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Math Common Core State Standards Review

6th Grade into 7th Grade

6th Grade Common Core Overview

Ratios and Proportional Relationships

- Understand ratio concepts and use ratio reasoning to solve problems.

The Number System

- Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
- Multiply and divide multi-digit numbers and find common factors and multiples.
- Apply and extend previous understandings of numbers to the system of rational numbers.

Expressions and Equations

- Apply and extend previous understandings of arithmetic to algebraic expressions.
- Reason about and solve one-variable equations and inequalities.
- Represent and analyze quantitative relationships between dependent and independent variables.

Geometry

- Solve real-world and mathematical problems involving area, surface area, and volume.

Statistics and Probability

- Develop understanding of statistical variability.
- Summarize and describe distributions.

6th Grade: Ratios and Proportional Relationships

Understand ratio concepts and use ratio reasoning to solve problems.
CCSS.Math.Content.6.RP.A.1
Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*

CCSS.Math.Content.6.RP.A.2
Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."*

CCSS.Math.Content.6.RP.A.3
Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

CCSS.Math.Content.6.RP.A.3.a
Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

CCSS.Math.Content.6.RP.A.3.b
Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?*

CCSS.Math.Content.6.RP.A.3.c
Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

CCSS.Math.Content.6.RP.A.3.d
Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Name: ____________________ Date: ______________ Time: ______________

Finding Equivalent Ratios

For each ratio given, write five equivalent ratios. Make sure to express some ratios with words, some as fractions, some as percents, and some with colons.

1. The ratio of bicycles to cars is 4 to 5.

4 to 5

2. The ratio of apples to oranges is 50%.

50%

3. The ratio of girls to boys is 6:3.

6:3

4. The ratio of cats to dogs is 5 to 2.

5 to 2

5. The ratio of students with pets to all students is $\frac{1}{4}$.

$\frac{1}{4}$

6. Write your own ratio, and then complete the name collection box.

The ratio of ____________ to ____________ is ____________.

Name: ____________________ Date: ______________ Time: ________

Finding Equivalent Ratios

For each ratio given, write five equivalent ratios. Make sure to express some ratios with words, some as fractions, some as percents, and some with colons.

1. The ratio of apple pies to total pies is $\frac{6}{10}$.

$\frac{6}{10}$

2. The ratio of red apples to green apples is 7:2.

7:2

3. The ratio of football players to basketball players is 200%.

200%

Name: ____________________ Date: ______________ Time: ______________

Ways to Represent Rates

1. Express the following rate in words:

   $$\frac{7 \text{ miles}}{\text{hour}}$$

   ____

2. Express the following rate in words:

   $$\frac{32 \text{ cups}}{\text{gallon}}$$

   ____

3. Express the following rate as a fraction:

   25 dollars per month

   ____

4. Express the following rate as a fraction:

   12 inches per foot

   ____

5. Express the following rate in words:

   $$\frac{3 \text{ mangoes}}{2 \text{ dollars}}$$

   ____

6. Write two rates (both in words or both in fractions) that use the number of days in a week.

Name: ____________________________ Date: __________________ Time: __________

Ways to Represent Rates

1. Express the following rate in words:

$$\frac{\text{12 liters}}{\text{day}}$$

____

2. Express the following rate as a fraction:

168 hours per week

____

3. Express the following rate in words:

$$\frac{\text{4 boxes}}{\text{5 dollars}}$$

____

Name Date Time

Using Formulas to Represent Rates

Write a formula for each rule. Then complete each table and answer the questions.

1. Tomatoes cost $2.50 per lb.

Rule: Cost = $2.50 * number of lbs Formula: ______________________

Number of Pounds p	Cost ($) c	Equation
1		$c = 2.50 * 1$
2		
	15.00	
	25.00	$25.00 = 2.50$
15		$* \; 2.50 = c$

a. How much would 8 pounds cost? __________

b. Write an equation to model the problem. ______________________

2. Ellen is 3 years older than her sister.

Rule: Ellen's age = Sister's age + 3 Formula: ______________

Sister's age (years) s	Ellen's age (years) e	Equation
5		$e = 5 + 3$
8		
14		
	24	$24 = s + 3$
	33	$30 = s + 3$

a. How old will Ellen be when her sister is 18? ______________________

b. Write an equation to model the problem. __________________

Name: ____________________ Date: ____________ Time: ____________

Using Formulas to Represent Rates

1. Raisins cost $1.20 per box.

Rule: Cost = $1.20 ∗ number of boxes

Formula: ____________

Number of boxes b	Cost ($) c	Equation
1		
3		$c = 1.20 * 3$
4		
	8.40	$8.40 = 1.20 * b$

How much would 6 boxes cost? ____________

2. Kim has worked 7 months more than Tina.

Rule: Kim's months = Tina's months + 7

Formula: ____________

Tina's months worked (t)	Kim's months worked (k)	Equation
1		$k = t + 7$
6		
	16	$16 = t + 7$
18		

How many months has Kim worked if Tina has worked for a year?

____

Name Date Time

Solving Rate Problems Using Proportions

Example:

Ms. Marquez is reading stories that her students wrote. She has read 5 stories in 40 minutes.

a. At this rate, how long will it take her to read the next story? 8 minutes

b. How long will it take her to read all 30 of her students' stories? 240 min, or 4 hr

c. Complete the proportion to show your solution.

$$\frac{5 \text{ stories}}{40 \text{ minutes}} = \frac{30 \text{ stories}}{\boxed{240} \text{ minutes}}$$

1. Janet scored 36 points in the first 4 basketball games.

a. On average, how many points did she score per game? ______

b. At this rate, how many points might she score in a 24-game season? ______

c. Complete the proportion to show your solution.

$$\frac{36 \text{ points}}{4 \text{ games}} = \frac{\boxed{} \text{ points}}{24 \text{ games}}$$

2. Last year, 40 students sold \$1,200 worth of T-shirts for their school's fundraiser.

a. On average, how many dollars' worth of T-shirts did each student sell? ______

b. This year, 60 students will be selling T-shirts. If they sell at the same rate as last year, how much money can they expect to raise? ______

c. Complete the proportion to show your solution.

$$\frac{\boxed{} \text{ students}}{\$\boxed{}} = \frac{\boxed{} \text{ students}}{\$\boxed{}}$$

3. Jim worked at the pet store from 5:00 P.M. to 11 P.M. He earned \$72.

a. How much did he earn per hour? ______

b. Jim works 27 hours per week. How much will he earn in 1 week? ______

c. Complete the proportion to show your solution.

$$\frac{\$\boxed{}}{\boxed{} \text{ hours}} = \frac{\$\boxed{}}{\boxed{} \text{ hours}}$$

Name: ______________________ Date: ______________ Time: ______________

Solving Rate Problems Using Proportions

1. Barry worked for 5 hours. He earned $55.

a. How much did he earn per hour?

____

b. Barry works 25 hours per week. How much will he earn in 1 week?

____

c. Complete the proportion to show your solution.

$$\frac{55 \text{ dollars}}{5 \text{ hours}} = \frac{\underline{\qquad} \text{ dollars}}{25 \text{ hours}}$$

2. Carmen read 300 pages of her book in 4 hours.

a. At this rate, how many pages would she read in 1 hour? ______________

b. At this rate, how many pages would she read in 6 hours? ______________

c. Complete the proportion to show your solution.

$$\frac{300 \text{ pages}}{4 \text{ hours}} = \frac{\underline{\qquad} \text{ pages}}{6 \text{ hours}}$$

3. On yesterday's field trip, 900 students took 18 buses to the museum.

a. On average, how many students rode each bus? ______________

b. Next month, 1,500 students will be going on a field trip. How many buses will they need? ______________

c. Complete the proportion to show your solution.

$$\frac{\underline{\qquad} \text{ students}}{\underline{\qquad} \text{ buses}} = \frac{\underline{\qquad} \text{ students}}{\underline{\qquad} \text{ buses}}$$

Name ________________ Date ________ Time ________

Solving Percent Problems

Solve using paper and pencil.

Example: In a survey of 25 people, 20% of them ate oatmeal for breakfast.

a. How many people ate oatmeal? 5 people

b. How many people did not eat oatmeal? 20 people

1. Of the 150 people who voted in the election, 30% of the people voted for Pat.

a. How many people voted for Pat? ____________

b. How many people did not vote for Pat? ____________

2. Of the 120 people in the theater troupe, 65% of them are in the chorus.

a. How many people are in the chorus? ____________

b. How many people are not in the chorus? ____________

. A taxi driver receives about 15% of the fare as a tip.

a. What is the tip on a \$10 fare? ____________

b. What is the tip on a \$30 fare? ____________

c. What is the tip on a \$50 fare? ____________

4. The \$2.00 price of an ice cream bar at a neighborhood park is shared as follows:

10% pays for the ice cream bar.

20% pays for the concession stand worker.

30% is profit for the concession stand owner.

10% pays for the electricity/fuel costs to keep the ice cream bars cold.

30% pays for the rental fee on the ice cream cart.

a. How much pays for the ice cream bar? ____________

b. How much goes to the rental fee? ____________

c. How much does the concession worker get? ____________

Name: ______________________ Date: ______________ Time: ______________

Solving Percent Problems

1. Multiply.

$$\begin{array}{r} 4.8 \\ \underline{*\ 3.9} \end{array}$$

2. Express each value as a fraction, a decimal, and a percent.

Fraction	Decimal	Percent
$\frac{4}{5}$		
	0.6	
		70%

3. In a survey of 200 people, 45% of them had a pet.

How many people had a pet?

____

How many people did not have a pet?

____

4. Of 160 students at Wilson Middle School, 35% are in band.

How many students are in band?

____

How many students are not in band?

____

5. A restaurant bill is $60.00. The customer tips 20%.

What is the amount of the tip?

____

How much would a 30% tip be?

____

6. Explain how you solved Problem 5.

Name: ______________________ Date: ______________ Time: ________

Solving Percent Problems

1. Of the 150 students in sixth grade, 60% play a sport.

   How many students play a sport? ______________________

   How many students do not play a sport? ______________________

2. In a survey of 80 people, 75% liked peaches.

   How many people liked peaches? ______________________

   How many people did not like peaches? ______________________

3. Gerald is working as a waiter at a dinner party. He recevies 15% of the bill for each table as a tip. Calculate his tip for each table.

Table	Bill Total	Tip Amount
1	$150.00	
2	$40.00	
3	$75.00	
4	$32.00	
5	$225.00	

Name ____________________ Date ____________ Time ____________

Finding the Unit Whole When Given Percents

Write a number model with a variable to help you solve each problem. You might find it helpful to rename the percents as fractions.

Example:

If 21 buttons are 15% of the buttons in a jar, how many buttons are in the jar?

Number model: $15\% * b$, or $\frac{15}{100} * b = 21$

Answer: 140 buttons

1. If 63 blocks are 10% of a set, how many blocks are in the set?

   Number model: ____________________

   Answer: ____________ blocks

2. If \$125 is 50% of the cost of a phone, how much does the phone cost?

   Number model: ____________________

   Answer: ____________ dollars

3. If 42 pages are 25% of a book, how many pages are in the book?

   Number model: ____________________

   Answer: ____________ pages

4. Seventy-eight people attended a school fair. This was 60% of the number expected to attend. How many people were expected to attend?

   Number model: ____________________

   Answer: ____________ people

5. Eighteen of the stickers are stars. This is 20% of the stickers in the pack. How many stickers are in the pack?

   Number model: ____________________

   Answer: ____________ stickers

Name: ______________________ Date: ______________ Time: ______________

Finding the Unit Whole When Given Percents

1. There are 22 students in each homeroom. There are 13 homerooms. How many students are there in all? Number model: ______________ Answer: ________ students	**2.** Divide. **a.** $12 \div \frac{1}{6} =$ ________ **b.** $27 \div \frac{3}{5} =$ ________
3. If 36 students are 10% of the school, how many students are in the school? Number model: ______________ Answer: ________ students	**4.** If 77 stamps are 20% of a collection, how many stamps are in the collection? Number model: ______________ Answer: ________ stamps
5. A fundraiser has earned \$215 so far. This is 25% of the goal. How much money is the fundraiser expected to earn? Number model: ______________ Answer: \$________	**6.** Explain how you solved Problem 5.

Name Date Time

Conversion Rates

Metric System

Units of Length

1 kilometer (km) = 1,000 meters (m)
1 meter = 10 decimeters (dm)
= 100 centimeters (cm)
= 1,000 millimeters (mm)
1 decimeter = 10 centimeters
1 centimeter = 10 millimeters

Units of Area

1 square meter (m^2) = 100 square decimeters (dm^2)
= 10,000 square centimeters (cm^2)
1 square decimeter = 100 square centimeters
1 square kilometer = 1,000,000 square meters

Units of Volume

1 cubic meter (m^3) = 1,000 cubic decimeters (dm^3)
= 1,000,000 cubic centimeters (cm^3)
1 cubic decimeter = 1,000 cubic centimeters

Units of Capacity

1 kiloliter (kL) = 1,000 liters (L)
1 liter = 1,000 milliliters (mL)
1 cubic centimeter = 1 milliliter

Units of Weight

1 metric ton (t) = 1,000 kilograms (kg)
1 kilogram = 1,000 grams (g)
1 gram = 1,000 milligrams (mg)

System Equivalents

1 inch is about 2.5 cm (2.54)
1 kilometer is about 0.6 mile (0.621)
1 mile is about 1.6 kilometers (1.609)
1 meter is about 39 inches (39.37)
1 liter is about 1.1 quarts (1.057)
1 ounce is about 28 grams (28.350)
1 kilogram is about 2.2 pounds (2.205)

U.S. Customary System

Units of Length

1 mile (mi) = 1,760 yards (yd)
= 5,280 feet (ft)
1 yard = 3 feet
= 36 inches (in.)
1 foot = 12 inches

Units of Area

1 square yard (yd^2) = 9 square feet (ft^2)
= 1,296 square inches ($in.^2$)
1 square foot = 144 square inches
1 acre = 43,560 square feet
1 square mile (mi^2) = 640 acres

Units of Volume

1 cubic yard (yd^3) = 27 cubic feet (ft^3)
1 cubic foot = 1,728 cubic inches ($in.^3$)

Units of Capacity

1 gallon (gal) = 4 quarts (qt)
1 quart = 2 pints (pt)
1 pint = 2 cups (c)
1 cup = 8 fluid ounces (fl oz)
1 fluid ounce = 2 tablespoons (tbs)
1 tablespoon = 3 teaspoons (tsp)

Units of Weight

1 ton (T) = 2,000 pounds (lb)
1 pound = 16 ounces (oz)

Units of Time

1 century = 100 years
1 decade = 10 years
1 year (yr) = 12 months
= 52 weeks (plus one or two days)
= 365 days (366 days in a leap year)
1 month (mo) = 28, 29, 30, or 31 days
1 week (wk) = 7 days
1 day (d) = 24 hours
1 hour (hr) = 60 minutes
1 minute (min) = 60 seconds (sec)

Name Date Time

Using Proportions to Convert Measurement Units

Set up a proportion for each measurement unit conversion. Use cross multiplication to help solve the proportion. Show how the units cancel. Solve and round your answer to the nearest hundredths. Use the Conversion Rates master to help you.

Example: Summer break lasts 52 days. How many weeks is this?

Proportion: $\dfrac{\boxed{52 \text{ days}}}{\boxed{w \text{ weeks}}} = \dfrac{\boxed{7 \text{ days}}}{\boxed{1 \text{ week}}}$

Solution: $\frac{52}{w} = \frac{7}{1}$

$52 * 1 = \_\_\_ \quad \_\_\_ = 7 * w$

$\frac{52}{w} = \frac{7}{1}$

52 days $*$ 1 week $=$ 7 days $*$ w weeks

$\dfrac{\cancel{52 \text{ days}} * \text{weeks}}{\cancel{7 \text{ days}}} = w \text{ weeks}$

7.4 weeks $=$ w weeks

Answer: Summer break lasts _________ weeks.

1. A puppy weighs 84 ounces. How many pounds does the puppy weigh?

Solution:

$\dfrac{\boxed{}}{\boxed{}} = \dfrac{\boxed{}}{\boxed{}}$

Answer: The puppy weighs _________ pounds.

2. A ballroom is 578 square feet. How many square yards is it?

Solution:

$\dfrac{\boxed{}}{\boxed{}} = \dfrac{\boxed{}}{\boxed{}}$

Answer: The ballroom is _________ square yards.

3. A family drove 680 kilometers on vacation. How many miles did the family drive?

Solution:

$\dfrac{\boxed{}}{\boxed{}} = \dfrac{\boxed{}}{\boxed{}}$

Answer: The family drove _________ miles.

Name: ______________________ Date: ______________ Time: ______________

Using Proportions to Convert Measurement Units

Set up a proportion for each measurement unit conversion. Use cross multiplication to help solve the proportion. Show how the units cancel. Solve and round your answer to the nearest tenth. Use the Conversion Rates master to help you.

1. Ryan is 328 months old.
How many years old is Ryan?

Solution:

Proportion: $\frac{\boxed{}}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$

Answer: Ryan is ________ years old.

2. Henry weighs 74.8 pounds. How many kilograms does he weigh?

Solution:

Proportion: $\frac{\boxed{}}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$

Answer: Henry weighs ________ kilograms.

3. A container holds 144 cups of water.
How many gallons of water does it hold?

Solution:

Proportion: $\frac{\boxed{}}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$

Answer: The container holds ________ gallons.

Name ______________________ Date __________ Time __________

Using Ratios to Convert Measurement Units

Solve each conversion problem. Use the Conversion Rates master to help you.

Example: 12 ft = 4 yd

Conversion rate: 3 ft = 1 yd

Solution: $12 \text{ ft} * \frac{1 \text{yd}}{3 \text{ ft}}$

$\frac{(12 \cancel{\text{ft}} * 1 \text{ yd})}{3 \cancel{\text{ft}}}$

$\frac{12 \text{ yd}}{3} = 4 \text{ yd}$

1. 72 qt = ________ gal

Conversion rate: ____________________

Solution: ____________________

____

____

2. ________ in. = 38.1 cm

Conversion rate: ____________________

Solution: ____________________

____

____

3. 4 mi^2 = ________ acres

Conversion rate: ____________________

Solution: ____________________

____

____

4. Explain how you solved Problem 3.

____

____

____

____

Name: ______________________ Date: ______________ Time: ______________

Using Ratios to Convert Measurement Units

For Problems 2–4, solve each conversion problem.
Use the Conversion Rates master to help you.

1. a. Write the number 4 as a fraction with denominator of 3.

____

Multiply.

b. $\frac{1}{5} * \frac{3}{7} =$ _______

c. $\frac{3}{4} * \frac{5}{8} =$ _______

2. a. 135 ft^2 = _______ yd^2

Conversion rate:

__________ = __________

Solution: ______________

b. _______ mi = 7,040 yd

Conversion rate:

__________ = __________

Solution: ______________

3. a. _______ acres = 8 mi^2

Conversion rate:

__________ = __________

Solution: ______________

b. 6 ft^2 = _______ $in.^2$

Conversion rate:

__________ = __________

Solution: ______________

4. _______ yards (yd) = 252 inches (in.)

Conversion rate:

__________ = __________

__________ = __________

Solution: ______________

6th Grade: The Number System

Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
CCSS.Math.Content.6.NS.A.1
Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?.*

Compute fluently with multi-digit numbers and find common factors and multiples.
CCSS.Math.Content.6.NS.B.2
Fluently divide multi-digit numbers using the standard algorithm.

CCSS.Math.Content.6.NS.B.3
Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

CCSS.Math.Content.6.NS.B.4
Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4 (9 + 2)..*

Apply and extend previous understandings of numbers to the system of rational numbers.
CCSS.Math.Content.6.NS.C.5
Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

CCSS.Math.Content.6.NS.C.6
Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

CCSS.Math.Content.6.NS.C.6.a
Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., -(-3) = 3, and that 0 is its own opposite.

CCSS.Math.Content.6.NS.C.6.b
Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.

CCSS.Math.Content.6.NS.C.6.c
Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

CCSS.Math.Content.6.NS.C.7
Understand ordering and absolute value of rational numbers.

CCSS.Math.Content.6.NS.C.7.a
Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret -3 > -7 as a statement that -3 is located to the right of -7 on a number line oriented from left to right.*

CCSS.Math.Content.6.NS.C.7.b
Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write -3 °C > -7 °C to express the fact that -3 °C is warmer than -7 °C.*

CCSS.Math.Content.6.NS.C.7.c
Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of -30 dollars, write |-30| = 30 to describe the size of the debt in dollars.*

CCSS.Math.Content.6.NS.C.7.d
Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.*

CCSS.Math.Content.6.NS.C.8
Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Name ______ Date ______ Time ______

Dividing Mixed Numbers and Fractions

Division of Fractions Algorithm

$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} * \frac{d}{c}$

Divide. Show your work. Write your answers in simplest form.

Example: $\frac{7}{8} \div \frac{3}{6} =$ ______

$\frac{7}{8} * \frac{6}{3} = \frac{42}{24} = 1\frac{3}{4}$

1. $\frac{7}{6} \div \frac{5}{12} =$ ______

2. $\frac{11}{15} \div \frac{1}{3} =$ ______

3. $\frac{16}{3} \div 2\frac{1}{4} =$ ______

4. $1\frac{2}{7} \div \frac{3}{10} =$ ______

5. $\frac{8}{14} \div \frac{8}{14} =$ ______

6. $2\frac{3}{5} \div \frac{6}{8} =$ ______

7. $\frac{5}{6} \div 1\frac{3}{5} =$ ______

8. $3\frac{4}{5} \div 8\frac{1}{3} =$ ______

Name: ______________________ Date: ______________ Time: ______________

Dividing Mixed Numbers and Fractions

1. Multiply. Write your answers in simplest form.

a. $\frac{5}{8} * \frac{5}{6} =$ ________

b. $\frac{4}{3} * \frac{7}{12} =$ ________

2. Multiply. Write your answers in simplest form.

a. $1\frac{4}{5} * 1\frac{5}{6} =$ ________

b. $2\frac{2}{3} * 3\frac{1}{4} =$ ________

3. Divide. Show your work.

a. $\frac{6}{5} \div \frac{1}{2} =$ ________

b. $\frac{3}{4} \div \frac{4}{12} =$ ________

4. Divide. Show your work.

a. $\frac{5}{7} \div \frac{3}{8} =$ ________

b. $\frac{7}{15} \div \frac{2}{5} =$ ________

5. Divide. Show your work.

a. $3\frac{1}{6} \div \frac{2}{3} =$ ________

b. $\frac{11}{4} \div 2\frac{1}{8} =$ ________

6. Explain how you solved Problem 5b.

Name Date Time

Choose Your Algorithm

Use any multiplication algorithm you choose to solve the following problems.
Show your work.

Example: 0.28 * 1.3 = 0.364

1. 0.47 * 0.83

2. 19.6 * 3

3. 23.65 * 6

4. 0.48 * 25.2

5. 0.21 * 28

6. 4.8 * 25

7. 1.52 * 0.4

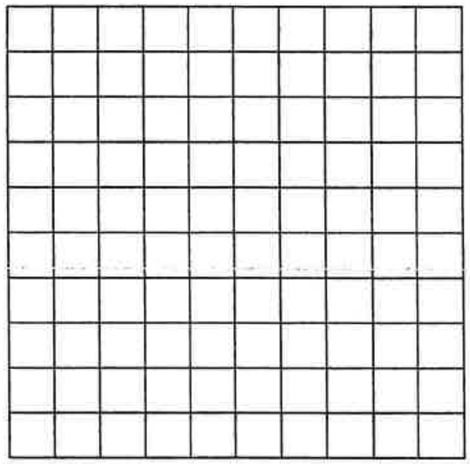
8. Select one problem. Explain your multiplication algorithm.

Name: ______________________ Date: ______________ Time: ____________

Choose Your Algorithm

1. Shade each factor. Then find the product.

0.3 * 0.3 = _______



2. Solve.

$$\begin{array}{r} 25.96 \\ \times \quad 3 \\ \hline \end{array}$$

3. Solve.

$$\begin{array}{r} 5.9 \\ \times \quad 17 \\ \hline \end{array}$$

4. Solve.

$$\begin{array}{r} 0.58 \\ \times \ 0.67 \\ \hline \end{array}$$

5. Explain how you found the answer in Problem 4.

Name Date Time

The Distributive Property

The **distributive property** is a number property that combines multiplication with addition. The distributive property can be stated in 2 different ways.

Multiplication over Addition

For any numbers *a*, *x*, and *y*:

$a * (x + y) = (a * x) + (a * y)$

$(x + y) * a = (x * a) + (y * a)$

Use the distributive property to fill in the blanks.

1. $4 * (70 + 8) = (4 *$ 70 $) + (4 *$ 8 $)$

2. $(\_\_\_\_\_ + \_\_\_\_\_) * 8 = (40 * 8) + (6 * \_\_\_\_\_)$

3. $(41 + 19) * 7 = (\_\_\_\_\_ * \_\_\_\_\_) + (\_\_\_\_\_ * \_\_\_\_\_)$

4. $6 * (30 + 4) = (\_\_\_\_\_ * 30) + (\_\_\_\_\_ * 4)$

5. $(29 * x) + (12 * x) = (\_\_\_\_\_ + \_\_\_\_\_) * \_\_\_\_\_$

6. $8 * (90 + 3) = (\_\_\_\_\_ * 90) + (8 * 3)$

7. $4 * (5 + 6) = (\_\_\_\_\_ * \_\_\_\_\_) + (\_\_\_\_\_ * \_\_\_\_\_)$

8. $(50 * 7) + (8 * \_\_\_\_\_) = (\_\_\_\_\_ + \_\_\_\_\_) * 7$

9. $5 * (12 + h) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_$

10. $6 * (d + 7) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_$

Name: ______________________ Date: ______________ Time: ______________

The Distributive Property

Use the distributive property to rewrite each expression.

1. **a.** 4 * (3 + 9) = (4 * _____) + (4 * _____)

   b. 12 * (6 + 10) = (12 * _____) + (12 * _____)

   c. (8 + 15) * 7 = (8 * _____) + (15 * _____)

2. **a.** (11 + 5) * 8 = (_____ * 8) + (_____ * 8)

   b. 14 * (10 + *h*) = (14 * _____) + (14 * _____)

   c. (*q* + 21) * 6 = (*q* * _____) + (21 * _____)

3. **a.** 17 * (7 + _____) = (_____ * 7) + (_____ * 20)

   b. (_____ + *g*) * 45 = (10 * _____) + (_____ * 45)

   c. (_____ + 5) * _____ = (9 * *v*) + (_____ * *v*)

Name: ______________________ Date: ______________ Time: ______________

The Least Common Multiple and Renaming Fractions

1. Is 35 a prime or composite number? ______________	**2.** Is 23 a prime or composite number? ______________
3. What is the least common multiple of 24 and 18? ______________	**4.** Use the least common multiple to rename the fractions with common denominators. $\frac{11}{24}$ and $\frac{7}{18}$ ________ and ________
5. Use the least common multiple to rename the fractions with common denominators. $\frac{3}{7}$ and $\frac{1}{3}$ ________ and ________	**6.** Explain how you found the answer in Question 5.

Name: ______________________________ Date: ____________________ Time: __________

The Least Common Multiple and Renaming Fractions

1. What is the least common multiple of 12 and 30?

____

2. Use the least common multiple to rename the fractions with common denominators.

$\frac{5}{12}$ and $\frac{7}{30}$ ________ and ________

Name ______ Date ______ Time ______

Positive and Negative Numbers in Real-World Situations

Write each situation with a positive or negative number. Then explain what 0 represents.

1. a water depth of 70 feet –70 0 represents the surface of the water.

2. a debt of $120 ______ ______

3. a temperature of 25°C ______ ______

4. a mountain with an elevation of 4,861 feet ______

Write positive and negative numbers for each situation below. Then put the numbers in order from least to greatest.

5. **a business:** $10 profit, break even, $25 loss, $40 loss, $20 profit
   $10, $0, –$25, –$40, $20
   –$40, –$25, $0, $10, $20

6. **a list of elevations:** 345 feet above sea level, 282 below sea level, at sea level, 257 above sea level, 8 feet below sea level

7. **a bank account:** $150 withdrawal, $125 deposit, $75 withdrawal, no change, $50 deposit

8. **a basketball game:** ahead 4 points, ahead 1 point, behind 3 points, tied, behind 1 point

Name: ____________________ Date: ______________ Time: ______________

Positive and Negative Numbers in Real-World Situations

1. Put the following numbers in order from least to greatest. –38, 34, –40, –2, 6 _______, _______, _______, _______, _______	**2.** Put the following numbers in order from least to greatest. –22, 49, –47, –13, 2 _______, _______, _______, _______, _______

3. **a.** Write a positive or negative number to tell that a mountain has an elevation of 9,652 feet.

____

b. What does zero represent?

____

4. **a.** Write the following situations for a basketball team using positive or negative numbers: ahead by 4 points, behind by 6 points, tied, ahead by 2 points

_______, _______, _______, _______

b. Write the numbers in order from least to greatest.

_______, _______, _______, _______

Name ______________________ Date ____________ Time ____________

Subtracting Positive and Negative Numbers

Transaction	Start	Change	End/Start of Next Transaction
New business, start at $0	$0	$0	$0
Credit (payment) of $8 comes in	$0	Add $8	+ $8
Credit of $2	+ $8	Add ______	______
Debit of $4	______	Add ______	______
Credit of $2 was an error. Adjust account.	______	Subtract ______	______
Debit of $7	______	Add ______	______
Credit of $5	______	Add ______	______
Debit of $4 was an error. Adjust account.	______	Subtract ______	______
Debit of $7 was an error. Adjust account.	______	Subtract ______	______
Debit of $11	______	Add ______	______

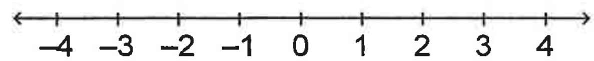
Name: ______________________ Date: ______________ Time: ______________

Subtracting Positive and Negative Numbers

1. Write >, <, or = to make the number sentence true.

   –5 ________ –10

2. Plot each number on the number line and write the letter label for the point.



   A: 3
   B: 1
   C: 2
   D: –4

3. Your business account has a balance of +$7. However, a previous credit of $9 was an error. What is the balance after adjusting the account?

   ____

4. Your business account has a balance of –$5. However, a previous debit of $10 was an error. What is the balance after adjusting the account?

   ____

5. Your business account has a starting balance of +$7. There is a debit of $8 and a credit of $4. A previous debit of $3 was an error. What is the new balance of the account?

   ____

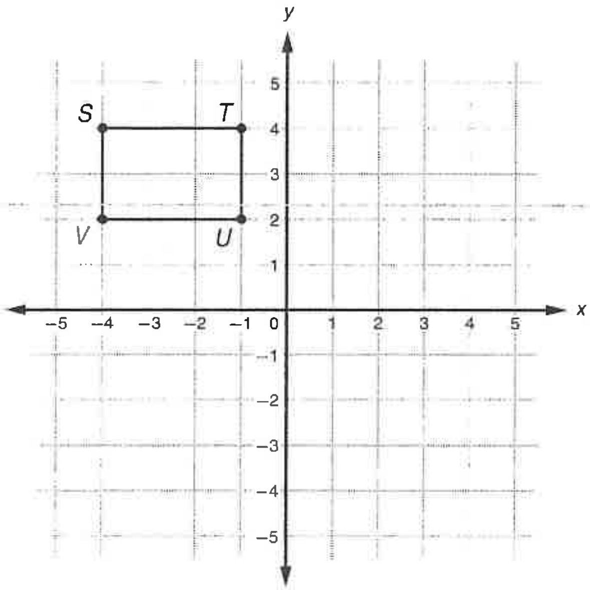
6. Explain how you found the new balance in Problem 5.

Name Date Time

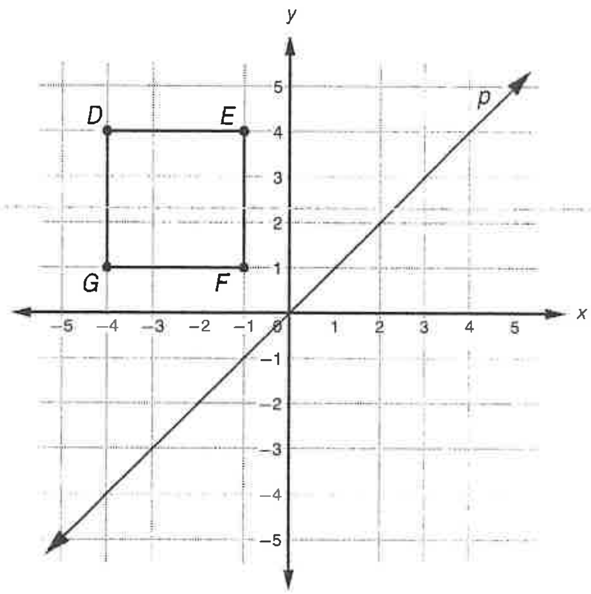
Plotting Reflections on a Grid

Reflect each figure over the indicated axis or line of reflection. Then plot and label the vertices of the image that results from the reflection. Use a transparent mirror to check your placement of each image.

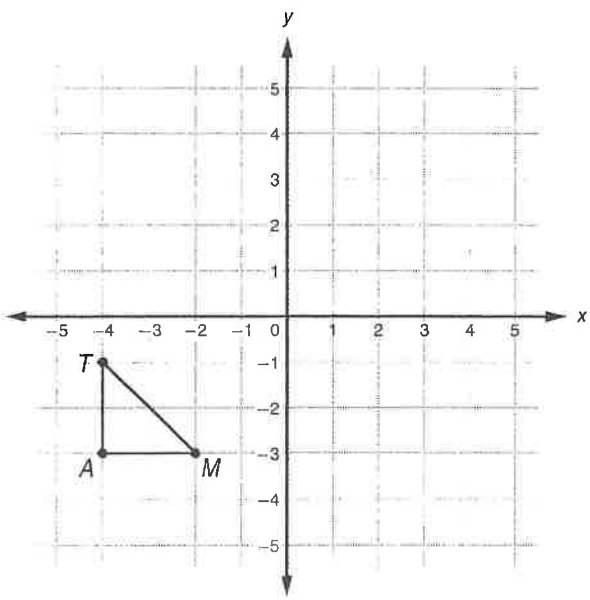
1. Reflect rectangle *STUV* over the *x*-axis.



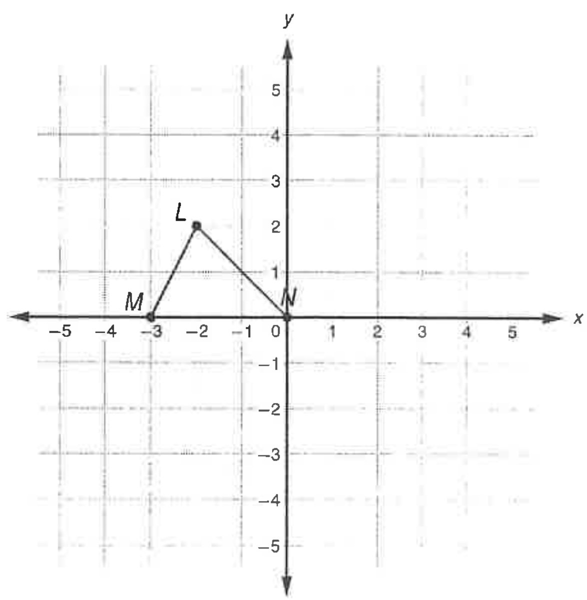
2. Reflect square *DEFG* over line *p*.



3. Reflect triangle *TAM* over the *y*-axis.



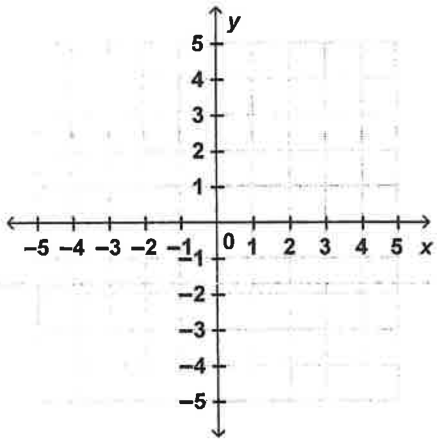
4. Reflect triangle *LMN* over the *y*-axis.



Name: ______________________ Date: ______________ Time: ____________

Plotting Reflections on a Grid

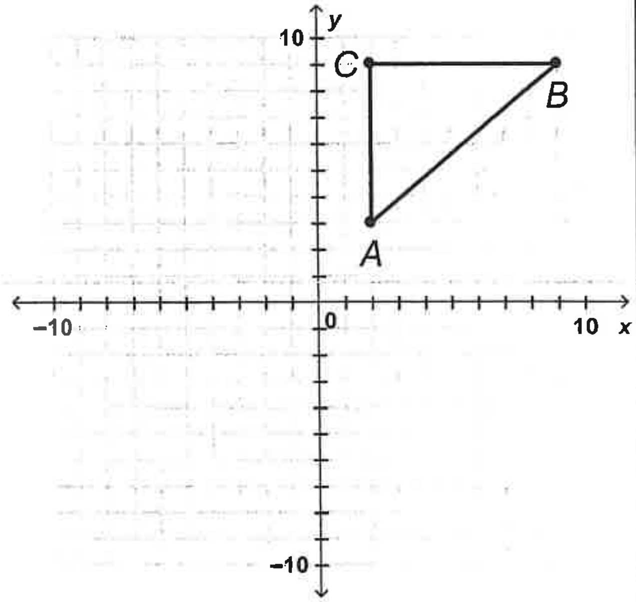
1. Plot and label the ordered pairs on the grid.



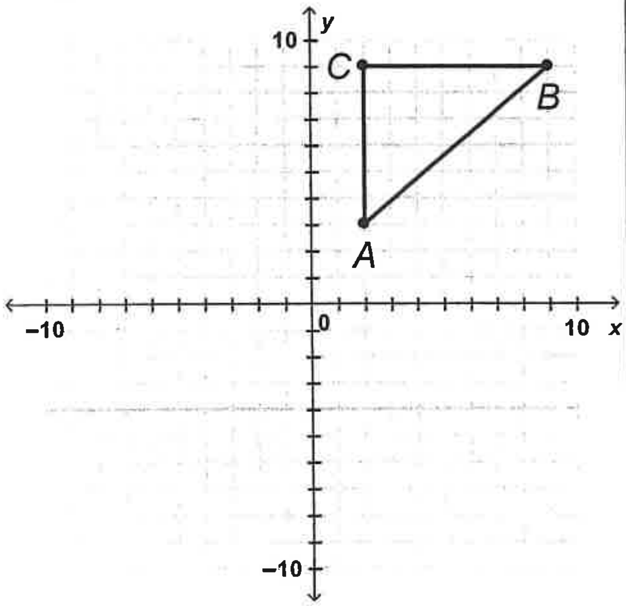
M: (5,4) *N*: (–1,–2) *O*: (–3,3)

P: (4,–1) *Q*: (3,–3)

2. Plot and label the image of triangle *ABC* after a reflection over the *x*-axis.



3. Reflect figure *ABCD* over the *y*-axis. Then plot and label the vertices of the image that results from that reflection.



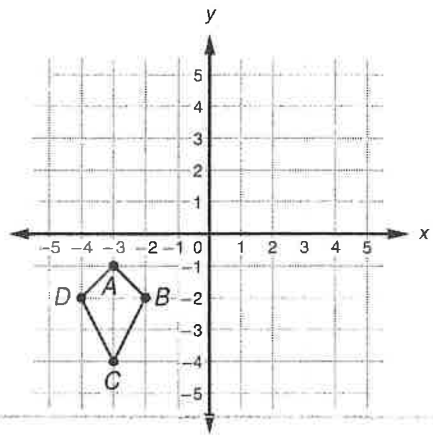
4. Look at your answer to Problem 3. Describe a pattern you notice about the coordinates of a figure that is reflected across the *y*-axis.

Name Date Time

Translations on a Coordinate Grid

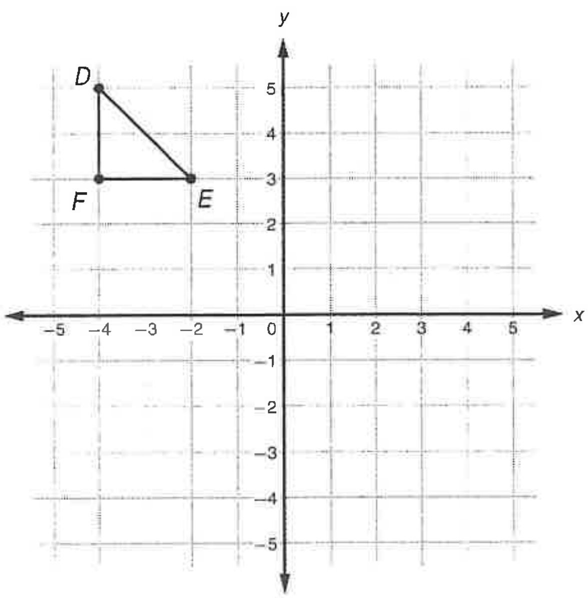
Example:
Translate quadrangle *ABCD* 6 units to the right and 5 units up.

Plot and label the vertices of the image that would result from the translation.

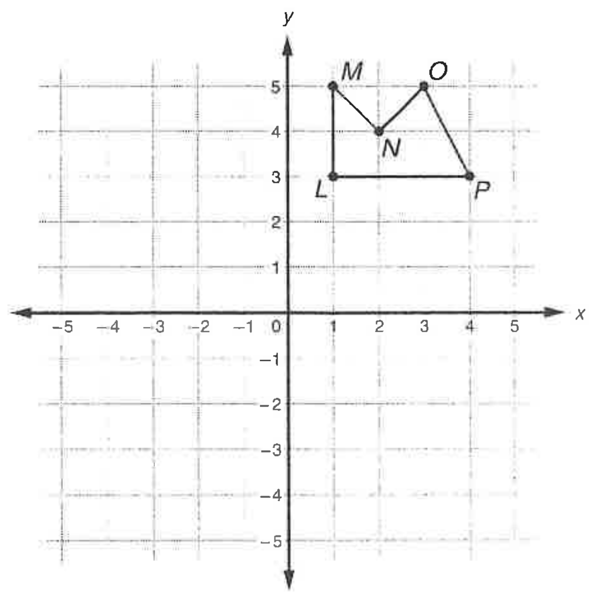


Plot and label the vertices of the image that would result from each translation.

1. Translate triangle *DEF* 5 units to the right and 4 units down.



2. Translate pentagon *LMNOP* 0 units to the right and 5 units down.



Try This

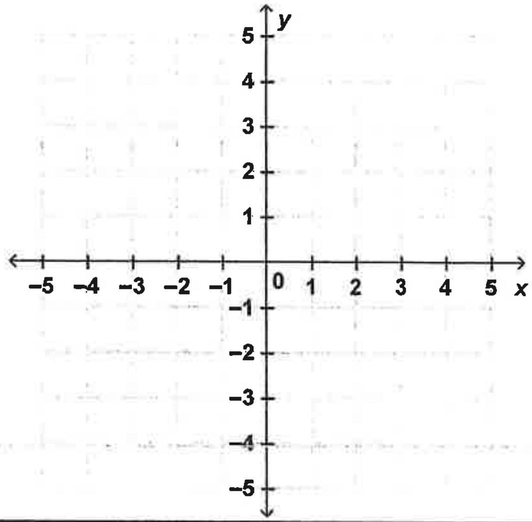
3. Square *WXYZ* has the following vertices:
W (−3,−2), *X* (−1,−2), *Y* (−1,−4), *Z* (−3,−4)

Without graphing the preimage, list the vertices of image *W′X′Y′Z′* resulting from translating each vertex 2 units to the right and 3 units up.

W′ (_____,_____); *X′* (_____,_____); *Y′* (_____,_____); *Z′* (_____,_____)

Name: ______________________ Date: ______________ Time: ______________

Translations on a Coordinate Grid



1. The vertices for pentagon *RSTUV* are listed below. Plot and label *RSTUV* on the coordinate grid above.

R: (−1,−2) *S*: (−2,−4) *T*: (−3,−4)
U: (−4,−2) *V*: (−3,−1)

2. Translate pentagon *RSTUV* 5 points to the right and 1 point down. List the vertices of pentagon *R'S'T'U'V'*. Plot and label *R'S'T'U'V'* on the coordinate grid above.

R': (_____,_____) *S'*: (_____,_____)

T': (_____,_____) *U'*: (_____,_____)

V': (_____,_____)

3. Translate pentagon *RSTUV* 6 points to the right and 6 points up. List the vertices of pentagon *R"S"T"U"V"*. Plot and label *R"S"T"U"V"* on the coordinate grid above.

R": (_____,_____) *S"*: (_____,_____)

T": (_____,_____) *U"*: (_____,_____)

V": (_____,_____)

4. What is one conclusion you can draw about the relationship between the coordinates of the original figure and coordinates of a translation?

6^{th} Grade: Expressions and Equations

Apply and extend previous understandings of arithmetic to algebraic expressions.
CCSS.Math.Content.6.EE.A.1
Write and evaluate numerical expressions involving whole-number exponents.

CCSS.Math.Content.6.EE.A.2
Write, read, and evaluate expressions in which letters stand for numbers.

CCSS.Math.Content.6.EE.A.2.a
Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 - y.*

CCSS.Math.Content.6.EE.A.2.b
Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.*

CCSS.Math.Content.6.EE.A.2.c
Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas* $V = s^3$ *and* $A = 6\,s^2$ *to find the volume and surface area of a cube with sides of length* $s = 1/2$.

CCSS.Math.Content.6.EE.A.3
Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*

CCSS.Math.Content.6.EE.A.4
Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for..*

Reason about and solve one-variable equations and inequalities.
CCSS.Math.Content.6.EE.B.5
Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

CCSS.Math.Content.6.EE.B.6
Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

CCSS.Math.Content.6.EE.B.7
Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.

CCSS.Math.Content.6.EE.B.8
Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

Represent and analyze quantitative relationships between dependent and independent variables.
CCSS.Math.Content.6.EE.C.9
Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.

Name Date Time

Using the Order of Operations

Please Excuse My Dear Aunt Sally

Parentheses Exponents Multiplication Division Addition Subtraction

Evaluate each expression.

Examples:

a. $16 + 4^2 / 8$

$16 + 16 / 8$

$16 + 2 = 18$

b. $4^3 / 2 + 5$

$64 / 2 + 5$

$32 + 5 = 37$

1. $2^3 * 3^2 - 5 =$ ________

2. $((5^2 + 2^2) + 3) / 4 =$ ________

3. $5 + (30 / 3)^2 =$ ________

4. $7^2 + 12 / 2^2 =$ ________

5. $(6^2 - 6) + (4 * 2^3) =$ ________

6. $(18 + 3^2) / (1 + 2^3) =$ ________

7. $6^2 + 2(6 - 1) =$ ________

8. $((15 - 3^2) + 4) * 3 =$ ________

Insert parentheses to make each number sentence true.

9. $48 / 2^3 + 4 / 2 = 5$

10. $6^2 / 11 - 2 * 3 = 12$

11. $2^3 * 3^2 - 5 = 32$

12. $3^2 - 1 * 7 / 2^2 = 14$

13. $5^2 / 2^2 + 1 * 4 = 20$

14. $7^2 - 9 * 4^2 - 3^2 = 280$

Name: ______________________ Date: ______________ Time: ____________

Using the Order of Operations

1. Evaluate each expression.

a. $7^2 + 6(5 + 3) =$ ________

b. $6^2 + 2^4 - 17 =$ ________

c. $32 + (2 * 5)^2 =$ ________

2. Evaluate each expression.

a. $5 * (31 - 4^2)$ ________

b. $(13 + 8^2) / (36 - (5^2))$ ________

c. $(5^2 - 20) + (2^3 * 2)$ ________

3. Insert parentheses to make each number sentence true.

a. $3 * 5^2 + 38 = 113$

b. $31 + 6^2 / 9 - 3 = 37$

c. $5^2 - 1 / 2 + 6 = 3$

Name: ________________ Date: ________________ Time: ________

Using the Order of Operations

1. Evaluate each expression.

a. $8^2 + 3(8 - 4)$ ________ **b.** $48 - 3^3 + 19$ ________

c. $11 + (3 * 3)^2$ ________

2. Evaluate each expression.

a. $7 * (31 - 5^2)$ ________ **b.** $(24 + 4^2) / (8 - 2^2)$ ________

c. $(7^2 - 12) + (4^3 * 2)$ ________

3. Insert parentheses to make each number sentence true.

a. $5^3 / 5 + 20 = 5$ **b.** $8 + 5^2 / 3 = 11$

c. $120 / 2 + 2^3 * 4 = 48$

Name Date Time

Using Formulas to Solve Problems

To solve a problem using a formula, you can substitute the known quantities for variables in the formula and solve the resulting equation.

Example: A formula for converting between Celsius and Fahrenheit temperatures is $F = 1.8C + 32$, where C represents the Celsius temperature and F represents the Fahrenheit temperature.

- ◆ Use the formula to convert 30°C to degrees Fahrenheit.

	$F = 1.8C + 32$
Substitute 30 for C in the formula.	$F = (1.8 * 30) + 32$
Solve the equation.	$F = 86$
Answer:	30°C = 86°F

- ◆ Use the formula to convert 50°F to degrees Celsius.

	$F = 1.8C + 32$
Substitute 50 for F in the formula.	$50 = (1.8 * C) + 32$
Solve the equation.	$10 = C$
Answer:	50°F = 10°C

1. The formula $W = 570a - 850$ expresses the relationship between the average number of words children know and their ages (for ages 2 to 8). The variable W represents the number of words known, and a represents age in years.

a. About how many words might a $3\frac{1}{4}$-year-old child know? ____________

b. About how old might a child be who knows about 1,700 words? ____________

2. A bowler whose average score is less than 200 is given a handicap. The **handicap** is a number of points added to a bowler's score for each game. A common handicap formula is $H = 0.8 * (200 - a)$, where H is the handicap and a is the average score.

a. What is the handicap of a bowler whose average score is 160? ____________

b. What is the average score of a bowler whose handicap is 68? ____________

3. An adult human female's height can be estimated from the length of her tibia (shinbone) by using the formula $H = 2.4 * t + 75$, where H is the height in centimeters and t is the length of the tibia in centimeters.

a. Estimate the height of a female whose tibia is 31 centimeters long. ____________

b. Estimate the length of a female's tibia if she is 175 centimeters tall. ____________

Name: ______________________ Date: ______________ Time: ______________

Using Formulas to Solve Problems

1. Write a number sentence that describes the numbers in the table.

____

x	y
4	12
8	24
15	45
30	90

2. Write an equation to represent the situation.

The number of baseball players in a tournament (p) is 9 times the number of teams (t).

____

3. Jackie checked the thermometer one morning. It read 12° C. Use the formula to find this temperature in Fahrenheit (F).

$F = (1.8 * C) + 32.$

$F =$ ________ °

4. The formula for finding the Perimeter of rectangle is: $P = 2l + 2w$.

Find the Perimeter (P) of a rectangle that has a length (l) of 12 cm and width (w) of 8 cm.

Perimeter (P) = ________ cm

5. Use the formula $d = r * t$.

Find the distance (d) when $r = 7.5$ and $t = 5$.

$d =$ ________

6. Write and solve your own Review Box question using a formula.

Name: ______________________________ Date: ____________________ Time: __________

Using Formulas to Solve Problems

1. The formula for finding the Perimeter of a rectangle is: $P = 2l + 2w$.

Find the length (l) of a rectangle that has a width (w) of 5 cm, and has perimeter (P) of 26 cm.

length (l) = ________ cm

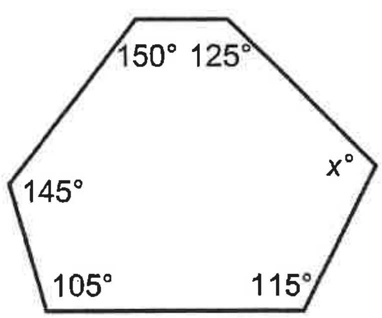
2. A bank gives its customers interest for putting money in a savings account.

Matthew has a savings account at this bank. Determine the Interest (I) he will earn for 2 years ($t = 2$) for an account that gives 3% interest if Matthew has \$500 in Principal (P) using the formula $I = P \times 0.03 \times 2$

I = \$________

3. You can use the formula $s = 180 * (n - 2)$ to find the sum of the interior angle measures of any polygon with n sides.

Find the value of x in the figure below.



x = ________ °

Name Date Time

Creating Equivalent Expressions

The order of operations is shown in the diagram below.

in order, left to right

( ) → a^n → * or / → + or −

Use the diagram to help you evaluate each expression. Then create an equivalent expression using parentheses, if needed, and at least 3 operations: exponents, multiplication, division, addition, subtraction.

1. $(42 - 7) * 2 =$ 70

   Equivalent expression: $120 - (7^2 + 1)$

2. $2^3 * 8 - 8 =$ ______

   Equivalent expression: ______

3. $15 - 28 / 7 * 2 =$ ______

   Equivalent expression: ______

4. $(100 / (4^2 + 4)) =$ ______

   Equivalent expression: ______

5. $7 * 2^3 =$ ______

   Equivalent expression: ______

6. $6 + 3 * 1 =$ ______

   Equivalent expression: ______

7. $6 + 4 * 4^2 =$ ______

   Equivalent expression: ______

8. $(9 + 1) / 2 * 3^2 =$ ______

   Equivalent expression: ______

Name: ______________________ Date: ______________ Time: ______________

Creating Equivalent Expressions

For Problems 2–4, evaluate each expression. Then create an equivalent expression using at least 3 of the following: parentheses, exponents, multiplication, division, addition, subtraction

1. Write the expression for each given statement. **a.** 10 added to 7 times 8. ________________ b. 12 divided by the difference of 9 and 5. ________________	**2. a.** 46 – 8 ∗ 4 = ________ Equivalent expression: ________________ **b.** 24 / (12 – 9) + 20 = ________ Equivalent expression: ________________
3. a. 19 + 6^2 / 9 = ________ Equivalent expression: ________________ **b.** 5^2 ∗ 4 – 12 = ________ Equivalent expression: ________________	**4. a.** 28 + 16 / 2^2 = ________ Equivalent expression: ________________ **b.** 41 – 3 ∗ 4 + 5^2 = ________ Equivalent expression: ________________

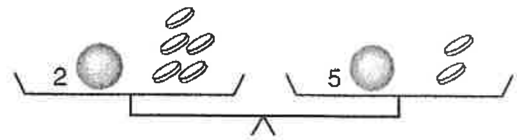
Name ______________________ Date __________ Time __________

Using a Pan-Balance to Model Equations

Solve these pan-balance problems. In each figure, the two pans are balanced.

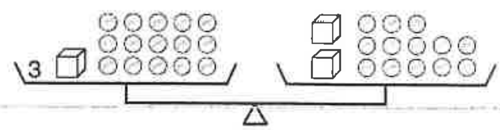
1. One ball weighs

as much as ________ coin(s).



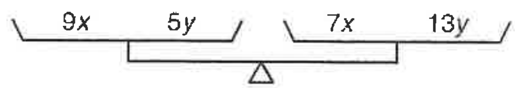
2. One square weighs

as much as ________ paper clips(s).



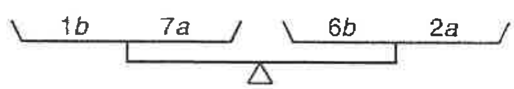
3. One x weighs

as much as ________ y(s).



4. One a weighs

as much as ________ b(s).

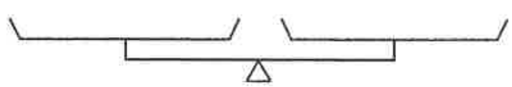


Write an equation that represents the statement.

5. One p weighs

as much as five qs.

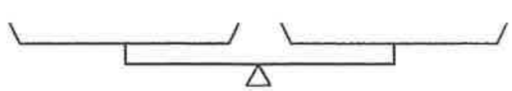
Equation: ____________________



6. One x and 2 ys weigh

as much as six xs and one y.

Equation: __________________________________



Name: ______________________ Date: ______________ Time: ______________

Using a Pan Balance to Model Equations

1. Miguel is 10 meters ahead of Pedro in a race. Pedro has run 350 meters. Write an expression to show how far Miguel has run.

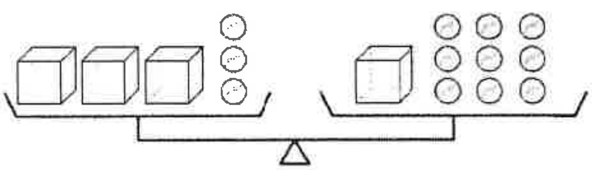
____

2. Box A weighs seven times as much as Box B. Write an expression to show how much Box A weighs if Box B weighs 10 pounds.

____

3. Solve the pan balance problem.

1 cube = _________ marbles



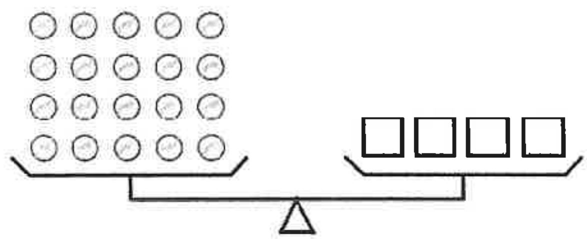
Write an equation that models the statement above.

____

4. Solve the pan balance problem.

Three squares weigh as much as

_________ marble(s).

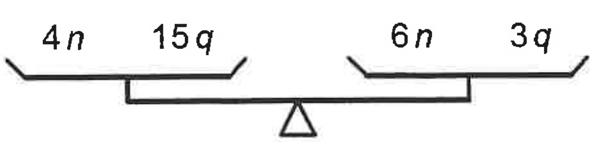


Write an equation that models the statement above.

____

5. Solve the pan balance problem.

One n weighs as much as ________ q(s).



Write an equation that models the statement above. ____________________

Name Date Time

Generating Tables and Making Line Graphs

Write a formula to represent each rule. Then complete each table and graph the data. Connect the points.

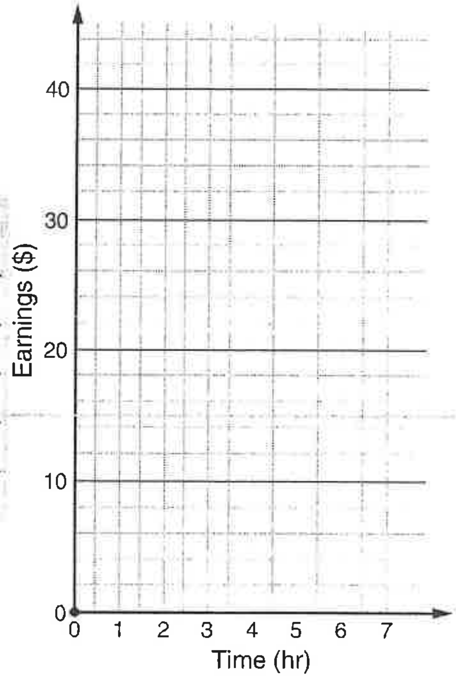
1. Robert earns $5.00 per hour.

Rule:
Earnings = $5.00/hr
∗ number of hr worked

Formula:

____

Time (hr) *h*	**Earnings ($)** *E*
1	
2	
4	
	25.00
6.5	



a. Plot a point to show Robert's earnings for $5\frac{1}{2}$ hours.

b. How much would he earn? ____________

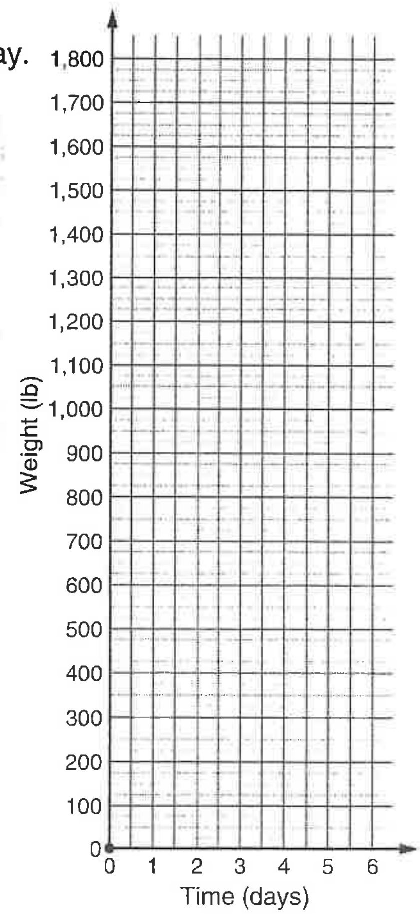
2. A young blue whale can gain as much as 300 pounds per day.

Rule:
Weight gained =
300 lb/day
∗ number of days

Formula:

____

Time (days) *t*	**Weight gained (lb)** *W*
1	
2	
4	
	1,575
6	



a. Plot a point to show the number of pounds a young blue whale can gain in 30 hours.

b. How many pounds is that? ____________

Source: Beyond Belief!

Name: ______________________ Date: ______________ Time: ______________

Generating Tables and Making Line Graphs

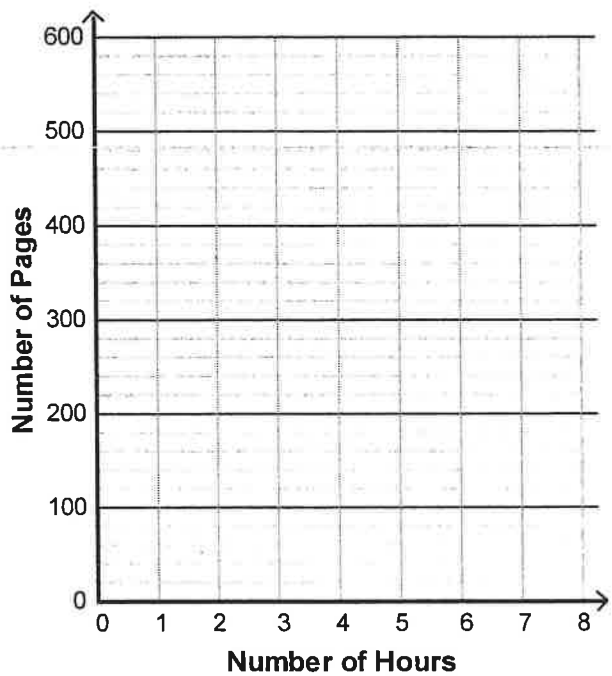
1. Complete the table. Graph the data and connect the plotted points.

Kayla reads at a rate of 40 pages per hour.

Rule: Pages = 40 * number of hours

Hours *h*	**Pages** *P*
1	40
2	
3	
4	
	280
8	

Kayla's Reading Rate



2. If Kayla has to finish reading a 200-page book for homework, how many hours will it take?

____

3. Using the rule from Problem 1, how long will it take her to read 20 pages?

____

6^{th} Grade: Geometry

Solve real-world and mathematical problems involving area, surface area, and volume.
CCSS.Math.Content.6.G.A.1
Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

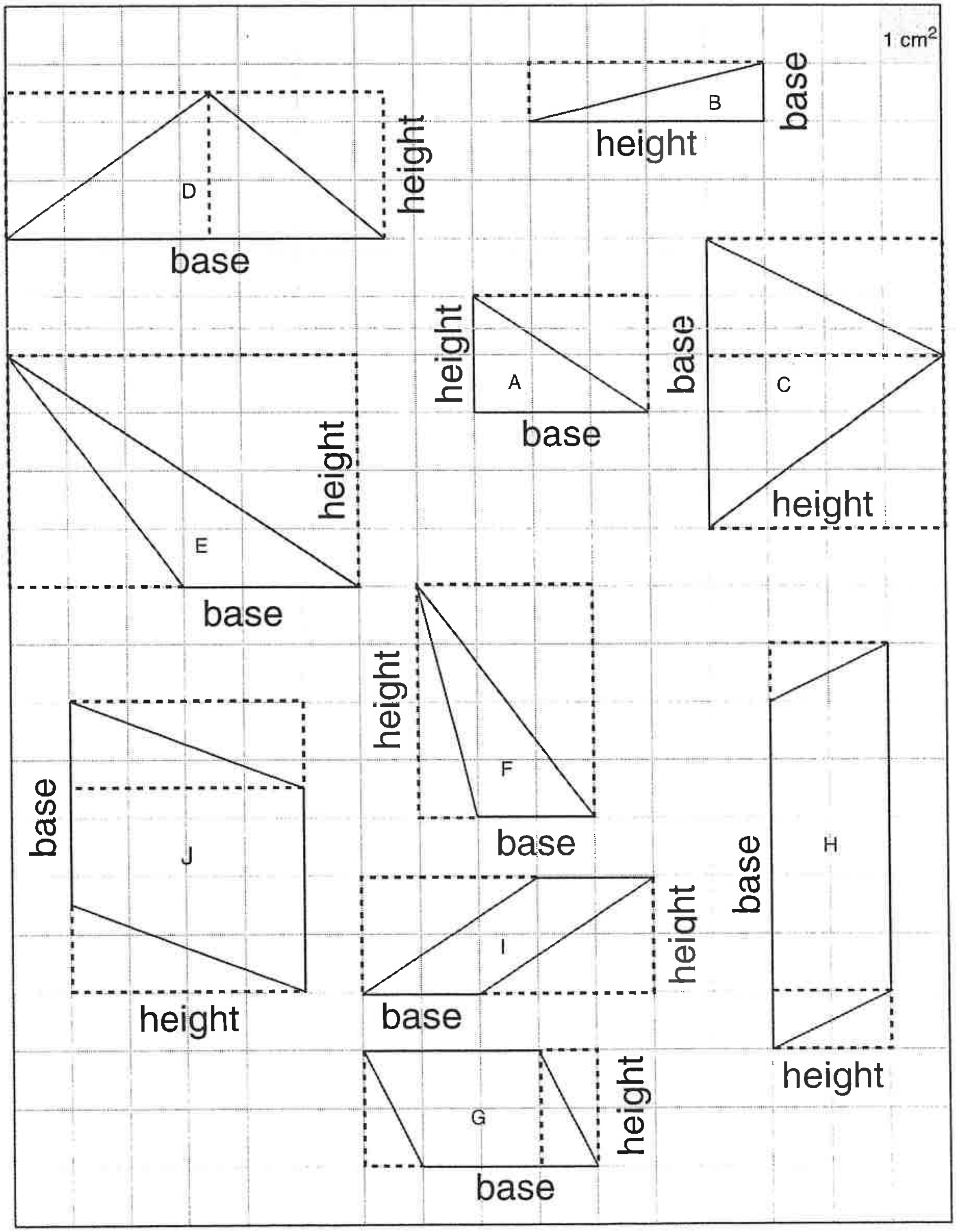
CCSS.Math.Content.6.G.A.2
Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

CCSS.Math.Content.6.G.A.3
Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

CCSS.Math.Content.6.G.A.4
Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Name Date Time

The Rectangle Method



Name Date Time

Finding Area Formulas for Triangles and Parallelograms

1. Fill in the table. All figures are shown on the The Rectangle Method master.

Triangles	Area	base	height	base * height
A	3 cm^2	3 cm	2 cm	6 cm^2
B	______ cm^2	______ cm	______ cm	______ cm^2
C	______ cm^2	______ cm	______ cm	______ cm^2
D	______ cm^2	______ cm	______ cm	______ cm^2
E	______ cm^2	3 cm	4 cm	______ cm^2
F	______ cm^2	______ cm	______ cm	______ cm^2
Parallelograms	**Area**	**base**	**height**	**base * height**
G	6 cm^2	3 cm	2 cm	6 cm^2
H	______ cm^2	______ cm	______ cm	______ cm^2
I	______ cm^2	2 cm	______ cm	______ cm^2
J	______ cm^2	______ cm	______ cm	______ cm^2

2. Examine the results of Figures A–F. Propose a formula for the area of a triangle as an equation and as a word sentence.

Area of a triangle = ______________________________

____

____

3. Examine the results of Figures G–J. Propose a formula for the area of a parallelogram as an equation and as a word sentence.

Area of a parallelogram = ______________________________

____

____

Name: ______________________ Date: ______________ Time: ____________

Finding Area Formulas for Triangles and Parallelograms

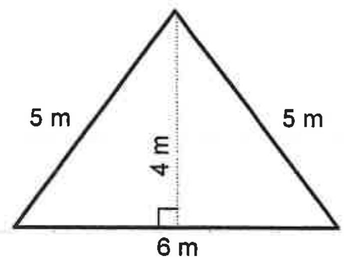
1. Fill in the missing factors.

a. 5 × ________ = 15

b. 7 × ________ = 14

c. 6 × ________ = 60

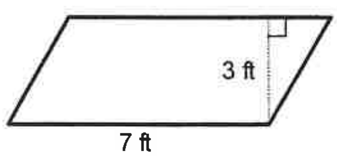
2. Find the area of the triangle.



Number model: ________________

Area: ________________ m^2

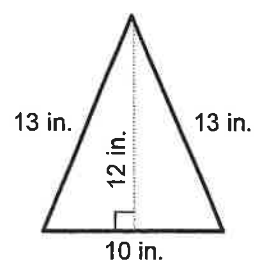
3. Find the area of the parallelogram.



Number model: ________________

Area: ________________ ft^2

4. Find the area of the triangle.



Number model: ________________

Area: ________________ in^2

Name Date Time

Storage Volume Problems: Fractional Side Lengths

South Ridge Shopping Mall offers temporary storage lockers in three different sizes for shoppers to rent. The table below shows the dimensions of the each locker.

Locker Type	Length	Width	Height
Small	$1\frac{1}{2}$ feet	1 foot	$1\frac{1}{2}$ feet
Medium	$1\frac{1}{2}$ feet	$1\frac{1}{2}$ feet	$2\frac{1}{2}$ feet
Large	$1\frac{1}{2}$ feet	2 feet	$3\frac{1}{2}$ feet

1. Find the volume of each of the storage lockers. Show your work. Use the formulas at the right to help you.

Volume of a Rectangular Prism

$V = B * h$ or $V = l * w * h$

V = volume

B = area of base

l = length of base

w = width of base

h = height

Example: Volume of small locker = $2\frac{1}{4}\ ft^3$

$1\frac{1}{2} * 1 * 1\frac{1}{2} = \frac{3}{2} * \frac{1}{1} * \frac{3}{2}$

$= \frac{18}{8} = 2\frac{2}{8} = 2\frac{1}{4}$

a. Volume of medium locker = ______________

b. Volume of large locker = ______________

2. Allen needs to leave two boxes in a storage locker while he eats lunch. Both boxes are 2 feet in length by $1\frac{1}{2}$ feet in width, and $1\frac{1}{2}$ feet in height. Which storage locker will Allen need to rent? Show your work and explain your thinking.

____

____

____

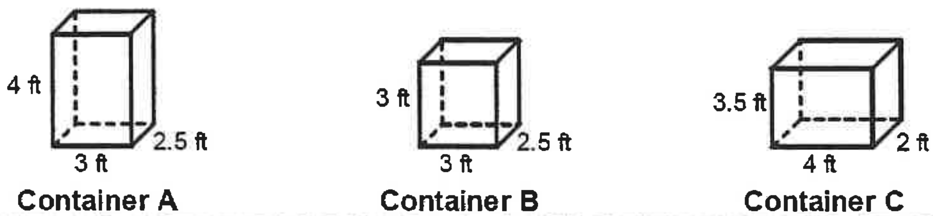
____

Name: ______________________ Date: ______________ Time: ______________

Storage Unit Volume Problems: Fractional Side Lengths

Use the formulas on the page S1 to calculate the volume of each container.

1. A store sells containers in three different sizes, which are shown below.



Find the volume of each container. Show your work.

a. Volume of Container A = ______________ (unit)

b. Volume of Container B = ______________ (unit)

c. Volume of Container C = ______________ (unit)

d. Genji only needs 21 ft^3 of space for her items. The largest dimension for any of the items is 2.5 feet. Which container should she buy?

____

e. Explain your answer.

____

____

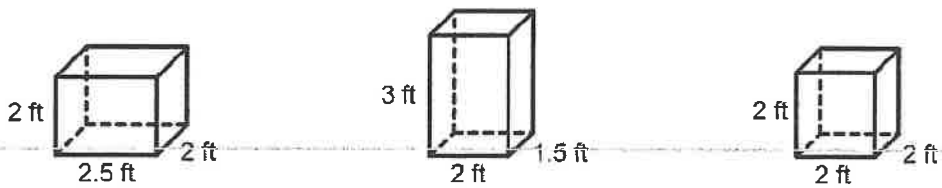
____

Name: ______________________ Date: ______________ Time: ________

Storage Unit Volume Problems: Fractional Side Lengths

Use the formulas on page S1 to calculate the volume of each.

1. A moving company sells boxes in three different sizes, which are shown below.



Box A **Box B** **Box C**

Find the volume of each box. Show your work.

a. Volume of Box A = ______________
(unit)

b. Volume of Box B = ______________
(unit)

c. Volume of Box C = ______________
(unit)

d. Wen needs 9.5 ft^3 of space for some items. The largest dimension for any of the items is 2.4 feet. Which box should he buy?

____

e. Explain your answer.

____

____

____

Name Date Time

Taxi Rides

Steve and his uncle have planned a trip to another city. Steve wants to make a map of the city showing the bus station and the places they want to visit.

1. The location of each place is given next to the grid. Plot and label each location on the grid to make a map of the city. Each grid square represents one block.

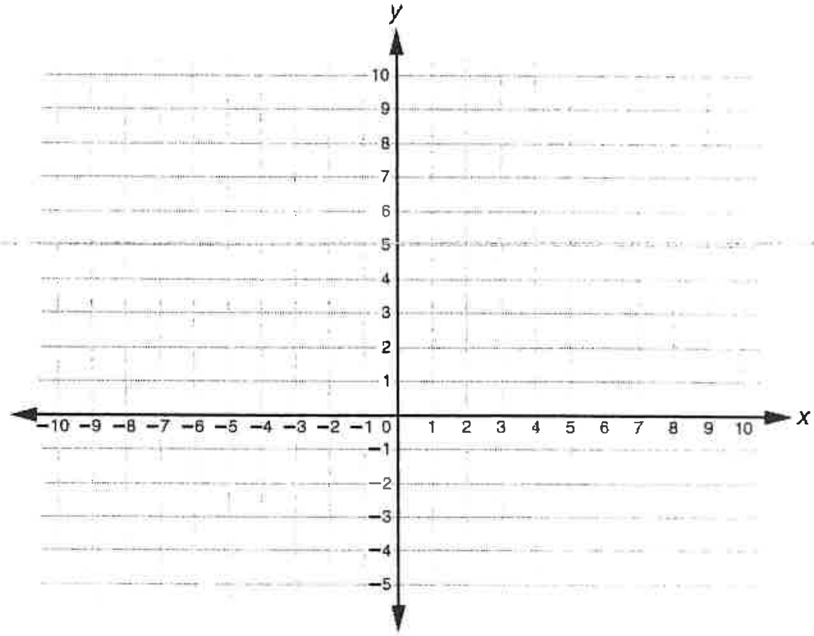
A: Bus station (−5, 8)

B: Aquarium (3, 8)

C: Restaurant (3, −1)

D: Theater (−7, −1)

E: Bookstore (−5, −1)



They will be traveling around the city by taxi. The taxi meter calculates the distance the taxi has traveled from the starting point (*s*) to the ending point (*e*) using the following formula:

$$d = |s - e|$$

Steve has planned to visit the locations in the order shown below. Find the distance that they will travel on each part of their trip. Use a number sentence to justify each answer.

Example: Bus station (*A*) to the aquarium (*B*): 8 blocks

Number sentence: $|-5 - 3| = |-8| = 8$

2. Aquarium (*B*) to the restaurant (*C*): ____________

Number sentence: ____________

3. Restaurant (*C*) to the theater (*D*): ____________

Number sentence: ____________

4. Theater (*D*) to the bookstore (*E*): ____________

Number sentence: ____________

5. Bookstore (*E*) to the aquarium by way of the bus station (*A*): ____________

Number sentence: ____________

Name: ______________________ Date: ______________ Time: ______________

Taxi Rides

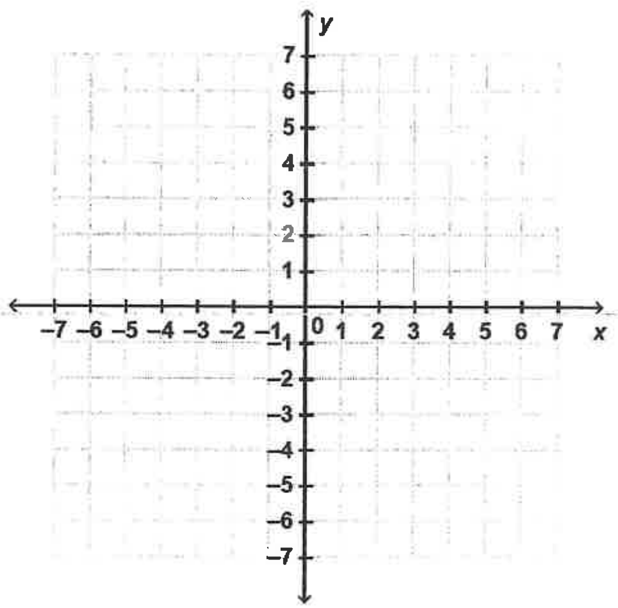
1. Plot points *M* and *N* on the coordinate grid below.

M: (2,–5)

N: (–3,–5)

Find the distance between points *M* and *N*:

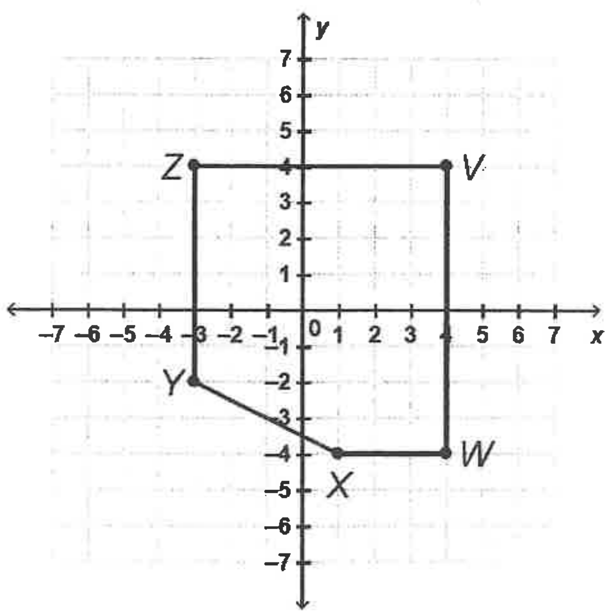
____



2. Use the grid below to complete the problem.

If a taxi drives you from the Zoo (point *Z*) to Valley High School (point *V*) and then to Wonderbowl (point *W*), how many blocks have you gone?

________ blocks



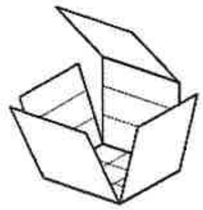
Write a number sentence using absolute value to get your answer.

Number sentence: ______________________________________

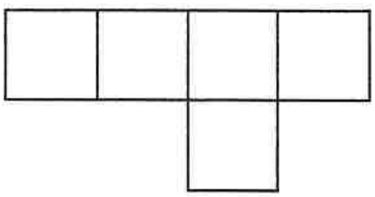
Name ____________________ Date ____________ Time ____________

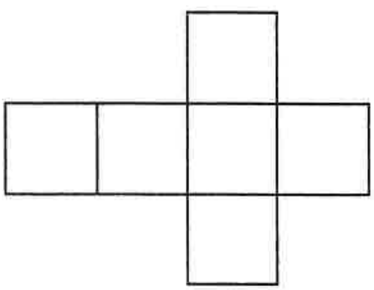
Unfolding Cubes

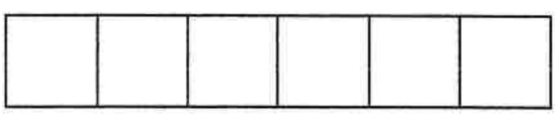
If you could unfold a prism so that its faces are laid out as a set attached at their edges, you would have a flat diagram for the shape. Imagine unfolding a cube. There are many different ways that you could make diagrams, depending on how you unfold the cube.

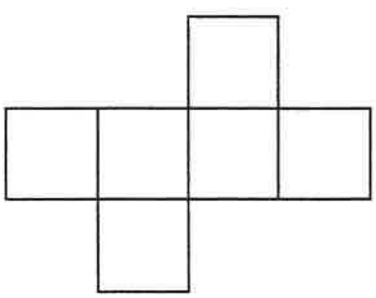


Which of the following are diagrams that could be folded to make a cube? Write *yes* or *no* in the blank next to each diagram.

1.  ____________

2.  ____________

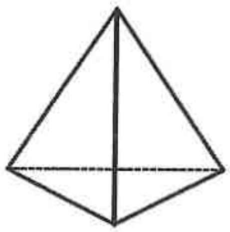
3.  ____________

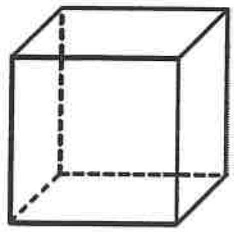
4.  ____________

Name: ______________________ Date: ______________ Time: ____________

Unfolding Cubes

1. Write the name for each solid.

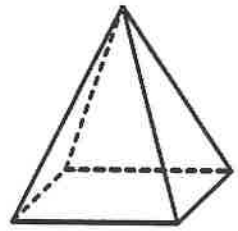


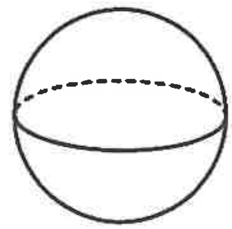


______________ ______________

______________ ______________

2. Write the name for each solid.

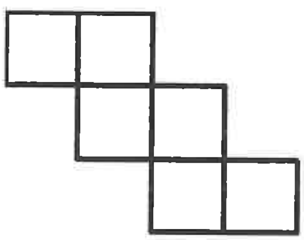




______________ ______________

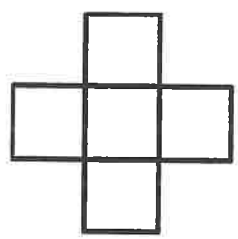
______________ ______________

3. Can this diagram be folded into a cube? Write yes or no next to the diagram.



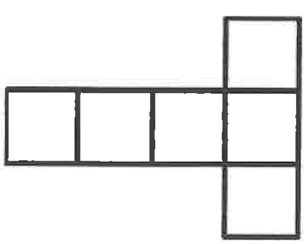
____

4. Can this diagram be folded into a cube? Write yes or no next to the diagram.



____

5. Can this diagram be folded into a cube? Write yes or no next to the diagram.



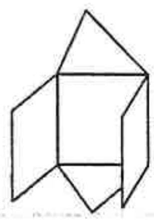
____

6. Explain your answer for Problem 5.

Name Date Time

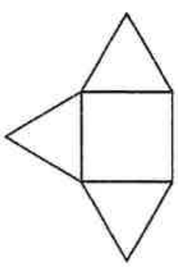
Unfolding Triangular Prisms

If you could unfold a prism so that its faces are laid out as a set attached at their edges, you would have a flat diagram for the shape. Imagine unfolding a triangular prism. There are different ways that you could make diagrams, depending on how you unfold the triangular prism.



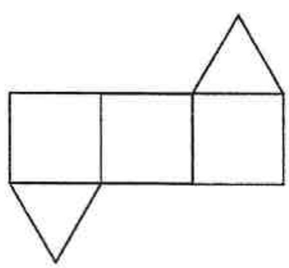
Which of the following are diagrams that could be folded to make a triangular prism? Write *yes* or *no* in the blank under each diagram.

1.



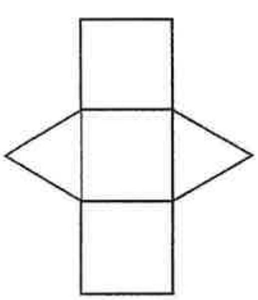
______

2.



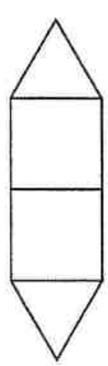
______

3.



______

4.



______

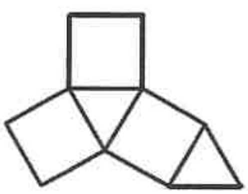
Name: ____________________ Date: ______________ Time: ____________

Unfolding Triangular Prisms

1. Draw or write the names of two things that are the shape of a cone.

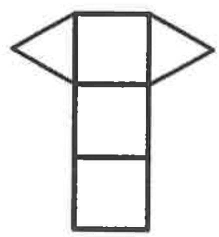
2. Draw or write the names of two things that are the shape of a sphere.

3. Can this diagram be folded into a triangular prism? Write yes or no next to the diagram.



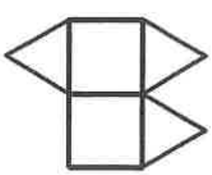
______

4. Can this diagram be folded into a triangular prism? Write yes or no next to the diagram.



______

5. Can this diagram be folded into a triangular prism? Write yes or no next to the diagram.



______

6. Explain your answer for Problem 5.

6th Grade: Statistics and Probability

Develop understanding of statistical variability.
CCSS.Math.Content.6.SP.A.1
Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.*

CCSS.Math.Content.6.SP.A.2
Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

CCSS.Math.Content.6.SP.A.3
Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

Summarize and describe distributions.
CCSS.Math.Content.6.SP.B.4
Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

CCSS.Math.Content.6.SP.B.5
Summarize numerical data sets in relation to their context, such as by:

CCSS.Math.Content.6.SP.B.5.a
Reporting the number of observations.

CCSS.Math.Content.6.SP.B.5.b
Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

CCSS.Math.Content.6.SP.B.5.c
Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

CCSS.Math.Content.6.SP.B.5.d
Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Name: ______________________ Date: ______________ Time: __________

Identifying Statistical Questions

"Statistical questions" are questions used to gather variable data, or different responses. Read each question below. Write Yes if the question is statistical. Write No if the question is not statistical.

1. **a.** How much did you pay for that toy? ______

b. What is your favorite book? ______

c. Which year is the next leap year? ______

d. How many baskets did each team member make? ______

2. **a.** What is the fastest land animal? ______

b. What day of the week is New Year's Day this year? ______

c. How much does a hot dog cost at ballparks? ______

d. What is the shoe size of your family members? ______

3. **a.** What are the different kinds of pets at the pet store? ______

b. How many days per week do you exercise? ______

c. Who won the Nobel Prize in 1973? ______

d. What were the scores on the science test? ______

Name: ______________________ Date: ______________ Time: ______________

Reasoning About Stem-and-Leaf Plots

Use the table below to complete Problem 3.

Science Test Scores									
85	65	85	85	66	43	95	85	73	90
47	82	95	79	93	85	77	96	98	50

1. Write <, >, or =.

957 ☐ 100

146 ☐ 64

162 ☐ 872

724 ☐ 1,000

2. The ages of the teachers at Northridge Middle School are represented by the following data set:

33, 35, 54, 26, 43, 50, 38, 44, 60, 33

Construct a stem-and-leaf plot to represent the age data.

Ages of Teachers

Stems (10s)	**Leaves (1s)**

3. **a.** Explain the mistakes in the stem-and-leaf plot for the science test scores.

____

____

____

b. Correct the stem-and-leaf plot to show the correct data.

Science Test Scores

Stems (10s)	**Leaves (1s)**
4	3 7
5	
6	5 6
7	3 7 9
8	2 5 5 5
9	0 3 5 5 6 8

Name: ______________________ Date: ______________ Time: ______________

Comparing the Mean and Median

1. Put these numbers in order from least to greatest.

4,030 40,003 34,000 40,030

least ______________

____

____

greatest ______________

2. Felix's English test scores are 85, 90, 67, and 90.

a. Find the median and mean score.

Median: ________ Mean: ________

b. Is the median or the mean the better representation of Felix's overall performance, or are they about the same? Explain your reasoning.

____

____

____

3. The ages of students in an art class are 17, 34, 19, 17, 15, 18, and 18.

a. Find the median and mean age.

Median: ________ Mean: ________

b. Which landmark, the mean or median, is the better representation of the ages of the students? Explain.

____

____

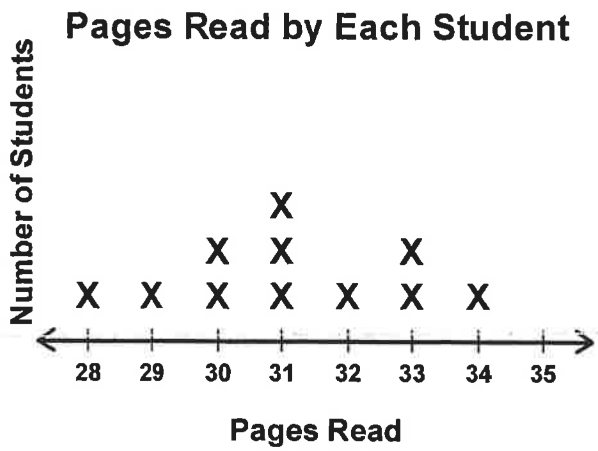
____

4. Another 19-year-old student joins the art class in Problem 3. Without doing any calculations, how will the mean change? Explain how you know.

Name: ____________ Date: ____________ Time: ____________

Interpreting Data on a Line Plot

1. Look at the line plot below.



a. What is the mode of the data?

____

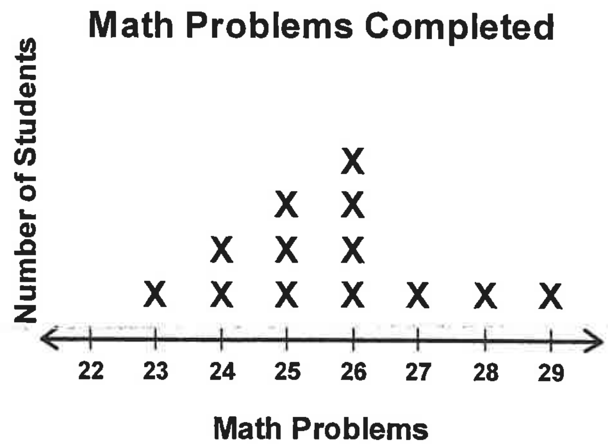
b. What was the most pages read?

____

c. What was the fewest pages read?

____

2. Look at the line plot below.

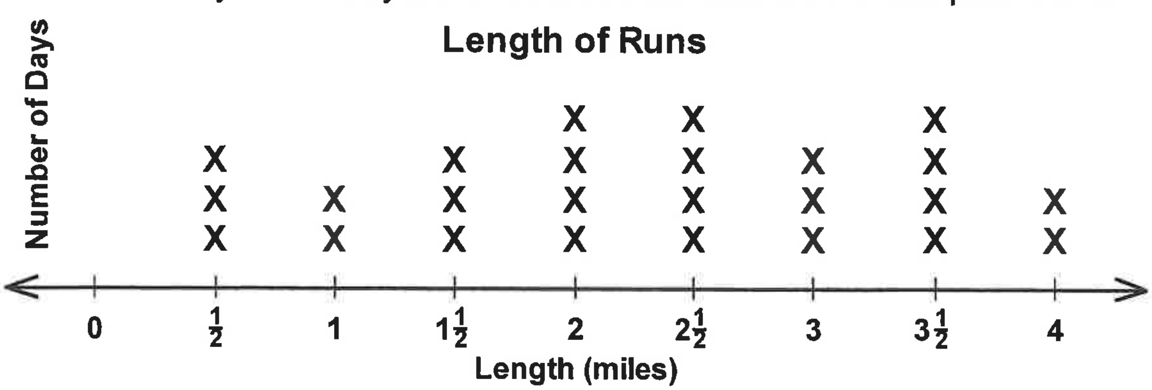


a. What is the difference between the most problems completed and the fewest problems completed?

____

b. What is the mode? ________

3. Jake ran each day for 25 days. He recorded his data on the line plot below.



a. How much longer was his longest run than his shortest run? ________ miles

b. If Jake runs another 25 days in the same pattern, how many miles do you predict he will run? ________ miles

c. How many days do you predict he will run 3 miles? ________

Name: ______________________ Date: ______________ Time: ________

Defining the Mean

1. The amount of money you earned babysitting five days last month is: \$14, \$5, \$12, \$8, \$8.

   How would the mean change if \$5 was removed from the data set? If you are not sure, compute the mean of the given data, and then compute again after deleting the \$5.

   ____

   ____

2. Look at the Stickers Earned table. Figure out the mean (average) number of stickers per student.

Stickers Earned	
Student's Name	**Number of Stickers**
Carl	5
Renee	7
Olivia	7
Pedro	6
Tommy	1
Pamela	4

   The mean number of stickers is ________.

3. Stephanie took four tests. Her scores were 84, 83, 82, and 91.

   What was her mean test score? ________

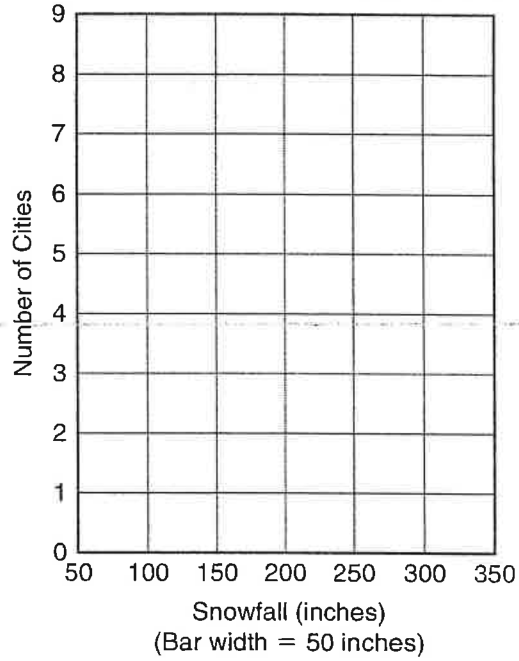
Name ______________________ Date ____________ Time ____________

Understanding Histograms

Average Annual Snowfall for the 15 Snowiest U.S. Cities

City and State	Average Snowfall (in.)
Valdez, AK	321.0
Mount Washington, NH	261.0
Blue Canyon, CA	240.3
Yakutat, AK	192.0
Marquette, MI	147.6
Syracuse, NY	118.8
Sault Ste. Marie, MI	118.4
Talkeetna, AK	115.4
Caribou, ME	113.2
Mount Shasta, CA	104.9
Flagstaff, AZ	100.1
Lander, WY	100.0
Juneau, AK	98.2
Sexton Summit, OR	97.8
Muskegon, MI	96.5

Average Annual Snowfall for the 15 Snowiest U.S. Cities



Source: www.ncdc.noaa.gov/oa/climate/online/ccd/avgsnf.txt

Use the data table and graph above to answer the questions.

1. What do the numbers on the horizontal axis represent?

____

2. What do the numbers on the vertical axis represent?

____

3. Which interval contains the greatest number of data points?

____

4. Why might it be useful to display data grouped into intervals?

____

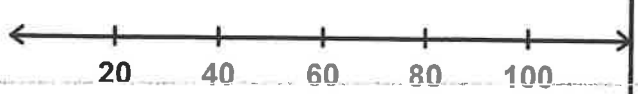
____

Name: ____________ Date: ____________ Time: ____________

Understanding Histograms

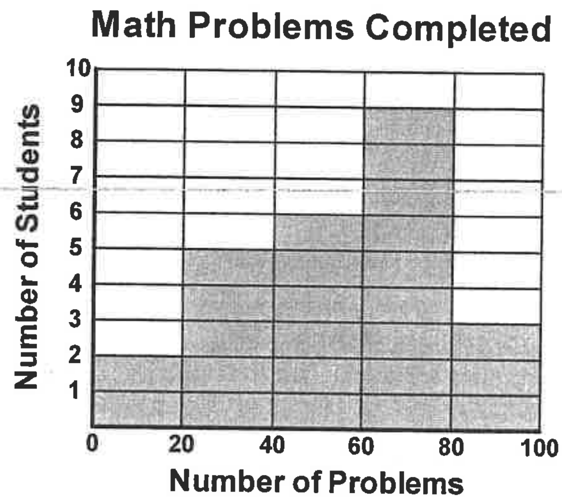
1. Plot the following numbers on the number line:

   35, 41, 70, 98



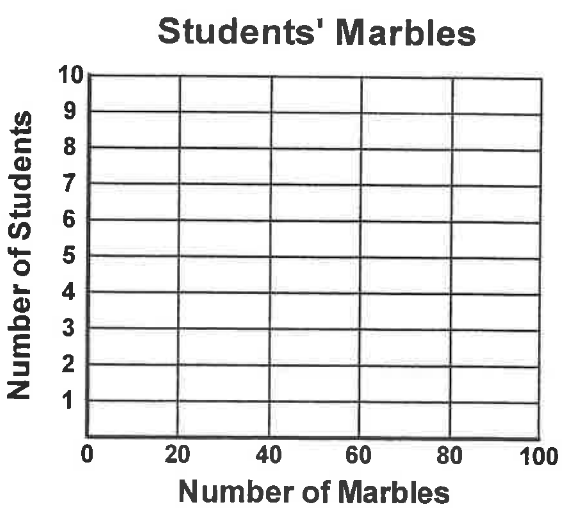
2. Add the following number of math problems completed to the histogram:

   62, 90, 33, 12



3. Construct a histogram to represent the following data:

   71, 66, 87, 25, 34, 67, 17, 3, 44, 65

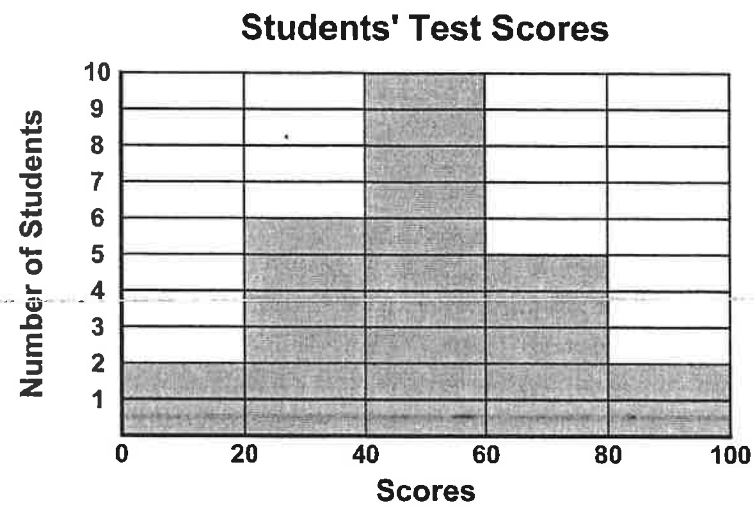


4. Which interval contains the fewest number of data points in Problem 3?

Name: ______________________ Date: ________________ Time: __________

Understanding Histograms

Use the information in the histogram to answer the questions.



1. **a.** What do the numbers on the horizontal axis represent?

____

b. What do the numbers on the vertical axis represent?

____

2. **a.** How many students earned a 60 or higher?

____

b. Which interval contains the greatest number of data points?

____

Name ______________________ Date ______________ Time ______________

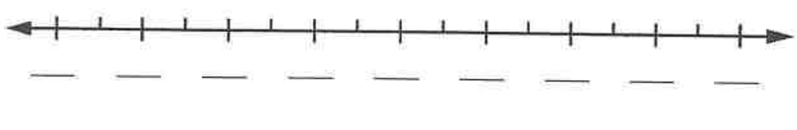
Making Dot Plots

The table at the right shows the scores of students who took an 18-question math quiz.

Score	Number of Students
10	0
11	1
12	1
13	5
14	4
15	8
16	10
17	6
18	3

1. Use the data from the table to create a dot plot on the number line. Add a title and labels.

____



2. Answer these questions about your dot plot.

a. How many students took the quiz? ______________________________

b. What does a dot represent? ______________________________

c. What was the score most frequently earned? ______________________________

d. Do you think the group did well on the quiz overall? ______________________________

____

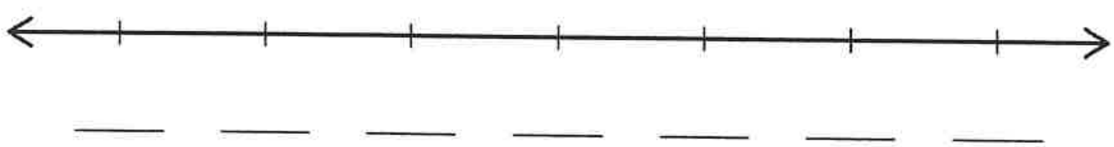
Name: ____________________ Date: ______________ Time: ________

Making Dot Plots

1. The students in Mrs. Romero's class received the following scores on a spelling quiz.
Use the scores to create a dot plot on the number line below.

Spelling Quiz Scores

90	90	95	90	85
95	95	100	95	100
75	80	70	95	80
85	75	75	80	90
90	90	85	95	90



2. **a.** How many students took the quiz? ____________________

b. What does a dot represent? ____________________

c. What was the score most frequently earned? ____________________

d. Do you think the group did well on the quiz overall? ____________________

Name ______________________ Date __________ Time __________

Finding Landmark Data

Heights of Third Graders			
Boys		**Girls**	
Boy	**Height**	**Girl**	**Height**
#1	136 cm	#1	123 cm
#2	129 cm	#2	141 cm
#3	110 cm	#3	115 cm
#4	122 cm	#4	126 cm
#5	126 cm	#5	122 cm
#6	148 cm	#6	144 cm
#7	127 cm	#7	127 cm
#8	126 cm	#8	133 cm
#9	124 cm	#9	120 cm
#10	142 cm	#10	125 cm
#11	118 cm	#11	126 cm
#12	130 cm	#12	107 cm

1. Find each of the following for each of the data sets in the table above.

Maximum: Boys 148 cm Girls __________

Minimum: Boys __________ Girls 107 cm

Range: Boys __________ Girls __________

Mode: Boys __________ Girls __________

Median: Boys __________ Girls __________

2. The average third-grade boy is slightly taller than the average third-grade girl. How can you use the data in the table to show this?

____

____

Name: ______________________ Date: ______________ Time: ________

Finding Landmark Data

1. The point totals for Team B for the last 5 games are: 12, 13, 15, 13, 20.

   Find the following landmarks:

   a. Mode: ________ **b.** Range: ________

   c. Minimum: ________ **d.** Maximum: ________

2. Here are the results of Cheng-Yu's last 9 vocabulary tests:

   87, 96, 80, 83, 90, 99, 80, 86, 82

   a. What is the range of her scores? ________

   b. What is the median of her scores? ________

   c. What is the mode of her scores? ________

3. Find the following landmarks for this set of numbers:

   796, 794, 792, 867, 793, 747, 775, 793, 767, 858

   a. Minimum: ________ **b.** Maximum: ________

   c. Mode: ________ **d.** Range: ________