet tall and 20 feet wide. One quart of paint will cover an area of 100 square feet. How many quarts of paint should the students buy?

Answer: _____ quarts of paint

15 feet



20 feet

1 quart will cover 100 square feet

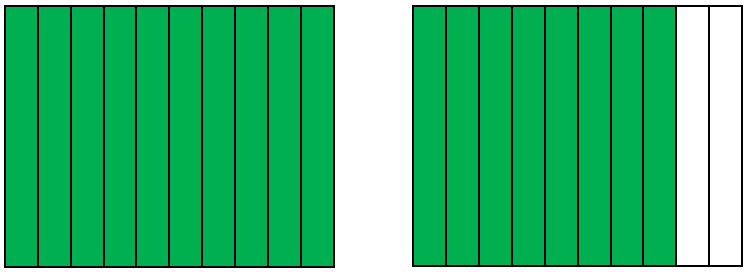
☺ ☺ ☺ ☺ 4. On average, the circus sells 1250 tickets each performance. If the circus has 24 performances a month, what is the total number of tickets sold each month?

Answer: _____ tickets

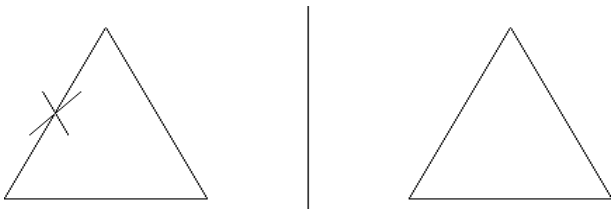
☺ ☺ 5. If figure A shows one whole, what fraction and what decimal show the shaded part of figure B? What number shows the shaded part of A and B together?

Answer: B: ___ as a fraction and ___ as a decimal
A + B can be written as ____ or as ____.

A B



☺ ☺ 6. There is an X on the original triangle. Mark where X would be when *reflected* across the line onto the triangle on the right.



☺ ☺ ☺ 7. Mario's bowling ball weighs 8 pounds 6 ounces. How many ounces does the ball weigh?

(1 pound = 16 ounces)

Answer: The ball weighs ____ ounces

☺ ☺ 8. What type of symmetry—line or rotational—do the blades of a windmill have, and why?

Answer: _____ symmetry and here is how I know:

Smiley Face Math **Name: _____**
Grade 4, Worksheet VIII

☺ 1. Sarah is using the Internet to do a book report on animals. She typed the word "mammal" into a search engine. The search engine found 1,856,324 web sites with the word "mammal".

What is the place value of "5" in "1,856,324"? _____

What is the place value of "6" in "1,856,324"? _____

What is the place value of "8" in "1,856,324"? _____

☺ ☺ ☺ 2. Angles that are 90° are called **right angles** . Angles that are less than 90° are called **acute angles**. Angles that are greater than 90° are called **obtuse angles**. You can use the corner of a sheet of paper to tell what type of angle you have.

Classify each of the angles made by the hour and minute hands as **acute**, **right**, or **obtuse**.

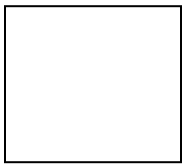
_____ _____ _____ _____ _____

☺ 3. Steve has trouble remembering that 7×6 = 42. But he does know that 5×6 = 30 because the "5 times" facts are easy for Steve. Tell how Steve can use what he knows to quickly figure out that 7×6 = 42.

Explanation:

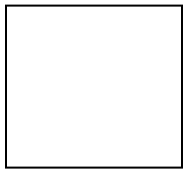
☺ ☺ 4. Diana bought ¼ pound of potatoes. Wayne bought ⅜ pound of broccoli. Show by shading in the rectangles below that Wayne's vegetables weighed more than Diana's. Each rectangle shows one whole pound.

Diana's potatoes



Wayne's broccoli

☺ ☺ 5. Since 16 ounces = 1 pound, you can tell how many ounces Diana and Wayne bought by dividing the "pounds" picture into *sixteenths* instead of into *fourths* and *eighths* as you did above. Divide the squares again, but this time into *sixteenths*, and see how many ounces each person bought.



Diana's potatoes
= ___ ounces

Wayne's broccoli
= ___ ounces

☺ 6. Use the calendar. Answer the questions below.

January 2009

Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

a. Circle the multiples of 2. Then draw a square around the multiples of 3.

b. Which numbers have both circles and squares around them? __. ___, ___, ___, and ___

c. Which *single number* is your circled and squared numbers a multiple of? ____

☺ ☺ ☺ 7. Six apples cost Javier $3.10. About how much did each apple cost?

=

Answer: about $_____

Smiley Face Math **Name: _____**
Grade 4, Worksheet IX

☺ ☺ ☺ ☺ 1. John walks between 1.8 and 3.2 miles each school day. ESTIMATE the number of miles he walks during the school week.

Estimate:_____

Below, explain how you made your estimate.

☺ ☺ ☺ 2. Brooke wanted a new music CD. Her Dad said he would buy it for her if she could guess the price, which was between $13 and $14.

a. How many money amounts are there between $13 and $14? _____

b. Name any five of those money amounts. Circle the one closest to $14:

_____, _____, _____, _____, _____

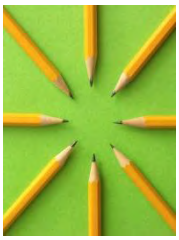
☺ ☺ 3. What angle do the hour and minute hands on the clock form at 3:00 o'clock? At 6:00 o'clock?

Answer: _____º

and _____ º

☺ ☺ ☺ 4. Trace this flag on paper you can see through. Flip your tracing on the right-hand edge of the flag. Then slide it about an inch to the right. Turn it 180º (which is a half-circle) about the center. Draw the image you have now. What does it look like?

☺ ☺ ☺ 5. Mrs. Johnson uses eight pencils each day in her reading group. One day she used pencils this long:



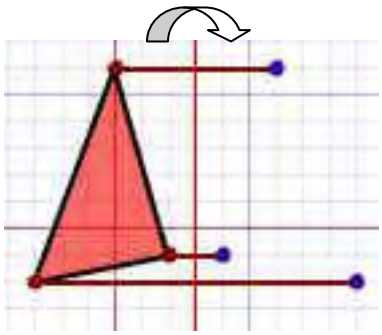
9.8 cm, 18 cm, 13.1 cm, 12.9 cm 10.4 cm, 13.7 cm, 14.1 cm, 9.7 cm

Draw a circle around the shortest length. Draw a triangle around the longest length.

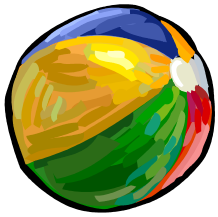
☺ ☺ 6. Homero, Billy, and Yazan have been collecting shells on Clearwater Beach. They found 33 shells in all. They both want to take home the same number of shells. How many shells will each boy get?

Answer:_____

☺ ☺ 7. Draw the reflection of the triangle below, using the dots to the right of the reflection line.



☺ ☺ ☺ 8. Dorian's having an end of the year party for his class. There are 23 students in his class. He would like to buy a beach ball for each student. Five beach balls come in a package. How many packages will Dorian have to buy so that everyone will get a ball?



Answer: _____ packages

Smiley Face Math **Name: _____**
Grade 4, Worksheet X

☺ ☺ 1. Jack is on vacation with his family in Orlando. He brought 5 pairs of shorts and 4 shirts. How many outfits can he make? (An "outfit" is any shirt matched with any pair of pants.)

Answer: _____ outfits

☺ ☺ ☺ 2. a. Measure the length and width of the mattress on your bed in feet. What is the length and width, rounded to the nearest whole foot?

Answer: length = ____ feet, width = ___ feet

b. Make a square out of cardboard that is 1 foot on each side. Use this to find the area of your mattress, in square feet.

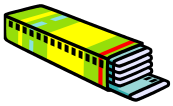
Answer: The area is ___ square feet.

c. Is there a quick way to find the area of a mattress if you know the length and the width? Explain:

☺ ☺ ☺ ☺ 3. Frank bought 5 packages of hotdogs. Each package has 8 hotdogs. He ate some hotdogs this week. Let *h* represent the number of hotdogs he ate. Write an expression to show how many hot dogs he has left.

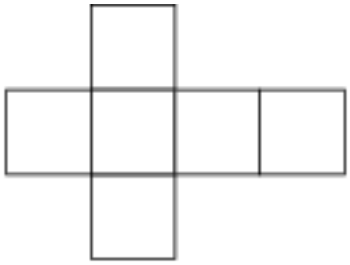
Answer: He has this many hot dogs left: _____

☺ 4. Juan has 8 packs of gum. There are 5 pieces of gum in each package. How many pieces of gum does he have in all?



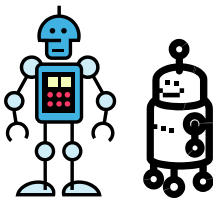
Answer:_____

☺ ☺ 5. Trace over the figure below. Then cut out your tracing and fold it on the inside lines so it makes a 3-dimensional shape. Put tape on it so it stays folded. What is this shape called?



Answer: It's called a _____

☺ ☺ ☺ 6. You have two robots that will do what you tell them to do with numbers. You set the robot on the left to always triple a number it gets as input. You set the robot on the right to always subtract 1 from a number it gets as input. Then you hook the robots up together so that you tell a number to the one on the left, then that robot outputs his number to the robot on the right, and that robot gives the final output. If you whisper "1" to the left robot, it then outputs 3×1 or "3" to the right robot, and the right robot outputs 3 – 1 or "2". Fill in the missing input-output chart below, for different input numbers.



Input number on left	Final output number
1	2
4	___
2	___
10	___

☺ 7. A penny is 0.01 of a dollar. So a nickel is what decimal part of a dollar?

Penny = $0.01

Nickel = $____

Section 3

Suggestions for helping your child find the answers

Grade 4, Worksheet I

1. **Answer: 72; 70; 66; 67. The repeating pattern is subtracting 4, adding 1.** This pattern has 2 operations, subtract and add. If your child is having difficulty seeing the pattern, encourage the child to figure out what happens from one number to the next, writing the thoughts below each set of numbers. The pattern will then become obvious.

88, 84, 85, 81, 82, 78, 79, 75, 76, **72**, 73, 69, **70**, **66**, **67**, 63, 64

-4 +1 -4 +1 -4 and so on…

2. **Answer: B $1,250.** How much profit has been made is the question at hand. Encourage the child to solve this problem in her or his own way. The child may begin this problem by multiplying 300 × $5, or he or she may realize that 100 × $5 is $500, so 300 × $5 would be 3 times that much, or $1500. That's how much has been spent.

But the school have made 250 × $11. The child may know that 100 × $11 is $1100, so 200 × $11 is twice that amount or $2200. Then 50 × $11 is half of $1100, or $550. So that's added to $2200 to get $2750 brought in. Their profit is then $2750 - $1500, or $1250.

3**. Answer: 32 kids.** The challenge with this problem is that it involves two multiplication steps. 4 cups to a quart and 4 quarts to a gallon means there are 4 × 4 or 16 cups in a gallon. So two gallons would have 2 × 16 cups, or 32 cups. The child might draw a picture of 4 cups "inside" a quart container, then 4 of those quarts "inside" a gallon, and then two gallons like that.

4. **Answer: $432. The explanation should show an understanding of the process they used to find their solution. A diagram may be a part of the explanation, but encourage your child to translate the picture into words.** This is a two-step problem that may be solved in different ways. Most children will multiply the number of lawns mowed by the money made for each lawn because 9 × 4 is a basic fact they may be comfortable with. The challenge comes when they need to multiply 36 by 12. If your child has difficulty with this, have her or him try breaking the 12 apart into 10 and 2. It might be easier to find 36 × 10 and 36 × 2, and then add the products together. Breaking 36 apart into 30 and 6 gives the child another number that is a multiple of ten (30) to work with. Or, the child might simply add 36 twelve times.

Grouping numbers is another strategy children use. They might draw a diagram or picture matching the lawns, money, and weeks in different combinations. Drawing a diagram always helps a child visualize the problem, making it easier to solve and explain.

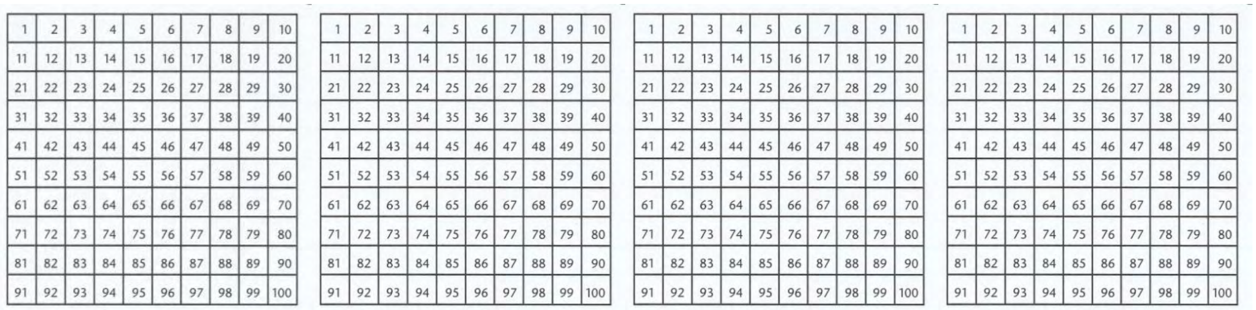
5. **Answer: 0.5 or 0.50 or 0.5 and any amount of zeros. (Note: it's not necessary for your child to put a zero before the decimal point.)** See if your child draws a picture to solve the problem. If he or she is having difficulty, encourage your child to draw a picture of a square

cake and then draw 9 lines to separate the cake into *tenths*. Shading in ½ the cake will be 5 of those tenths, or 5/10, or 0.5.

6. **Answer: Angle A= 90°. Angles B and C would be less than 90°, probably around 45°.** Angle A is a right angle and all right angles are 90°. You can tell it is a right angle by placing the corner of a standard piece of paper up to the corner of the angle you are trying to measure and the lines match up to the edges of the paper. The child can then use the same corner to tell the other angles are less than that, and probably only about half as big as the right angle.

7. **Answer: First—Lee; Second—Joey; Third—Kristen.** If this is the first time your child is exposed to decimals as time, tell them to think of it as money. You may ask, "Who has the least amount?" "Who has the most?" "In a race, would you want to finish in less or more time?" If the child is still having difficulty, try acting it out by using a stopwatch.

You can also use 4 hundreds charts like the ones below, representing each time on it. The whole square represents 1 minute, and since it's divided into 100 small squares, each of those is one *hundredth* minute. So shade in the right number for each child's time—the one with the fewest shaded squares is the winner.



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

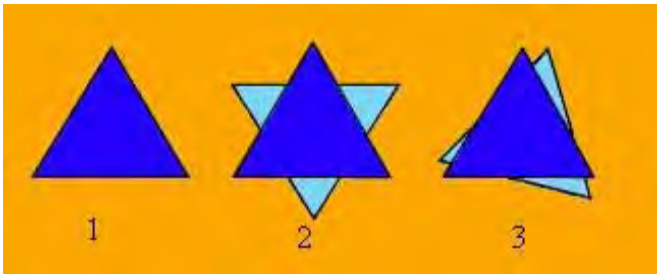
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

8. **Answer: 45 ÷ 5 = 9, or an equivalent statement.** Let your child solve this in her or his own way. Drawing a diagram of the flower beds and placing the flowers in the beds may help to visualize the problem. However, in the end, the child should write 45 ÷ 5 = 9, or an equivalent statement such as 5 × 9 = 45. In fourth grade, students will be expected to remember that fact—and the others like it—and use them fluently.

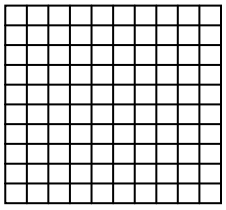
Suggestions for helping your child find the answers

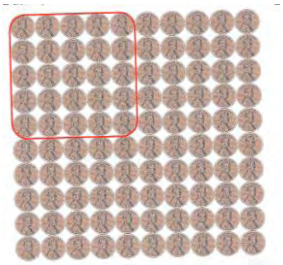
Grade 4, Worksheet II

1. **Answer: The starfish and flower have rotational symmetry and line symmetry. The butterfly and owl have line symmetry.** *Line symmetry* is when one half of an object is the mirror image of the other half. When an object has *line symmetry* you can draw a line down the center and both sides are exactly the same. An object with *rotational symmetry* occurs when an object has a center point and as you rotate it around, less than 360 degrees, it matches itself. The triangle below has rotational symmetry because it matched itself three times as it is turned 360 degrees. Encourage your child to find other examples of symmetry, both *line* and *rotational*, in the world.



2. **Answer: four-hundred thirty-three and thirty-eight hundredths.** Encourage your child to use the diagram that is provided with the problem which will help them see place value with decimals. You may also use the hundreds chart below to explain *hundredths* to the child by shading in 38 out of the hundred squares to represent thirty-eight *hundredths*. You could also relate this amount to $433.38 in which the "433" shows 433 dollars, and the ".38" shows 38 cents, which is 38/100 of a dollar. (The pennies circled in red below show 25/100 of a dollar.)





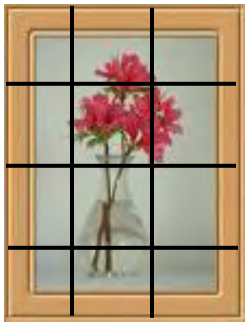
3. **Answer: B.** In this problem, the words match the equation. The variable *b* would be the number of bags, which is the unknown. Your child might have difficulty understanding this concept, but you can relate it to letting symbols stand for other things we don't know. For example, if this child is 2 years older than a sister, let *a* stand for this child's age and the sister's age is $a - 2$, always and forever, no matter what age this child becomes.

4. Answer: a. 1050; b. 2550; c. 4500 This problem is ripe for introducing how to multiply parts of a number and pull the parts together to get a final answer, which is what happens in our multiplication algorithm. The child can find the answer to (a) by either adding 150 seven times, or if the child knows how to multiply, by doing 150 × 7. He or she might even do the latter by finding 100 × 7 = 700, then 50 × 7 is half of that, or 750, and the sum of those is 1050.

To get the answer to (b), the child can again add 150 seventeen times, or multiply 150 × 17. He or she already has 150 × 7, so you might encourage the child to do 150 × 10 to get 1500, and add that to 1050. If the child uses the standard algorithm, these numbers are what will be obtained anyway. For (c), 150 × 30 can be obtained in ways similar to the above.

5**. Answer: 2/3 = 4/6 = 6/9.** Have the child shade in the parts of each pan to discover that the same amount has been shaded in each pan. If not, have the child take tracing paper and trace over the shaded amount in the first pan, 2/3, and put it on top of 4/6 and then 6/9.

6. **Answer: 12 cm^2.** The base and the height of the picture are given. Your child might know to multiply the base times the height to get the area of the picture. If the child doesn't know this, take a centimeter ruler and mark off 3 centimeters on the bottom and 4 up the side, and draw in the square centimeters (see below). First have the child count the squares—that's the area—and then encourage them to look at 4 rows with 3 in each row, and use *repeated addition* or *multiplication*—a shortcut to repeated addition—to find the answer.



7. **Answer: Equation: $x + x + x = 60$, or $3x = 60$; Solution: $x = 20$ grams** The picture shows a balance scale that commonly represents an equation. The left pan has 3 cans on it, labeled x, and the right pan has 6 strawberries, each weighing 10 grams. So the equation is $x + x + x = 60$ or $3x = 60$. If the child has trouble understanding this, have them take 3 identical cans from your kitchen and say that all 3 cans cost 60 cents, and use 6 dimes. Then have the child match up the cans with dimes so each can matches the same number of dimes, 2. Tell the child that's what you're doing when you solve an equation—simply finding out how much of something one unknown is worth.

Suggestions for helping your child find the answers

Grade 4, Worksheet III

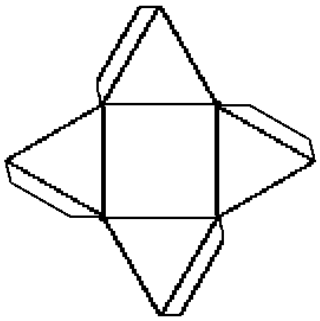
1. **Answer: A. 0.5 B. 0.25 C. 0.75.** Your child might not have encountered decimals in school yet. You might display a hundreds chart like the one below, and pretend it is a candy bar.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

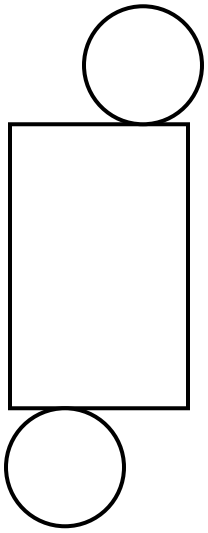
Have the child shade in the first 25 squares and write 0.25 to show that part of the candy bar. Then have the child decide what *fraction* of the candy bar is shaded. It's ¼ since four pieces that size make up 1 whole.

Go through a similar explanation of 0.5, which would be the first 50 squares, and matches ½. Then a similar activity for 0.75, which matches ¾.

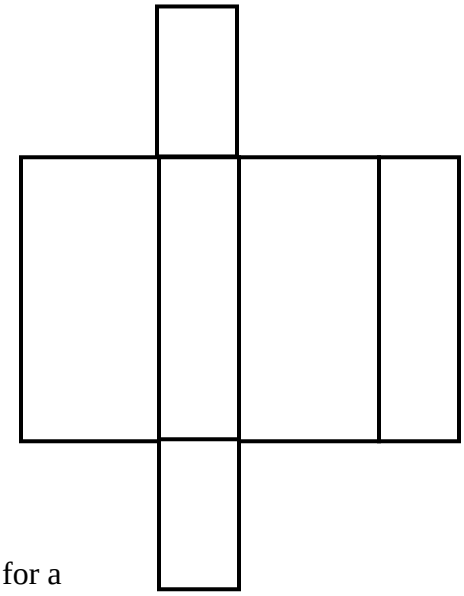
2. **Answer: the pyramid.** Explain that a net is a two dimension figure that, when cut out and folded up, makes a 3-dimensional shape. Each flat part is called a "face". Cut out the nets below and fold each one to match the sides, creating the three-dimensional shapes. (The net for a pyramid has tabs for gluing the faces together.)



Net for a pyramid.



Net for a cylinder.



Net for a rectangular prism (box).

3. **Answer: 5, 10, 15, 20, 25, 30, 35; 50** Encourage your child to think about counting by 5s and what that means. Because the question states the first seven multiples of 5, the child starts at 0 on the number line and then counts up from there by 5s. He or she can keep going till the 10th multiply of five has been found also. Hint: counting nickels or 5-minute increments on a clock might be worthwhile to your child, to show a real-world connection.

4. **Answer: 7.** This problem can be solved in various ways. One suggestion is for the child to draw a diagram of the candy bars and group them for each neighbor. This method will help to visualize the problem.

5. **Answer: a. ruler/meter stick/tape measure/yardstick b. feet.** Some form of a ruler would be the tool used for measuring height. This is a measurement of feet or meters (metric). Your child should start to become familiar with both systems and learn the appropriate time to use each.

6. **Answer: B: ¼.** Have your child look at the answer choices and rule out the ones that do not work as an equivalent fraction for 3/12. You might use a strip of paper made for the months of the year, each month being 1/12 of a year. Then 3/12 would be 3 months shaded in. Fold the strip into fourths and your child can see that same amount is ¼ of the strip. Show the child that ¾ of the strip is too much, and 12/3 means you could divide the strip into 3rds, and take 12 of those. That would be way too much. Other ways to easily show twelfths are with an egg carton, a clock face, and a ruler as each of these comes "naturally" divided into twelfths.

7. **Answer: Expression: $A + A + A + A + C + C + C + C + C$, or $4\times A + 5\times C$; *$43*.** Some children are not familiar with the word "expression." Help your child understand that an expression has operation signs (+, –, ×, ÷), but no equal sign (=). The expression might be written simply with addition signs, as in $A + A + A + A + C + C + C + C + C$. The way $4\times A + 5\times C$ is written means the number of adult tickets A is multiplied by the cost of each ticket; the number of child tickets C is multiplied by the cost of each ticket; the two amounts are then added. Let the child use play money and count out the amount spent for each ticket. He or she might want to put the money for the adult's tickets separate from the money for the children's tickets.

8. **Answer: 0.25.** This problem can be related back to problem 1 on this worksheet. Tell your child to think of the hundreds chart as one whole. Then have the child explain to you how many boxes it is broken up into. Then ask," How many are shaded in?" So that's 25 out of a hundred or 25 *hundredths*, which is written 0.25.

Have the child also think about calling this "2 *tenths* and 5 *hundredths*", because the square has also been broken into tenths by the vertical lines, and two of those are shaded, giving 2 *tenths*. There are 5 small squares left, and those are *hundredths*, so 2 *tenths* and 5 *hundredths* is another name for 25 *hundredths.*

Suggestions for helping your child find the answers

Grade 4, Worksheet IV

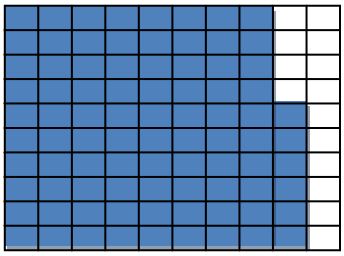
1**. Answer: Yes, he has enough money (unless there a a shipping and handling fee—there should be no tax on internet sales)** Your child should think of $24 as close to $25, a friendly number to use in estimation. Your child can either multiply 5 × $25 = $125, or add $25 five times, or perhaps count by 25s, saying "25, 50, 75, 100, 125."

2. **Answer: 30,000.** Your child can think of 3850 as close to 4,000, and then multiply 5 × 4000 = 20,000, or the child can add five 4,000s and get the same answer. Similarly, 5100 can be rounded to 5000 and 2 × 5000 = 10,000; or add two 5000s to get 10,000. Putting 20,000 and 10,000 together gives the final answer.

3. **Answer: A. Cassie the Cow B. scale C. ounces D. pounds** A cow is the obvious animal that weighs more and students coming into 4th grade should be familiar with the use of a scale to measure weight. Brian the Bee would be measured in ounces because he weighs less than 1 pound. 16 oz = 1 lb. An item whose weight is below 1 lb, such as a bee, will typically be measured in ounces. A cow definitely weighs a lot and would be measured in pounds.

4. **Answer: equation: 72 ÷ 8 = *x* or an equivalent true multiplication or division statement, with or without a variable. 9** If your child doesn't know what "equation" means, have her or him think of it as a number sentence that must be true. In most equations, though, you don't know one of the numbers—that's the math problem—so a variable is used as a placeholder, till you find the number. If the child doesn't know how to start the problem at all, have the child take out 72 cards of some sort, and share them equally between 8 spots on the floor, to represent 8 friends. How many would each friend get?

5. **Answer:**



The names are: **8 *tenths* and 6 *hundredths*** and

86 *hundredths*

Have your child to think of the whole grid as one that's divided into 100 small squares, and 86 are filled in. You might relate this problem back to problem 8 on Worksheet III and remind the child that 8 of the *tenths* columns are shaded, plus 6 small squares, so it can be called 8 *tenths* and 6 *hundredths*. Or 86 of the small squares—*hundredths*—are shaded, so you can also call it 86 *hundredths*.

6. **Answer: A. 8 B. 8 C. 8 × 8 = 64 square inches.** Your child can count the black, white and gray squares, but he or she might prefer to add 8 + 8 + ... + 8 and get 64. Encourage the child to notice that a short cut to repeatedly adding the same number is to multiply, in this case 8

× 8. Also have the child notice that the *area* of a rectangle like this one is always going to be the number of rows by the number of columns.

7. **Answer: 1, 2, 3, 4, 6, 8, 12, 24** This problem is an introduction to *factors* of a number. A *factor* of a number is one that divides into it evenly. In this case, she could give all 24 jelly beans to 1 friend, so 1 and 24 divide 24 evenly and are factors of 24. She could also give 12 jellybeans to 2 friends, or 2 jellybeans to 12 friends, so both 2 and 12 are *factors* of 24. Similarly for 3, 8, 4, and 6.

A more concrete way would be to use 24 of something (pieces of candy, beans, or some sort of manipulative) and divide all of the items until each group is equal. The groups would represent the number of friends.

8. **Answer: 54 times.** Your child might add 4 + 2 + 3 = 9; then, 9 × 6 = 54. Though this is a basic multiplication fact, the most enjoyable way to find the answer is to act it out. You might hear some bongo beats going on, but this is a wonderful way for your child to connect math with music!

9. **Answer: 36 points.** The most direct way to solve this problem is to add 7 + 5 = 12, then multiply 12 × 3 = 36. If your child is having difficulty with this, you might ask for another way to find how much three 12s make. The child might add 12 + 12 + 12 = 36. This is fine, as long as the connection is made that multiplication is a shortcut for repeated addition.

Suggestions for helping your child find the answers

Grade 4, Worksheet V

1. **Answer: about 3 liters.** This problem is about estimation in the real world. 4.8 liters is 4 and 8/10 liters, and that's very close to 5 liters. You can have your child talk about how much money $4.80 is, and what it's close to—$5. Likewise, 1.9 liters is very close to 2 liters, and 5 liters – 2 liters is 3 liters.

2. **Answer: 1320 miles. The explanation should show an understanding of the process they used to find their solution. A diagram may be a part of the explanation, but encourage your child to translate the picture into words.** This is a two-step problem and may be solved different ways. Some children find the distance one car travels and then add the three together, or multiply by three. Others may multiply 3 × 4 first, thinking that each trip of the three cars around the track results in 12 miles. They would then multiply 110 × 12, or add 110 twelve times. Whichever way your child chooses to solve the problem, discuss other options to allow the child to see different ways. Drawing the track and cars or even using toy cars sometimes helps children relate to the problem. If your child has difficulty with the explanation, talk about it with her or him first. Once it's verbalized, the child may find it easier to write.

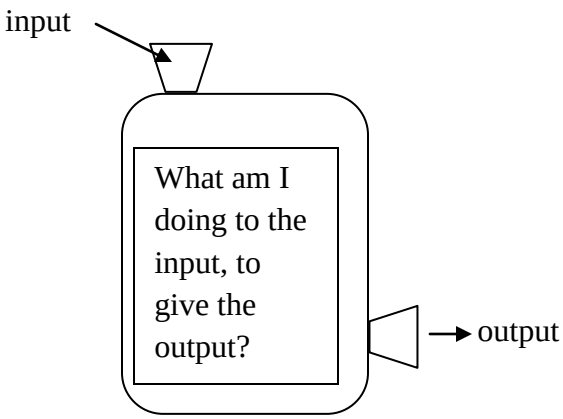
3. **Answer: C ($0.40)** Prompt a discussion about the value of $0.10 equaling 1 dime. Discuss that 1 dime is 1/10 of a dollar since 10 dimes make $1, and so 4 dimes is 4/10 of a dollar. There are two basic ways to show 40 cents: $0.40 or 40¢, **but not** 0.40¢. The latter means 4/10 of one cent or four-tenths of a penny.

4. **Answer:** ***Joe could make a 1 row-by-36 car lot; or a 2 row-by-18 car lot; or a 3 row-by-12 car lot; or a 4 row-by-9 car lot; or a 6 row-by-6 car lot; or a 9 row-by-4 car lot; or a 12 row-by-3 car lot; or an 18 row-by-2 car lot; or a 36 row-by-1 car lot. There are 9 ways all together.*** The purpose of this problem is to find the different combinations of numbers (factors) that make 36. Making a diagram or acting it out with toy cars, or things that represent the cars, will help your child visualize the answers. If the child knows some of the basic facts, start with those and then use other strategies to find the remaining combinations. The key is to count each combination both ways because the parking lot would look different, for example, with 2 rows of 18 cars or 18 rows of 2 cars. If the child writes a list as he or she works, a pattern might be seen as the numbers begin to reverse.

5. **Answer: ¼ of the square should be shaded. A. One-fourth is equal to 25% or 0.25.** If the child shades in one of the four small squares inside the larger one, they will have shaded 25 of the 100 tiny squares that make up the large square. Since there are 100 tiny squares, each is 1/100 of the square, so when ¼ is shaded in and that's 25 tiny squares, another name is 0.25 of the square. 25% is one of the "friendly numbers" for percent, so many children will recognize immediately that this shows ¼ of something. If not, tell them the word "per cent" literally means "per 100", so 25% literally means 25 out of 100.

6. **Answer: a. 21; 27; ? is $x + x + x$ *or* $3x$. b. 7; 9; is $x \div 3$. The relationship between the two tables is that the rules are inverse operations of each other.** To help your child identify this, have her or him look at how the numbers in each table are the same, just in opposite order. To extend this, see if the child can make up other tables with "inverse operations."

If your child is having trouble visualizing this problem, it might help to draw a "function machine" on the paper like the one below, and pretend that he or she is actually putting numbers into and taking numbers out of a machine. The task is to determine what the machine has been set to do to the input number, to find the output number



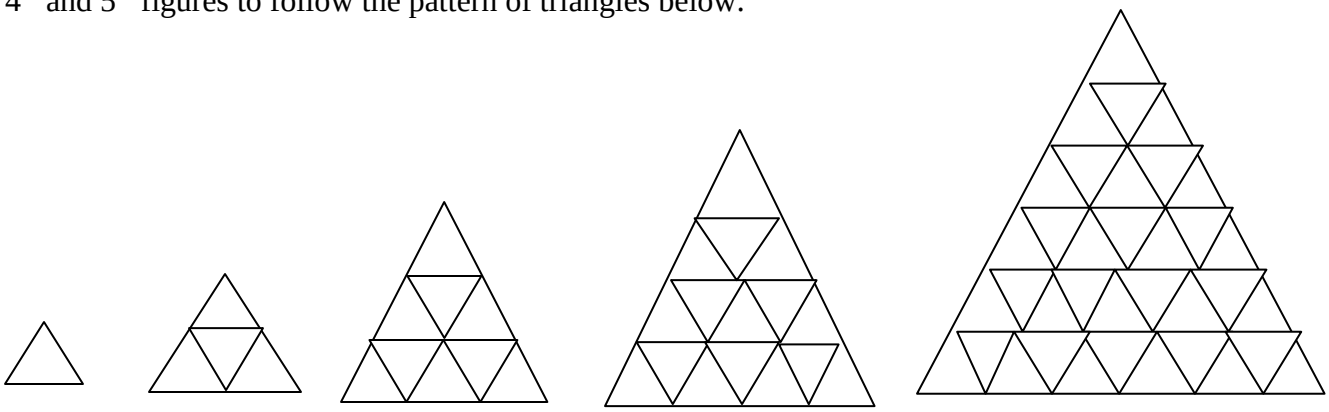
7. **Answer: $(150 + 85) \times 3 = t$; $t = 705$ minutes.** To solve this problem, your child needs to find the total minutes Sylvia spends on the Internet each day (150 + 85), and multiply that amount by the number of days each month this event occurs (3). Most children will write the initial equation as $150 + 85 \times 3$. If they do this, the problem might be solved as $85 \times 3 = 255$, then add 150, resulting in 405 minutes. This is an incorrect answer, because it is saying that she spends 85 minutes a day, 3 times a month plus an additional 150 minutes on the Internet. Talk with your child and ask what happens "3 times". In order to find the total number of minutes to multiply by three, the 150 and 85 need to be added together first and the parenthesis groups these numbers together for that reason.

8. **Possible Answer: about 800 beats.** The key word in this problem is <u>about</u> how many beats there are in the song. Start out by asking "is 3 minutes 58 seconds closer to 3 minutes or 4 minutes?" You can further the discussion by stating how many seconds are there are in 1 minute. Since 58 seconds is almost 1 minute, add that minute to the 3 minutes stated in the question, which would give 4 minutes. 180 beats per minute is also about 200 beats per minute, so an estimate is "about 200 beats per minute × 4 minutes", or 800 beats. Accept other reasonable answers such as if the child rounded off one of the numbers correctly, but used the other number as it stands.

Suggestions for helping your child find the answers

Grade 4, Worksheet VI

1. **Answer: a. See below**. **b. 36 and 49** The purpose of this problem is for the child to visualize the pattern as a row is added to the bottom of each triangle. Have your child draw the 4th and 5th figures to follow the pattern of triangles below.



1 2 3 4 5

For the (b) part of the question, maybe your child will recognize that the first five numbers of triangles are the square numbers—1, 4, 9, 16, and 25—and then predict that the next two square numbers are 6×6= 36 and 7×7 = 49. Another pattern is that each nth triangle is the sum of the first *n* odd numbers.

2. **Answer: 360°.** Your child should be familiar with the right angle, 90°. A square has four of those and 4 × 90° = 360°. If your child is unfamiliar with right angles, use an index card or a corner of a page to show this unique and useful angle.

3. **Answer: A is between 5 and 6, but closer to 6; B is between 7 and 8, but closer to 7; C is between 9 and 10, but closer to 9.** The point of this problem is for your child to realize that decimals allow us to name numbers *between* whole numbers. If your child divides the segment from 5 to 6 into 10 equal parts, then 5.7 will be the 7th such mark away from 5. Similarly, have the child divide the segment from 7 to 8 to find 7.3, and the segment from 9 to 10 to show 9.2. A better way to present this problem to your child would be to take a real centimeter ruler which is already marked off in *tenths* between the whole centimeter marks, and use that ruler to measure actual pencils or other such items around your house. (The marks between the whole centimeters are called *millimeters*, but they are also *tenths of a centimeter*. So *5.7 centimeters* is also *5 centimeters, 7 millimeters.*)

4. **Answer: Have your child perform as the problem states, and show it to you.** He or she should trace over the figure, stick a pin or another sharp object in the center as a "turn point", and turn the figure. The traced image should match the original with a "half-turn" of 180°.

5. **Answer: Sue is not right. She needs 10 small tables.** Eight people sitting around the four large tables is seating for 32 people. This leaves 38 people still needing seats. If the small tables seat 4, nine tables would only allow seating for 36, leaving 2 people without a place to sit. A tenth table is needed for the 2 remaining people. A good way for a child to solve this problem is to draw a diagram of the picnic tables. Your child might try Sue's way and draw the four large and nine small tables with the appropriate number of seats at each. After counting the seats, your child should realize Sue is two seats short. Another way your child might solve this problem is to draw her or his own plan for 70 people using four large tables and enough small tables to fit the remaining 38 people. Whichever way is chosen to draw the diagram, your child should see Sue's error. To extend this problem, have the child plan a picnic of their own. What kind of seating would is needed?

6. A**nswer: 2.25.** Each full box is one whole and the last box is divided into four equal sections with one of the sections shaded in. One out of four represents 25 *hundredths* of a box, just like ¼ of a dollar is $0.25. So the whole shaded area is 1 + 1 + 0.25 or 2.25 square inches.

7. **Answer: 12 eggs.** This problem can be solved by the *measurement* interpretation of division, although there are other ways to think of it. Two hours is 60 + 60 or 120 minutes. If you start marking off 10-minute chunks of time, you'll have six of those in each hour, or 12 in two hours. So "120 ÷ 10 = 12" is one way to write a number sentence for the problem.

8. **Answer: Hank is not correct. The toy cars weigh 10 grams each.** The key to this problem is for the child to know Hank has 25 grams total on each side of the scale. If the right side is 25 grams, then the two cars together must be 20 grams, and so each car would be half of that, or 10 grams. This problem is a precursor to solving the equation "$25 = 5 + 2x$," where x is the unknown weight of one car. If you subtract 5 grams from both sides of the equation, you have that "$20 = 2x$". Dividing both sides by 2 yields "$10 = 1x$".

Suggestions for helping your child find the answers

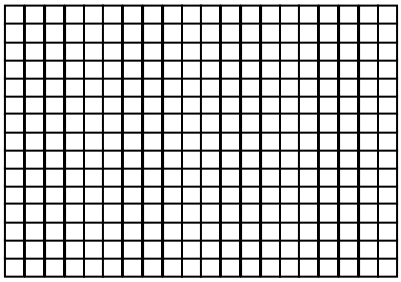
Grade 4, Worksheet VII

1. **Answer: 93½ square inches**. Help your child start with a clean sheet of paper, and mark off inches around the perimeter so that square inches (and ½ square inches) are produced when the marks are connected. There should be 8 × 11 or 88 whole square inches when counted, and another 11 one-half square inches. When the half square inches are put together, you have 5½ square inches to go with the 88 whole square inches. Altogether, then, there are 93½ square inches. You might point out to your child that 8½ × 11 is 8 × 11 + ½ × 11.

2. **Answer: A: 0.1 B: 0.2 C: 0.3 D: 0.4.** Be sure your child notices where 0 and 1 are on the number line, and that he or she realizes that the other numbers will be smaller numbers than 1 whole. The number line goes up each notch by one-tenth beginning with zero and ending at 1.1.

3. **Answer: 3.** This problem applies the concept of area to a real world problem. Your child may realize that the area of a rectangle is given by multiplying the length by the width, and your child may be able to do that multiplication. An area of 300 square feet should be obtained, which takes 3 quarts of paint.

If your child needs more help understanding what to do, have them make a drawing that shows a 15-centimeter by 20-centimeter rectangle where each centimeter represents 1 foot. Have the child draw in the grid for the paper—see below—and point out that there are now 15 rows with 20 squares in each row, and that's written as 15 × 20. The answer to 15 × 20 can be obtained by adding 20 fifteen times, or by adding 20 five times to get 100 square feet, then tripling that amount. In any case, once the child determines there are 300 squares in the grid, and every 100 squares requires 1 quart of paint, he or she can reason that 3 quarts are required.

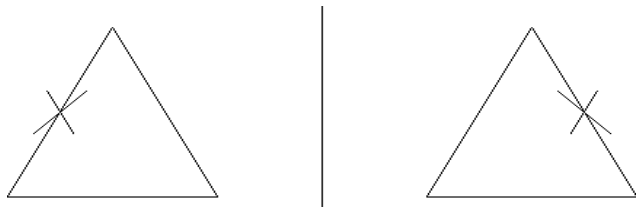


Each row has 20 squares in it, and there are 15 such rows.

4. **Answer: 30,000 tickets each month.** This problem shows another real-world use of multiplication. If your child can compute 24 × 1250 directly, then encourage that procedure. Or the problem can be approached by repeatedly adding 1250, doing so 24 times. Or the child might make short cuts to the addition, realizing that two 1250s is 2500, and two 2500s is 5000, so that would be 4 groups of 1250, and proceed further in that manner. Any way that makes sense to your child to find 24 × 1250 is appropriate. Multiplying multi-digit numbers will be practiced in 4th grade.

5. **Answer: The shaded part is 8/10 as a fraction, and 0.8 as a decimal. The total shaded area (A+B) would be 1 8/10 as a mixed number, or 1.8 as a decimal.** Figure B is separated into ten equal parts, so each part shows *tenths* of the whole. Since eight of them are shaded in, that makes eight tenths, which can be written both as a fraction (8/10) or as a decimal (0.8).

6. **Answer: See figure below.** Have your child practice this concept by creating a shape such as a triangle, tracing over the shape, and then "flipping" the shape over a line placed randomly outside the traced image. He or she can mark where the vertices would be, then remove the tracing and draw in lines to connect the vertices. You might liken this process to the child looking in a mirror, where the right hand becomes the left hand in the mirror image, and so forth. Right and left are reversed in this reflection.



7. **Answer: 134 ounces.** 8 pounds ×16 ounces per pound = 128 ounces. 128 ounces + 6 ounces = 134 ounces. Again, your child may know how to multiply 8 × 16 directly, but if not, he or she can add eight 16s together, and then add on the final 6 ounces. Your child will have plenty of practice with these types of multiplication problems in 4th grade.

8. **Answer: Rotational and line symmetry.** The blades of the windmill have *rotational symmetry* because you can turn the blades around the center point of the windmill, less than a full turn, and the windmill looks the same. It is also possible to cut the windmill in half (*line symmetry*) and put one half over the other, and the two sides match up. So this shape has both *line* and *rotational symmetry*.

Suggestions for helping your child find the answers

Grade 4, Worksheet VIII

1. **Answer: "5" is in the *ten thousands* place. "6" is in the *thousands* place. "8" is in the *hundred thousands* place.** Your child might look at a place value chart like the one below. The chart can be used to see that the 8 is in the *hundred thousands* place, the 5 is in the *ten thousands* place, and the 6 is in the *thousands* place.

Place Value						
Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

You might point out that we continue with this same system as numbers get larger. Numbers are grouped by commas (in this country) so that we never have to read larger than a 3-digit number, if we know the name of the *period* we're in. Your child might practice naming some larger numbers like:

94,000,000 miles from the earth to the sun—94 million

5,000,000,000 red blood cells in a liter of blood—5 billion

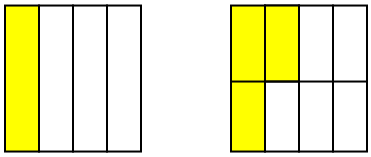
135,000,000,000 stars in our galaxy—135 billion

And the national debt, at the time these materials were prepared, was in the trillions of dollars. Large numbers are all around us, even if we don't think of them all the time. If we know the *period* names like millions, billions, trillions, and quadrillions, we can easily read large numbers.

2. **Answer: From the left: *acute, obtuse, right, obtuse,* and *right*.** The question itself gives the clues as to how to classify each of the angles. If your child is unfamiliar with the measurement of angles have her or him practice drawing some angles with an index card or another right-angled corner. One point of this problem is to show your child that angles are all around us. (Note: if your child says "acute" for the right-hand clock, and can explain that it's real close to *right*, then they are correct also. It's too hard to tell for sure.)

3. **Answer: There are several creative ways that your child might explain how to get from 5×6 to 7×6 quickly.** One way is to say "5×6 = 30", and two more 6s is 12, and 30+12 is 42. Another way is to start with 5×6 = 30, and add 6 more for 36, then count 6 more up to 42. The main point of the problem is for your child to learn to use what he or she knows, to quickly get things he or she doesn't know. You child might know that 8×6 = 48, for example, and 1 less 6 would be 48 – 6 = 42.

4. **Answer: Diana's square should be partitioned into equal 4 pieces, with one of them shaded, while Wayne's square should be partitioned into 8 pieces, with 3 of them shaded. Your child can see that 1 out of 4 shaded pieces is less than 3 out of 8 shaded pieces.** Watch and assist your child to divide the square for "Diana's potatoes" into 4 equal regions, and shade in 1 of those**,** and Wayne's into 8 equal regions, and shade in 3 of those. He or she can see that Wayne's square has more shaded area than Diana's, so 3/8 is bigger than ¼.



5. **Answer: Diana bought 4 ounces and Wayne bought six ounces.** The process of dividing the squares above into 16 pieces, all the same size, is similar to dividing them into 4 or 8 pieces. The result is that Diana will have 4 of her 16 pieces shaded, and Wayne will have 6 of his shaded, and that gives the number of ounces directly. The important part of this problem is for your child to realize that 4/16 is another name for ¼, and 6/16 is another name for ⅜. A good deal of time will be spent finding new names for fractions in 4th grade, and hopefully much of the class work will be similar to the above—drawing diagrams into equal parts, then shading the parts to show various fraction names for the same amount.

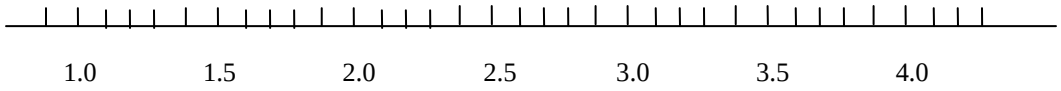
6. **a. 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, and 30 should be circled. 3, 6, 9, 12, 15, 18, 21, 24, 27, and 30 should have squares around them. b. 6, 12, 18, 24, and 30 have both circles and squares around them. The latter numbers are all multiples of 6.** If your child doesn't know what "multiples of 2" means, have her or him simply count by 2's—those are the multiples of 2. Likewise for the multiples of 3—the child can count by 3's to find them. The numbers that are multiples of both 2 and of 3 are numbers you hit when you count by 6. What your child is doing in this problem is a precursor to finding *common multiples*, and eventually the *least common multiple* of two given numbers. This procedure will profit the child when he or she starts adding fractions and needs to find a common denominator.

7. **Answer: 50¢ or 51¢ or 52¢.** The important part of this problem is for your child to realize that $3.10 needs to be split into six pieces all the same size (or close to the same size, since the question calls for an estimate.) A hint is the picture shown of the dollar bills. If your child is having trouble knowing what to do, have them draw 6 apples and three $1 bills, and then divide the dollar bills in half and give ½ dollar to each apple. Then the child can trade in the dime for ten pennies, and further distribute the money to the apples. The child will wind up with 51¢ for each apple, with 4¢ left over. An answer of 50¢ is appropriate as an estimate, or 51¢ or 52¢, depending on how accurate an answer the situation calls for.

Suggestions for helping your child find the answers

Grade 4, Worksheet IX

1. **Answer: Any mileage between 10 miles and 15 miles is acceptable.** Your child may need help realizing what 1.8 miles and 3.2 miles mean. You might show these numbers on a number line as below, and then ask what "friendly numbers" 1.8 and 3.2 are close to. He or she will likely say 2 and 3, so John travels somewhere between 2 and 3 miles each day. You might get the child to name a number between 2 and 3, and 2½ (or 2.5) is the most likely number for them to say. So if John went about 2½ miles each day for five days, your child will probably know that 2½ + 2½ gives 5, since 2 + 2 = 4 and ½ + ½ gives 1, and 4 + 1 = 5. So four days like that would be 10 miles, and another 2½ on the 5th day gives 12½ or 12.5 miles. However, the child might just use 2 miles per day, or 3 miles per day, as "about how far John went each day", and get an answer of 10 or 15 miles per school week.



2. **Answer: a. 99 b. Answers will vary.** The main point of this problem is for your child to realize that these decimal numbers are all between the two whole numbers 13 and 14. The problem is put into a familiar setting of money, but the same would be true if the setting were weight or distance or any other measure. With decimals, you can always find a number between any two given numbers.

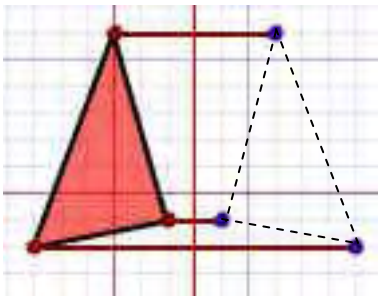
3. **Answer: 90º and 180º.** This problem returns to what the child learned in the previous worksheet about right angles—those with 90º angles. Angles can be checked with the corner of a sheet of paper. Ask your child what they would get if they put two 90º angles together. The answer should be an angle that is twice that large, or 180º, and what would it look like? It actually wouldn't look like an angle at all—it would seem to be a straight line. That's why it's called a *straight angle*. You might have to tell your child to ignore the extra "hand" in the clock on the left—the child might not realize that's the *second* hand.

4. **Answer: The child's drawing should look exactly like the original flag.** The purpose of this problem is for the child to realize that you can perform "rigid motions" with geometric figures—slides, flips, and turns. Occasionally, you will get the same figure back, as in this case—if there is enough symmetry in the original figure. This original flag has 2 lines of symmetry and also has rotational symmetry.

5. **9.7 cm is circled, and 18 cm has a triangle around it** The main point of this problem is for students to compare different lengths using decimals. Have a centimeter ruler and have your child show you the different lengths of each pencil, and keep track of the longest and shortest one they measure. You might point out that a length like 9.8 cm is also called 9 cm 8 mm. But they are simply two names for the same length—*millimeters* and *tenths of a centimeter.*

6. **11** Have your child put out 33 items to represent the sea shells, and then divide them equally into 3 groups. This problem is a foundation for long division—for example, the child could take ten seashells and put them into the 3 groups first, and then deal with the remaining 3 sea shells. Your child will have plenty of practice on this ”partitioning” interpretation of long division in 4th grade.

7. **Answer: See below.** The purpose of the problem is for your child to practice moving a figure using a “rigid motion.” In this case, the motion is called a *reflection.*



8. **5 packages.** This problem is a different interpretation of division than the one in #6 above, and this one is called *measurement*. Here the question is—if 1 package of balloons suffices for 5 students, how many groups of 5 students are there in 23 students? So you start subtracting 5 from 23, and you can do that 4 times, with 3 students left over. But practicality says that you’ll have to buy another package of balloons for those 3 students, so the real-world answer is you’ll need 5 packages. Encourage your child to draw 23 items for the students, and then group them into groups of size 5, and see how many groups there are.

Suggestions for helping your child find the answers

Grade 4, Worksheet X

1. Answer: 20 combinations Some students will know that you can multiply 5 and 4 to get the answer to this problem, but most students will not know this before entering 4th grade. They can solve the problem by drawing a line from each shirt to each pair of shorts, and they'll have 20 lines. They might prefer to make an organized list, calling the shirts, A, B, C, and D respectively, and the shorts E, F, G, H and I. Then the list would be something like: (A,E), (A,F), and so on.

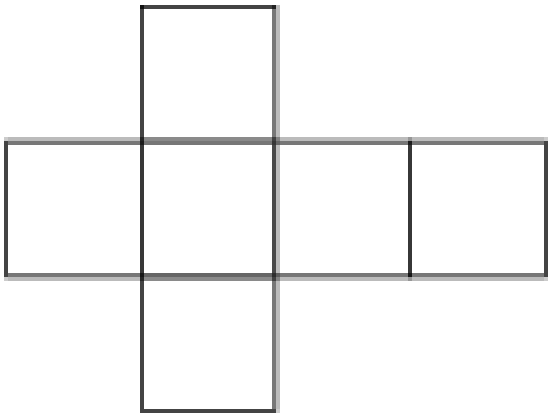
2. Answer: answers will vary Help your child measure the length and width of their mattress, and use words like "It's closer to 5 feet than to 4 feet" to get them to round off. If you have cardboard, then they can make the square as directed and place it down on the bed repeatedly to measure the area. If you don't have cardboard to use, then use a rag cut into a square that size, or a sheet of newspaper.

For part (c), hopefully you can lead your child to see that when he or she has an array of squares like this, that is l units long and w units wide, the area can be found by multiplying $l \times w$. (Don't use variables to describe this process unless the child is fairly advanced in mathematics.)

3. **Answer: $5 \times 8 - h$ or $8 \times 5 - h$.** An expression is like a phrase in English and doesn't have an equal sign. Many students want to find an answer to this problem (which is impossible since we do not know the missing amount). The student is being asked to decide what operations are needed to solve the problem and where the numbers would be placed. The student *should* use a variable here.

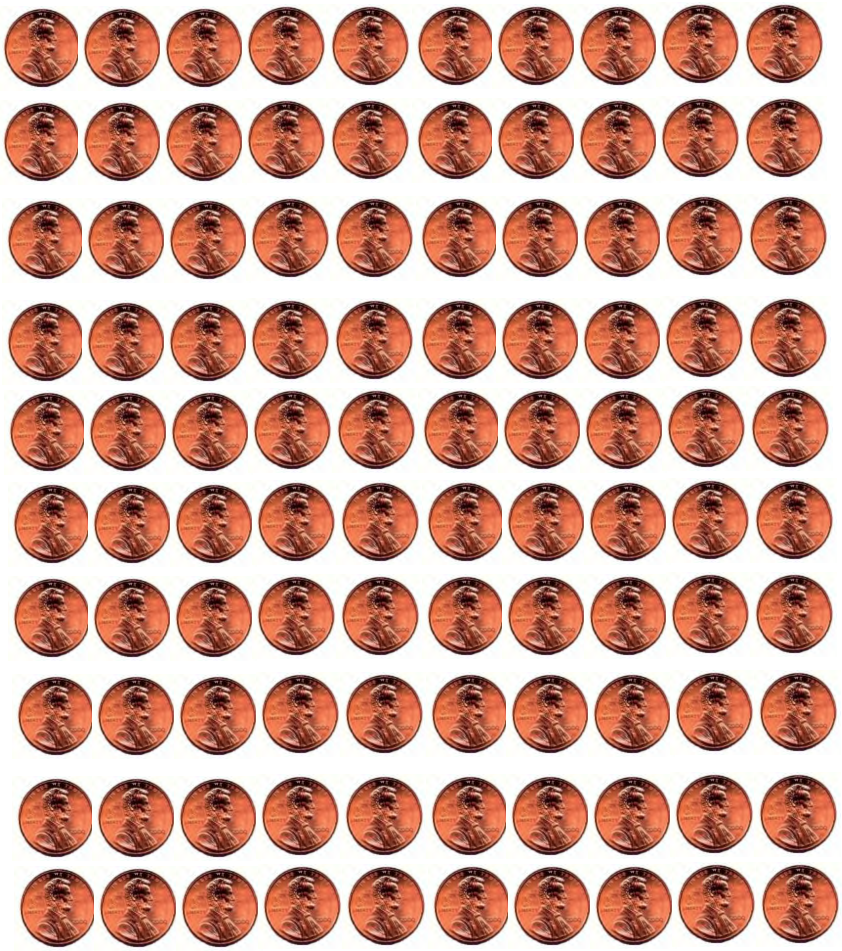
4. **Answer: 40** This problem is an example of the major type of story problem calling for multiplication—repeatedly adding the same amount. In this case, your child will probably add 5 eight times, or maybe count by fives up to 40.

5. **Answer: Cube.** Explain that a net is a three-dimensional shape that is broken down so that all the parts are two-dimensional (flat). Have the child cut out the net below, which is bigger and easier to hold, than the one pictured, and fold the sides to create the three-dimensional shape.



6. **Answer: The output numbers are 11, 5, and 29 respectively.** Discuss what is happening with your child, in terms of what each robot does and what happens when they are hooked together. Hooking together two operations like this produces what is called a *composite function*, an important idea when the child gets to algebra. If your child needs more examples before catching on as to how to get the answers, have her or him work first with the left machine, and if the child doesn't know to multiply, have them notice that it's also the input number added to itself two more times. Then work with the right robot. After that, put the two robots together.

7. **Answer: 0.05** Be sure your child understands that a penny is 1/100 of a dollar, since it takes 100 pennies to make a dollar. Writing 0.01 is simply another way to show 1/100 of something, so a penny is also $0.01. Since it takes 5 pennies to make a nickel, a nickel would be 5/100 of a dollar, or $0.05. Your child might practice writing various amounts of money by you circling them in a picture like that below, and the child writing decimal names for the circled amount.



Thank You!

Thank You!