Math Common Core
State Standards Review

4th Grade
into 5th Grade

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Grade 4 Common Core Overview

Operations and Algebraic Thinking

- Use the four operations with whole numbers to solve problems.
- Gain familiarity with factors and multiples.
- Generate and analyze patterns.

Number and Operations in Base Ten

- Generalize place value understanding for multi-digit whole numbers.
- Use place value understanding and properties of operations to perform multi-digit arithmetic.

Number and Operations—Fractions

- Extend understanding of fraction equivalence and ordering.
- Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
- Understand decimal notation for fractions, and compare decimal fractions.

Measurement and Data

- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
- Represent and interpret data.
- Geometric measurement: understand concepts of angle and measure angles.
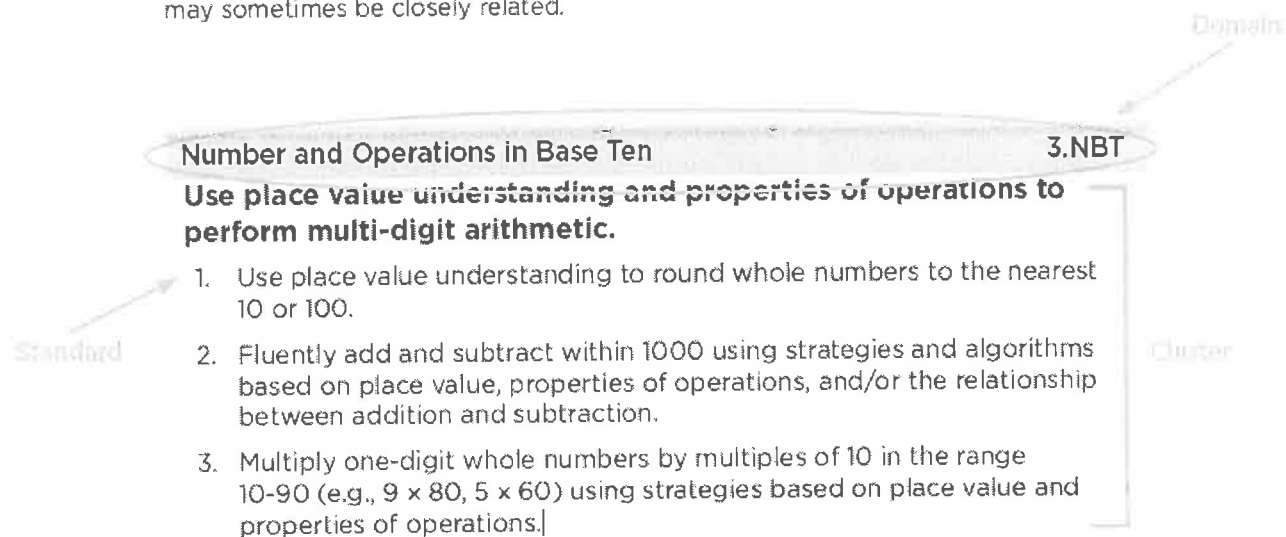
Geometry

- Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

How to read the grade level standards

Standards define what students should understand and be able to do.

Clusters are groups of related standards. Note that standards from different clusters may sometimes be closely related, because mathematics is a connected subject.

Domains are larger groups of related standards. Standards from different domains may sometimes be closely related.

Domain

| Number and Operations in Base Ten | 3.NBT |

Use place value understanding and properties of operations to perform multi-digit arithmetic.

1. Use place value understanding to round whole numbers to the nearest 10 or 100.

2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

3. Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9×80, 5×60) using strategies based on place value and properties of operations.

Standard

Cluster

Mathematical Practices

1. Make sense of problems and persevere in solving them.

2. Reason abstractly and quantitatively.

3. Construct viable arguments and critique the reasoning of others.

4. Model with mathematics.

5. Use appropriate tools strategically.

6. Attend to precision.

7. Look for and make use of structure.

8. Look for and express regularity in repeated reasoning.

Grade 4: Operations & Algebraic Thinking

Use the four operations with whole numbers to solve problems.
CCSS.Math.Content.4.OA.A.1
Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

CCSS.Math.Content.4.OA.A.2
Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.[1]

CCSS.Math.Content.4.OA.A.3
Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Gain familiarity with factors and multiples.
CCSS.Math.Content.4.OA.B.4
Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.

Generate and analyze patterns.
CCSS.Math.Content.4.OA.C.5
Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

Using Comparison to Solve Problems

Solve. Fill in the table. Then, write a number sentence and fill in each comparison statement.

1. **a.** Ryan's mother is 36 years old.
She is four times as old as Ryan.

How old is Ryan? _____

Ryan's Age	Comparison Factor	Ryan's Mother's Age

Number sentence: _____

Comparison statement: _____ is _____ times as much as _____.

b. Ryan's grandmother is 7 times as old as Ryan.

How old is Ryan's grandmother? _____

Ryan's Age	Comparison Factor	Ryan's Grandmother's Age

Number sentence: _____

Comparison statement: _____ is _____ times as much as _____.

2. Room 201 has twice as many girls as boys.
There are 11 boys in the class.

How many girls are in the class? _____

Number of Boys	Comparison Factor	Number of Girls

Number sentence: _____

Comparison statement: _____ is _____ times as much as _____.

3. The classroom library has four times as many fiction
books as nonfiction books. It has 30 nonfiction books.

How many fiction books are in the library? _____

Nonfiction Books	Comparison Factor	Fiction Books

Number sentence: _____

Comparison statement: _____ is _____ times as much as _____.

4. It took Isaac 8 minutes to walk to school.
It took Robert three times as long on the bus.

How long was Robert's bus ride? _____

Isaac's Trip	Comparison Factor	Robert's Trip

Number sentence: _____

Comparison statement: _____ is _____ times as much as _____.

Solving a Number Story with an Unknown

1. Ms. Lilly is taking a 171-mile trip. She drove 53 miles before lunch and 80 miles after lunch. How many miles are left?

   Step 1: How many miles has Ms. Lilly driven so far?

   Number model with unknown: _____

   Step 1 answer: _____ miles

   Step 2: How many miles are left?

   Number model with unknown: _____

   Answer: _____ miles   Summary number model: _____

2. Shawn buys milk for $0.45 and a peanut butter and jelly sandwich for $1.25. If he pays with a $5 bill, how much change should he get?

   Step 1: How much money did Shawn spend?

   Number model with unknown: _____

   Step 1 answer: $_____

   Step 2: How much change should he get?

   Number model with unknown: _____

   Answer: $_____   Summary number model: _____

3. Karl has 120 feet of speaker wire. He uses 12 feet to connect speakers in his living room and 35 feet for speakers in his bedroom. How many feet of wire does he have left?

   Step 1: How many feet of wire did Karl use?

   Number model with unknown: _____

   Step 1 answer: _____ feet

   Step 2: How many feet of wire does he have left?

   Number model with unknown: _____

   Answer: _____ feet   Summary number model: _____

Solving a Number Story with an Unknown

1. Write a number model with a variable for the unknown. Then solve the number story. Use a diagram or picture to help you.

   Donnie's brother has 500 minutes on his cell phone plan for the month. He used 125 minutes the first week, 175 minutes the second week, and 85 minutes the third week. How many minutes of phone usage does he have left for the month?

   Number model with unknown: _____

   Answer: _____
   (unit)

2. Fill in the diagram if needed. Solve. Show your work.

   The temperature at 2:00 P.M. was 47°F.
   The temperature at 11:00 P.M. was 21°F.
   The temperature dropped 10°F from
   8:00 P.M. to 11:00 P.M. How much did
   it drop from 2:00 P.M. to 8:00 P.M.?

Start	Change	End

   Number model with unknown: _____

   Answer: _____ °F

3. Jacquelyn spent $13.95 at a store. She bought a puzzle book for $5.50, a bag of cough drops for $2.35, and a toothbrush for $3.15. How much did a little bottle of shampoo cost?

   Number model with unknown: _____

   Answer: $_____

Factor Rainbows

When listing the factors of a number, you need to be certain that you have included all the factors in your list. Creating a factor rainbow is one way to do this. A **factor rainbow** is an organized list of factor pairs.

To the right is the factor rainbow for 36. Because 36 is a square number, one of the factors (6) is paired with itself.

36

1   2   3   4   6   6   9   12   18   36
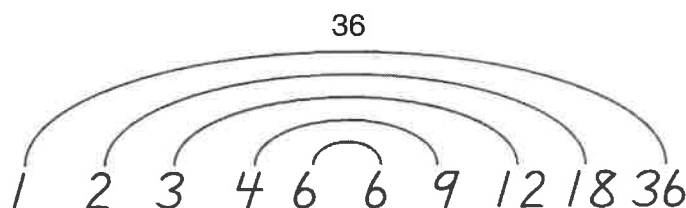
Complete a factor rainbow for each number.

1.   56

2.   48

3.   81

4.   72

Factor Rainbows

1. Use counters to solve.

   34 children.

   2 children share each computer.

   How many computers?

   _____ computers

2. Use counters to solve.

   45 campers.

   5 campers in each tent.

   How many tents?

   _____ tents

3. Make a factor rainbow for 15.

4. Make a factor rainbow for 42.

5. Make a factor rainbow for 66.

Grade 4: Number & Operations in Base Ten

Generalize place value understanding for multi-digit whole numbers.
CCSS.Math.Content.4.NBT.A.1
Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*

CCSS.Math.Content.4.NBT.A.2
Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

CCSS.Math.Content.4.NBT.A.3
Use place value understanding to round multi-digit whole numbers to any place.

Use place value understanding and properties of operations to perform multi-digit arithmetic.
CCSS.Math.Content.4.NBT.B.4
Fluently add and subtract multi-digit whole numbers using the standard algorithm.

CCSS.Math.Content.4.NBT.B.5
Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

CCSS.Math.Content.4.NBT.B.6
Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
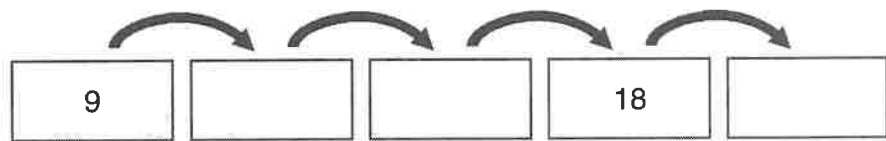
Solving Frames-and-Arrows Problems

1. On the number line below, count by 3s starting with 0. Circle every number that is part of the count.

```
←——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——+——→
    0  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17 18 19 20 21 22
```
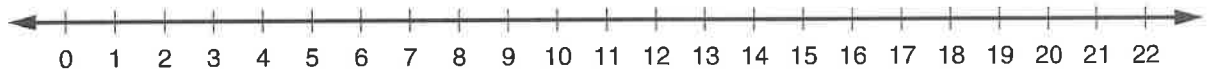
2. Use the rule to fill in the missing numbers.

Rule
+3

| 9 | | | 18 | |

3. Find the rule and fill in the missing numbers.

a.

Rule

| 100 | 150 | | | 300 |

b.

Rule

| 1,800 | | 1,850 | | 1,900 |
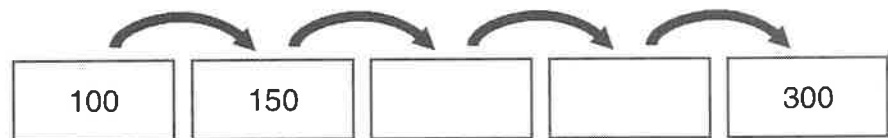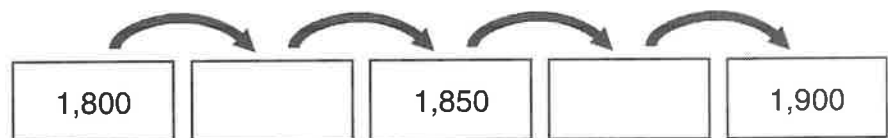
4. Explain how you figured out the rule for Problem 3b.

_____

_____

5. Find the missing numbers.

```
←————+————————+————————+————————+————————+————→
   350        ____      ____      ____       550
```
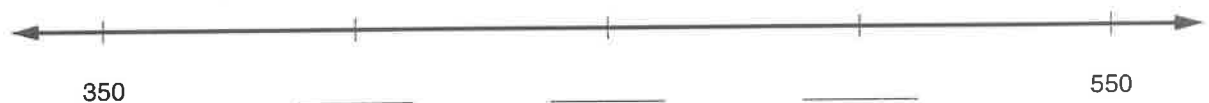
Using the > and < Symbols

Different symbols are used to show that numbers and amounts are not equal.

Example:

> means "is greater than."   < means "is less than."

Below are some ways to help you remember these symbols. Try each one.

1. 3,568 ___<___ 3,896

2. 7,206 _____ 7,216

3. 16,249 _____ 16,098

The alligator eats the bigger number.

4. 22,911 _____ 22,199

The less-than symbol looks like the fingers and thumb on your left hand. The words *left* and *less* start with the same letter. The less-than symbol points to the lesser number.

5. 13,009 _____ 13,053

6. 6,542 _____ 2,456

7. 50,800 _____ 50,801

8. 1,711 _____ 10,203

$$2 < 5 \quad 5 > 2$$

Mark two dots next to the greater number. Mark one dot next to the lesser number. Connect each of the two dots to the single dot, and the symbol will be correct.

9. 34,783 _____ 34,239

10. 98,221 _____ 9,999

11. 12,000 _____ 18,000

12. 44,731 _____ 44,781

Reviewing Place Value through 5-Digit Numbers

Ten-Thousands	Thousands	Hundreds	Tens	Ones

Complete.

1. The 9 in 4,965 stands for 9 ___*hundreds*___ or ___*900*___ .

2. The 4 in 48,215 stands for 4 _____ or _____ .

3. The 0 in 72,601 stands for 0 _____ or _____ .

4. The 7 in 87,629 stands for 7 _____ or _____ .

5. The 8 in 38,291 stands for 8 _____ or _____ .

6. The 3 in 5,413 stands for 3 _____ or _____ .

Follow the steps to write each number.

7. Write 6 in the tens place.
   Write 4 in the ten-thousands place.
   Write 9 in the ones place.
   Write 0 in the hundreds place.
   Write 1 in the thousands place.

   ___ ___ ___ ___ ___

8. Write 6 in the ones place.
   Write 4 in the thousands place.
   Write 9 in the hundreds place.
   Write 0 in the tens place.
   Write 1 in the ten-thousands place.

   ___ ___ ___ ___ ___

9. Write 6 in the hundreds place.
   Write 4 in the tens place.
   Write 9 in the ten-thousands place.
   Write 0 in the ones place.
   Write 1 in the thousands place.

   ___ ___ ___ ___ ___

10. Write 6 in the ten-thousands place.
    Write 4 in the hundreds place.
    Write 9 in the tens place.
    Write 0 in the thousands place.
    Write 1 in the ones place.

    ___ ___ ___ ___ ___

Using > and < to Compare Expressions

Different symbols are used to show that numbers and amounts are not equal.

Example:

> means "is greater than"   < means "is less than"

Below are some ways to help you remember
these symbols. Try each one.

The alligator eats the bigger number.

The less-than symbol looks like the
fingers and thumb on your left hand.
The words *left* and *less* start with the
same letter. The less-than symbol
points to the lesser number.

$$2 < 5 \quad 5 > 2$$

Mark two dots next to the greater
number. Mark one dot next to the
lesser number. Connect each of the
two dots to the single dot, and the
symbol will be correct.

1. 3,568 _____ 3,896

2. 7 + 6 _____ 9 + 8

3. 600 + 900 _____ 700 + 300

4. 7 * 6 _____ 5 * 8

5. 13,009 _____ 13,053

6. 8 + 8 _____ 6 + 9

7. 500 + 800 _____ 700 + 700

8. 5 * 10 _____ 9 * 7

9. 34,783 _____ 34,239

10. 11 − 5 _____ 12 − 8

11. 12,000 − 7,000 _____ 18,000 − 10,000

12. 36 / 9 _____ 25 / 5

13. What is your favorite way to remember the > and < symbols?
Pick one from above, or tell about your own idea.

_____

_____

Rounding Populations of Cities

1. Round each city's population to the nearest thousand.

Population for 10 U.S. Cities		
City	2009*	Rounded to the Nearest 1,000
Cedar Rapids, IA	128,182	*128,000*
Columbia, SC	129,333	
Fort Collins, CO	138,736	
Grand Rapids, MI	193,710	
Orlando, FL	235,860	
Salem, OR	155,719	
Santa Rosa, CA	157,468	
Scottsdale, AZ	238,715	
Shreveport, LA	199,242	
Syracuse, NY	138,560	

*www.city-data.com

Using the table, write the name of the cities that answer each question.

2. Which population(s) round to 140,000?

_____

3. Which population(s) round to 190,000? _____

4. Which population(s) round to 240,000? _____

5. Which population(s) round to 100,000?

_____

_____

6. Which population(s) round to 200,000?

_____

_____

Rounding Populations of Cities

1. Round to the nearest 100. **a.** 581 _____ **b.** 934 _____ **c.** 324 _____	**2.** In the number 972,864,153, the 6 is worth _____. the 1 is worth _____. the 2 is worth _____.
3. Round each number to the nearest thousand. **a.** 179,196 _____ **b.** 403,538 _____ **c.** 795,492 _____	**4.** Round each number to the nearest ten-thousand. **a.** 633,802 _____ **b.** 556,813 _____ **c.** 906,489 _____
5. Round each number to the nearest hundred-thousand. **a.** 284,776 _____ **b.** 425,701 _____ **c.** 980,648 _____	**6.** Make up and solve your own Review Box.

Add Multidigit Numbers Using the U.S. Standard Algorithm

1. Complete the diagram and write a number model.

Total	
Part	**Part**
29	6

_____

2. 40 birds. 9 fly away. How many stay?

_____ birds stay.

Fill in the diagram and write a number model.

Change

Start		End

_____

3. Use the U.S. standard algorithm to solve.

$$\begin{array}{r} 132 \\ + 601 \\ \hline \end{array}$$

4. Use the U.S. standard algorithm to solve.

$$\begin{array}{r} 437 \\ + 394 \\ \hline \end{array}$$

5. Use the U.S. standard algorithm to solve.

$$\begin{array}{r} 167 \\ + 336 \\ \hline \end{array}$$

6. Explain how you found your answer in Problem 5.

Subtract Multidigit Numbers Using the U.S. Standard Algorithm

Use the U.S. standard algorithm to solve the problem.

Example: There are 84 children on the
playground. 35 of them are boys.
How many girls are on the
playground?

_____49_____ girls

```
Tens Ones
  7   14
  8   4
- 3   5
  4   9
```

1. Write a number story for 57 − 46.
   Solve your number story.

   _____

   _____

   _____

   _____

   _____

Fill in the missing numbers in the subtraction problems.

2.
```
  □ □
  5 3
- 2 5
  2 □
```

3.
```
    □ □
  1 9 4
  -   4 6
  □ 4 8
```

Name: _____ Date: _____ Time: _____

Subtract Multidigit Numbers Using the U.S. Standard Algorithm

1. Box C weighs 13 pounds. Box D weighs 25 pounds. How much do they weigh together? _____ pounds 	Total
Part	Part		**2.** Deon exercised for 44 minutes on Tuesday and 17 minutes on Thursday. How many more minutes did he exercise on Tuesday? _____ minutes | Quantity
Quantity	 Difference
3. Use the U.S. standard algorithm to solve. $\begin{array}{r} 814 \\ -\ 101 \\ \hline \end{array}$	**4.** Use the U.S. standard algorithm to solve. $\begin{array}{r} 554 \\ -\ 387 \\ \hline \end{array}$
5. Use the U.S. standard algorithm to solve. $\begin{array}{r} 973 \\ -\ 138 \\ \hline \end{array}$	**6.** Explain how you found your answer in Problem 5.

Estimate and Find Products

Follow these steps for each problem.

a. Decide which two numbers need to be multiplied to give the exact answer. Write the two numbers.

b. Estimate the magnitude of the answer. Circle the box to show your estimate. Write a number model for the estimate.

c. Find the exact answer by multiplying the two numbers. Write the answer.

Example: The average person in the United States drinks about 16 ounces of soda per day. About how many ounces of soda is that per year?

a. $\underline{16 * 365}$ b. $\underline{20 * 400 = 8,000}$ c. $\underline{5,840}$

numbers that give the exact answer   number model for your estimate   exact answer

10s	100s	⟨1,000s⟩	10,000s	100,000s	1,000,000s

1. 149 small ostrich feathers together weigh about 1 ounce. About how many of them does it take to make 1 pound? (1 pound = 16 ounces)

a. _____ * _____   b. _____   c. _____

numbers that give the exact answer   number model for your estimate   exact answer

10s	100s	1,000s	10,000s	100,000s	1,000,000s

2. A test found that a lightbulb lasts an average of 87 days after being turned on. About how many hours is that?

a. _____ * _____   b. _____   c. _____

numbers that give the exact answer   number model for your estimate   exact answer

10s	100s	1,000s	10,000s	100,000s	1,000,000s

Name: _____ Date: _____ Time: _____

Estimate and Find Products

For each problem, write the two numbers that need to be multiplied to give the exact answer. Then write a number model for your estimate. Circle the box to show your estimate. Find the exact answer by multiplying the two numbers.

1. There are 43 gallons of water in a bath tub. How many cups of water are in the tub? (1 gallon = 16 cups)

   a. _____ * _____   b. _____   c. _____

   numbers that give   number model for your estimate   exact answer
   the exact answer

10s	100s	1,000s	10,000s	100,000s	1,000,000s

2. Paul's backyard is 59 yards wide. How wide is his backyard in inches? (1 yard = 36 inches)

   a. _____ * _____   b. _____   c. _____

   numbers that give   number model for your estimate   exact answer
   the exact answer

10s	100s	1,000s	10,000s	100,000s	1,000,000s

3. Janelle reads for 120 minutes each day. For how many minutes does she read in a year? (1 year = 365 days)

   a. _____ * _____   b. _____   c. _____

   numbers that give   number model for your estimate   exact answer
   the exact answer

10s	100s	1,000s	10,000s	100,000s	1,000,000s

Solving Number Stories

1. Divide.

   a. 12 ÷ 3 = _____   **b.** 35 / 5 = _____

   c. 80 ÷ 8 = _____   **d.** 54 / 6 = _____

2. Shawn has 70 crayons to put into boxes. 10 crayons fit into each box. How many boxes does he need?

   Number model with unknown:

   _____

   Answer: _____

   Summary number model:

   _____

3. Each vase has 9 flowers. There are 54 flowers in all. How many vases are there?

vases	flowers per vase	flowers in all

   Number model with unknown:

   _____

   Answer: _____

   Summary number model:

   _____

4. Andre has 64 batteries to put into packages. 8 batteries fit into each package. How many packages does he need?

packages	batteries per package	batteries in all

   Number model with unknown:

   _____

   Answer: _____

   Summary number model:

   _____

Find Products and Quotients with Multiples of 10, 100, and 1,000

1. Solve each problem.

   8 [50s] = _____   8 * 50 = _____

   6 [70s] = _____   6 * 70 = _____

   30 [90s] = _____   30 * 90 = _____

2. Solve each problem.

   How many 9s are in 360? _____

   _____ * 9 = 360

   360 / 9 = _____

3. Solve each problem.

   How many 4s are in 120? _____

   120 / 4 = _____

   How many 30s are in 2,400? _____

   2,400 / 30 = _____

   How many 900s are in 4,500? _____

   4,500 / 900 = _____

Grade 4: Number & Operations- Fractions

Extend understanding of fraction equivalence and ordering.
CCSS.Math.Content.4.NF.A.1
Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

CCSS.Math.Content.4.NF.A.2
Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

Build fractions from unit fractions.
CCSS.Math.Content.4.NF.B.3
Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.

CCSS.Math.Content.4.NF.B.3.a
Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

CCSS.Math.Content.4.NF.B.3.b
Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.
Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.

CCSS.Math.Content.4.NF.B.3.c
Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

CCSS.Math.Content.4.NF.B.3.d
Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

CCSS.Math.Content.4.NF.B.4
Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

CCSS.Math.Content.4.NF.B.4.a
Understand a fraction a/b as a multiple of $1/b$. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).*

CCSS.Math.Content.4.NF.B.4.b
Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)*

CCSS.Math.Content.4.NF.B.4.c
Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*

Understand decimal notation for fractions, and compare decimal fractions.
CCSS.Math.Content.4.NF.C.5
Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.[2] *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*

CCSS.Math.Content.4.NF.C.6
Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*

CCSS.Math.Content.4.NF.C.7
Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

Using Multiplication and Division to Find Equivalent Fractions

Fill in the blanks to show how the multiplication rule or the division rule is used to find equivalent fractions.

Example: $\dfrac{6 \boxed{*7}}{8 \boxed{*7}} = \dfrac{42}{56}$ $\dfrac{72 \boxed{\div 9}}{81 \boxed{\div 9}} = \dfrac{8}{9}$

1. $\dfrac{56 \boxed{}}{63 \boxed{}} = \dfrac{8}{9}$

2. $\dfrac{3 \boxed{}}{4 \boxed{}} = \dfrac{9 \boxed{}}{12 \boxed{}} = \dfrac{27 \boxed{}}{36 \boxed{}} = \dfrac{54 \boxed{}}{72 \boxed{}} = \dfrac{6 \boxed{}}{8 \boxed{}} = \dfrac{3}{4}$

Fill in the blanks to make equivalent fractions.

3. $\dfrac{2}{6} = \dfrac{\boxed{}}{18}$

4. $\dfrac{8}{56} = \dfrac{1}{\boxed{}}$

5. $\dfrac{\boxed{}}{12} = \dfrac{1}{3}$

6. $\dfrac{3}{\boxed{}} = \dfrac{9}{27}$

7. $\dfrac{9}{11} = \dfrac{\boxed{}}{22}$

8. $\dfrac{\boxed{}}{100} = \dfrac{2}{10}$

Match each fraction in the left column with an equivalent fraction in the right column. Then fill in the boxes on the left with either a multiplication or division symbol and a number showing how you changed each fraction to get the equivalent fraction.

9.

$\dfrac{1 \boxed{}}{2 \boxed{}}$ $\dfrac{25}{30}$

$\dfrac{16 \boxed{}}{24 \boxed{}}$ $\dfrac{1}{3}$

$\dfrac{5 \boxed{}}{6 \boxed{}}$ $\dfrac{6}{12}$

$\dfrac{10 \boxed{}}{30 \boxed{}}$ $\dfrac{4}{6}$

10.

$\dfrac{15 \boxed{}}{20 \boxed{}}$ $\dfrac{28}{30}$

$\dfrac{6 \boxed{}}{10 \boxed{}}$ $\dfrac{4}{5}$

$\dfrac{12 \boxed{}}{15 \boxed{}}$ $\dfrac{3}{4}$

$\dfrac{14 \boxed{}}{15 \boxed{}}$ $\dfrac{12}{20}$

Exploring Simplest Form

A fraction is in **simplest form** if no other equivalent fraction can be found by dividing the numerator and the denominator by a whole number. For example, $\frac{1}{2}$ is in simplest form.

Use the division rule to find an equivalent fraction in simplest form.

1. $\frac{6}{10} = \dfrac{6}{10} \div \dfrac{2}{2} = \dfrac{3}{5}$

2. $\frac{3}{18} = $ _____

3. $\frac{5}{20} = $ _____

4. $\frac{7}{35} = $ _____

5. $\frac{18}{30} = $ _____

6. $\frac{24}{36} = $ _____

7. $\frac{21}{49} = $ _____

8. $\frac{40}{48} = $ _____

9. $\frac{36}{81} = $ _____

10. $\frac{16}{32} = $ _____

Converting between Fractions, Decimals, and Percents

1. Rename each decimal as a fraction in simplest form.

Examples:
$0.6 = \frac{6}{10} = \frac{3}{5}$　　　　$0.32 = \frac{32}{100} = \frac{8}{25}$

a. $0.5 =$ _____

b. $0.89 =$ _____

c. $0.46 =$ _____

d. $0.65 =$ _____

e. $0.75 =$ _____

f. $0.4 =$ _____

g. $0.25 =$ _____

h. $0.36 =$ _____

2. Rename each fraction as a percent.

Examples:
$\frac{2}{5} = \frac{40}{100} = 40\%$　　　　$\frac{9}{20} = \frac{45}{100} = 45\%$

a. $\frac{2}{4} = \frac{\boxed{}}{100} =$ _____%

b. $\frac{4}{5} = \frac{\boxed{}}{100} =$ _____%

c. $\frac{5}{10} = \frac{\boxed{}}{100} =$ _____%

d. $\frac{30}{50} = \frac{\boxed{}}{100} =$ _____%

e. $\frac{12}{20} = \frac{\boxed{}}{100} =$ _____%

f. $\frac{7}{25} = \frac{\boxed{}}{100} =$ _____%

g. $\frac{3}{20} = \frac{\boxed{}}{100} =$ _____%

h. $\frac{14}{10} = \frac{\boxed{}}{100} =$ _____%

3. Rename each percent as a fraction in simplest form.

Examples:
$34\% = \frac{34}{100} = \frac{17}{50}$　　　　$40\% = \frac{40}{100} = \frac{2}{5}$

a. $25\% = \frac{\boxed{}}{100} = \frac{\boxed{}}{4}$

b. $60\% = \frac{\boxed{}}{100} = \frac{\boxed{}}{5}$

c. $70\% = \frac{\boxed{}}{100} = \frac{\boxed{}}{10}$

d. $80\% = \frac{\boxed{}}{100} = \frac{\boxed{}}{5}$

e. $75\% = \frac{\boxed{}}{100} = \frac{\boxed{}}{4}$

f. $85\% = \frac{\boxed{}}{100} = \frac{\boxed{}}{20}$

g. $140\% = \frac{\boxed{}}{100} = \frac{\boxed{}}{5}$

h. $250\% = \frac{\boxed{}}{100} = \frac{\boxed{}}{2}$

Converting Fractions and Mixed Numbers to Decimals

Write each fraction or mixed number in the first column as a decimal.
Use the second column to show the calculation you made to each
fraction or mixed number. Write the decimal in the third column.

Fraction or Mixed Number	Calculations	Equivalent Decimals
$\frac{3}{4}$	$\frac{3 * 25}{4 * 25} = \frac{75}{100}$	0.75
$7\frac{6}{20}$	$7\frac{6 \div 2}{20 \div 2} = 7\frac{3}{10}$	7.3
$\frac{4}{5}$		
$\frac{6}{50}$		
$\frac{21}{70}$		
$\frac{11}{20}$		
$1\frac{24}{40}$		
$8\frac{7}{50}$		
$5\frac{1}{2}$		
$2\frac{9}{25}$		

Using Number Sense to Compare Fractions and Mixed Numbers

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

1. $\dfrac{4}{5}$ _____ $\dfrac{2}{5}$

2. $\dfrac{3}{8}$ _____ $\dfrac{3}{10}$

3. $\dfrac{1}{2}$ _____ $\dfrac{7}{10}$

4. $\dfrac{7}{20}$ _____ $\dfrac{3}{4}$

5. $\dfrac{2}{5}$ _____ $\dfrac{4}{10}$

6. $\dfrac{4}{3}$ _____ $1\dfrac{2}{3}$

7. $5\dfrac{2}{5}$ _____ $5\dfrac{4}{5}$

8. $\dfrac{5}{2}$ _____ $2\dfrac{1}{2}$

9. $3\dfrac{1}{4}$ _____ $2\dfrac{5}{6}$

10. $7\dfrac{3}{8}$ _____ $7\dfrac{6}{8}$

11. $5\dfrac{5}{7}$ _____ $5\dfrac{3}{8}$

12. $4\dfrac{2}{8}$ _____ $4\dfrac{1}{4}$

13. Write the fractions in order from smallest to largest.

$\dfrac{2}{5}$ $\dfrac{2}{3}$ $\dfrac{5}{12}$ $\dfrac{9}{16}$ $\dfrac{3}{6}$ $\dfrac{1}{15}$ $\dfrac{19}{20}$ $\dfrac{1}{5}$

_____ _____ _____ _____ _____ _____ _____ _____

14. Write the mixed numbers in order from smallest to largest.

$3\dfrac{1}{2}$ $2\dfrac{5}{8}$ $3\dfrac{2}{3}$ $2\dfrac{1}{12}$ $2\dfrac{9}{10}$ $3\dfrac{2}{6}$

_____ _____ _____ _____ _____ _____

Estimate and Solve Subtraction Problems with Mixed Numbers

First make an estimate, and then subtract. Write your answer in simplest form.
Show your work.

Example: $3\frac{3}{4}$

$\underline{-1\frac{1}{4}}$

$2\frac{1}{2}$

Estimate: about ___3___

1. $4\frac{4}{5}$

$\underline{-2}$

Estimate: about _____

2. $7\frac{5}{6}$

$\underline{-2\frac{2}{6}}$

Estimate: about _____

3. $9 - 1\frac{1}{3} =$ _____

Estimate: about _____

4. $6 - 3\frac{3}{5} =$ _____

Estimate: about _____

5. $8\frac{1}{4} - 4\frac{3}{4} =$ _____

Estimate: about _____

6. $5\frac{5}{8} - 4\frac{7}{8} =$ _____

Estimate: _____

7. Isaac would like to practice the violin $8\frac{1}{2}$ hours this week. So far, he has practiced $6\frac{3}{4}$ hours. How many more hours does he need to practice this week?

_____ Estimate: _____

Solving Addition and Subtraction Fraction Word Problems

1. Marcus drank $\frac{2}{5}$ of a carton of juice yesterday. He drank $\frac{1}{5}$ of the carton of juice today.

   a. What fraction of the carton of juice did Marcus drink in all? ___$\frac{3}{5}$ of the carton___

   Number model: ___$\frac{2}{5} + \frac{1}{5} = \frac{3}{5}$___

   b. What fraction of the carton of juice is left? ___$\frac{2}{5}$ of the carton___

   Number model: ___$\frac{5}{5} - \frac{3}{5} = \frac{2}{5}$___

2. Sing Li biked $\frac{3}{8}$ of a mile to school. After school, she biked $\frac{2}{8}$ of a mile to her friend's house and $\frac{5}{8}$ of a mile back home.

   a. How far did she bike after school? _____

   Number model: _____

   b. How much farther did she bike after school than before school? _____

   Number model: _____

3. Deshawn, Ariel, and Adam picked pumpkins on their field trip to the pumpkin patch. Deshawn took home $\frac{3}{10}$ of the pumpkins. Ariel took home $\frac{2}{10}$ of the pumpkins. Adam took home $\frac{1}{10}$ of the pumpkins. The rest of the pumpkins were left for the teacher.

   a. What fraction of the pumpkins did the students take home? _____

   Number model: _____

   b. What fraction of the pumpkins did their teacher get? _____

   Number model: _____

4. Emilia is making a blanket. She has $\frac{5}{7}$ yard of fabric. She bought $\frac{6}{7}$ yard of fabric. She gave her grandmother $\frac{3}{7}$ yard of fabric.

   a. How many yards of fabric does Emilia have before she gives some away?

   _____

   Number model: _____

   b. How many yards of fabric does Emilia have after she gives some away?

   _____

   Number model: _____

Solving Fraction Stories about Part of a Set

Solve these number stories. Use counters or draw pictures to help you.

Example: Andy bought 24 stamps for his stamp collection. $\frac{3}{4}$ of the stamps are from the United States. How many stamps are from the United States?

_____*18*_____ stamps

1. There are 8 muffins in the box. Demetri ate $\frac{1}{4}$ of them. How many muffins did Demetri eat?

   _____ muffins

2. Alayah bought a dozen eggs at the store. When she got home, she found that $\frac{1}{3}$ of the eggs were cracked. How many eggs were cracked?

   _____ eggs

3. Mark had 16 trading cards. He gave $\frac{1}{4}$ of them to his cousin. How many trading cards does he have left?

   _____ trading cards

4. Cheryl had 6 packages of tissue paper. She used $\frac{2}{3}$ of the packages to wrap presents. How many packages of tissue paper does she have left?

   _____ packages

5. Juanita bought 15 plants for her garden. $\frac{1}{5}$ of the plants are pepper plants. $\frac{3}{5}$ of the plants are tomato plants.

   a. How many pepper plants did she buy?

   _____ pepper plants

   b. How many tomato plants did she buy?

   _____ tomato plants

   c. The rest of the plants were cucumber plants. What fraction of her garden was cucumber plants?

   _____

6. Percy, Xavier, and Mel shared 9 stickers. Percy got 3. Xavier got 2.

   a. What fraction of the stickers does Xavier have?

   _____

   b. What fraction of the stickers do Percy and Xavier have together?

   _____

   c. What fraction of the stickers does Mel have?

   _____

Finding the Unit Whole Using Fractions

Find the worth of the unit fraction to help you solve each problem below.

Example: At the pet store, there are 20 goldfish. This is $\frac{5}{8}$ of the fish in the store.

    a. The unit fraction is worth _____4_____.

    b. How many fish does the store have? ____32 fish____

1. At the tart shop, 12 peach tarts were baked. This is $\frac{2}{7}$ of the tarts that were baked.

    a. The unit fraction is worth _____.

    b. How many tarts were baked? _____

2. At the clothing store, $\frac{3}{5}$ of the shirts on the rack are blue. This is 21 of the shirts.

    a. The unit fraction is worth _____.

    b. How many shirts are on the rack? _____

3. At the sports store, 4 of the baseball gloves are for left-handed people.
   This is $\frac{1}{3}$ of the baseball gloves.

    a. The unit fraction is worth _____.

    b. How many baseball gloves are there? _____

4. At the hobby store, $\frac{3}{5}$ of the model cars are racing cars. This is 36 of the
   model cars.

    a. The unit fraction is worth _____.

    b. How many model cars are there? _____

5. At the flower shop, there are 45 daisy bouquets. This is $\frac{3}{8}$ of the bouquets.

    a. The unit fraction is worth _____.

    b. How many bouquets are in the shop? _____

Using an Area Model to Multiply a Fraction by a Whole Number

Draw an area model for each product. Then write the product as a fraction or as a mixed number.

Example: $2 * \frac{2}{3} =$ ____$\frac{4}{3},$ or $1\frac{1}{3}$____
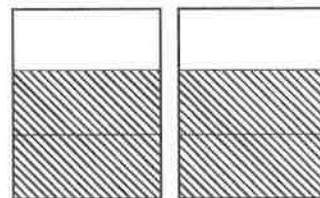
1. $3 * \frac{1}{3} =$ _____
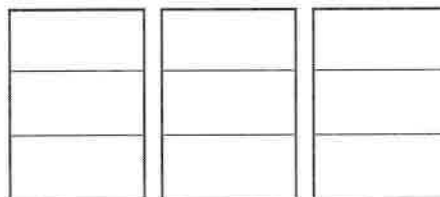
2. $2 * \frac{1}{4} =$ _____
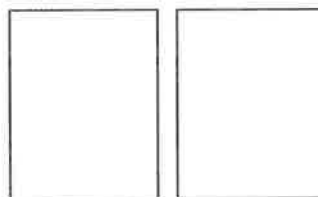
3. $4 * \frac{3}{5} =$ _____
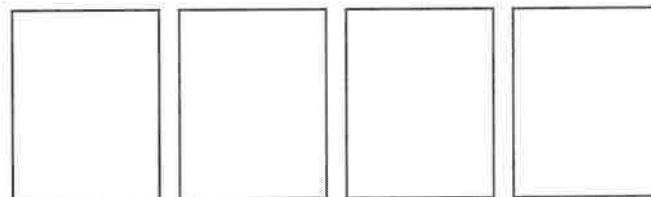
4. $2 * \frac{3}{8} =$ _____
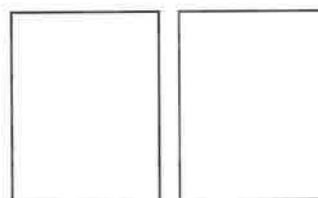
Using the 100-Grid to Model Adding Tenths and Hundredths

1. Rewrite the fraction pair using a common denominator. $\frac{6}{1}$ and $\frac{8}{7}$ _____ and _____	**2.** Rewrite the fraction pair using a common denominator. $\frac{5}{9}$ and $\frac{4}{15}$ _____ and _____
3. Shade the grid to help find the sum. $\frac{8}{10} + \frac{7}{100} =$ _____	**4.** Shade the grid to help find the sum. $\frac{2}{10} + \frac{51}{100} =$ _____
5. Shade the grid to help find the sum. $\frac{4}{10} + \frac{3}{100} =$ _____	**6.** Explain how you found the answer in Problem 5.
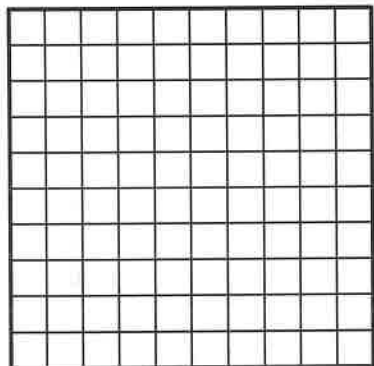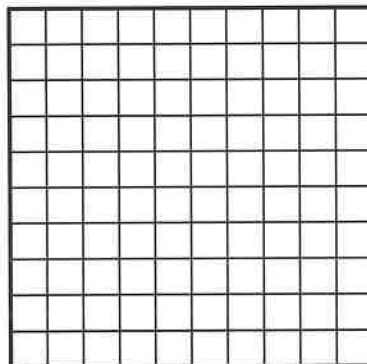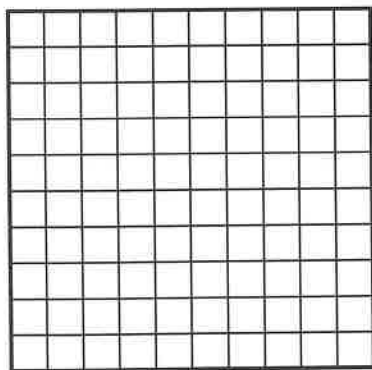
Converting between Decimals and Percents

Fill in the blanks.

1. $0.36 = \dfrac{0.36 * 100}{100} = \dfrac{\boxed{36}}{100} = \underline{36}$ %

2. $0.7 = \dfrac{0.7 * 100}{100} = \dfrac{\boxed{}}{100} = \underline{}$ %

3. $0.09 = \dfrac{0.09 * 100}{100} = \dfrac{\boxed{}}{100} = \underline{}$ %

4. $4.602 = \dfrac{4.602 * 100}{100} = \dfrac{\boxed{}}{100} = \underline{}$ %

Rename each decimal as a percent.

5. $0.53 =$ _____   **6.** $0.06 =$ _____

7. $2.7 =$ _____   **8.** $8.61 =$ _____

Rename each percent as a decimal.

9. $42\% =$ _____   **10.** $2\% =$ _____

11. $316\% =$ _____   **12.** $1,410\% =$ _____

Easy Fraction, Decimal, and Percent Equivalencies

Fill in the numbers to represent each fraction. The denominators for finding equivalent fractions have been given to you. Shade the grid to show the fraction.

Whole

large square

1. Ways of showing $\frac{75}{100}$:
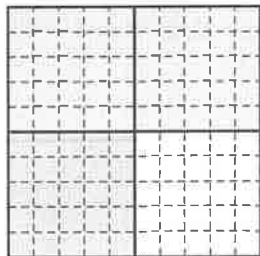
$$\frac{3}{4} = \frac{75}{100}$$

$$0.\underline{75} = \underline{75}\%$$

2. Ways of showing $\frac{40}{100}$:
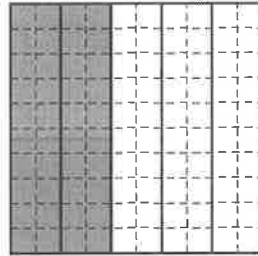
$$\frac{2}{5} = \frac{40}{100}$$

$$0.\underline{40} = \underline{40}\%$$

3. Ways of showing $\frac{24}{60}$:
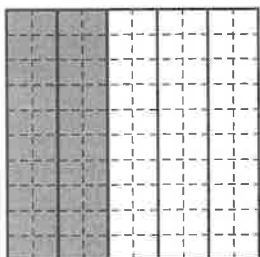
$$\frac{2}{5} = \frac{40}{100}$$

$$0.\underline{40} = \underline{40}\%$$

4. Ways of showing $\frac{30}{50}$:
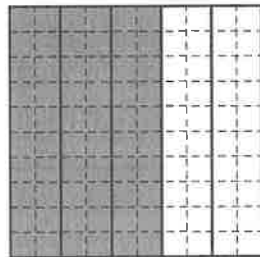
$$\frac{3}{5} = \frac{60}{100}$$

$$0.\underline{60} = \underline{60}\%$$

5. Ways of showing $\frac{16}{80}$:
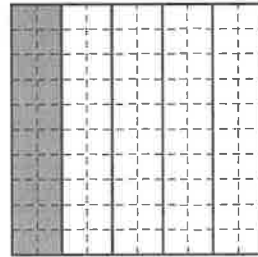
$$\frac{1}{5} = \frac{20}{100}$$

$$0.\underline{20} = \underline{20}\%$$

6. Ways of showing $\frac{7}{10}$:
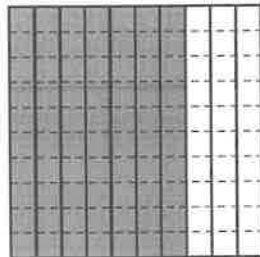
$$\frac{7}{10} = \frac{70}{100}$$

$$0.\underline{70} = \underline{70}\%$$

7. Ways of showing $\frac{24}{80}$:
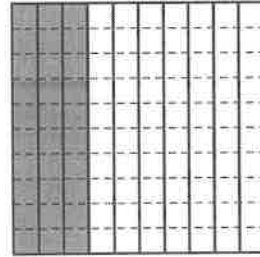
$$\frac{3}{10} = \frac{30}{100}$$

$$0.\underline{30} = \underline{30}\%$$

8. Ways of showing $\frac{48}{60}$:
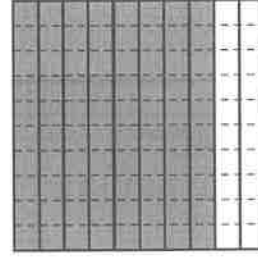
$$\frac{8}{10} = \frac{80}{100}$$

$$0.\underline{80} = \underline{80}\%$$

Ordering and Comparing Decimals

1. Write < or >. You may use your base-10 blocks to help you.

a. 1.24 __>__ 1.18   b. 0.09 _____ 0.3   c. 0.4 _____ 0.65

d. 1.15 _____ 0.45   e. 3.7 _____ 5.82   f. 2.59 _____ 2.57

2. Put these numbers in order from smallest to largest. You may use your base-10 blocks to help you.

a. 0.02, 0.2, 0.22, 2.2   _____ _____ _____ _____
                            smallest   largest

b. 0.89, 0.29, 1.7, 2.03   _____ _____ _____ _____
                            smallest   largest

c. 3.4, 3.04, 0.34, 0.43   _____ _____ _____ _____
                            smallest   largest

d. 0.05, 0.50, 0.55, 0.08 _____ _____ _____ _____
                            smallest   largest

Grade 4: Measurement & Data

Solve problems involving measurement and conversion of measurements.
CCSS.Math.Content.4.MD.A.1
Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

CCSS.Math.Content.4.MD.A.2
Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

CCSS.Math.Content.4.MD.A.3
Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

Represent and interpret data.
CCSS.Math.Content.4.MD.B.4
Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*

Geometric measurement: understand concepts of angle and measure angles.
CCSS.Math.Content.4.MD.C.5
Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

CCSS.Math.Content.4.MD.C.5.a
An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.

CCSS.Math.Content.4.MD.C.5.b
An angle that turns through n one-degree angles is said to have an angle measure of n degrees.

CCSS.Math.Content.4.MD.C.6
Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

CCSS.Math.Content.4.MD.C.7
Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

How Many Hours and Minutes?

Solve each problem. Use your clock to help you.

The marching band performance lasted 90 minutes.

Example: How many whole hours are in 90 minutes?

___*1*___ hour(s)

How many minutes are left over?

___*30*___ minute(s)

1. The bus trip to the performance took 35 minutes. The return trip took another 35 minutes. How many minutes were spent on the bus in all?

   _____ minutes

   How many whole hours?

   _____ hour(s)

   How many minutes are left over?

   _____ minute(s)

2. How many minutes in all did the marching band perform and ride on the bus?

   _____ minutes

   How many whole hours?

   _____ hour(s)

   How many minutes are left over?

   _____ minute(s)

3. Describe how you figured out the answer to Problem 2.

   _____

   _____

   _____

   _____

   _____

Equivalent Units of Capacity

1. Complete.

   a. _____ cups = $\frac{1}{2}$ pint

   b. 1 pint = _____ cups

2. **a.** How many quarts are in 1 gallon?

   _____ quarts

   b. How many cups are in 1 quart?

   _____ cups

3. **a.** How many pints are in 1 quart?

   _____ pints

   b. How many cups are in 1 gallon?

   _____ cups

4. Complete.

   a. _____ pints = 1 half-gallon

   b. 1 gallon = _____ pints

5. Draw a picture to show how many cups are in a half-gallon.

Name _____ Date _____ Time _____

Converting among Metric Units of Length

Symbols for Metric Units of Length
kilometer (km)
meter (m)
decimeter (dm)
centimeter (cm)
millimeter (mm)

1 km = 1,000 m
1 m = 0.001 km

1 decimeter

0 ———————————————————— 1 dm

1 m = 10 dm   1 dm = 0.1 m

10 centimeters

0 1 2 3 4 5 6 7 8 9 10 cm

1 m = 100 cm   1 cm = 0.01 m
1 dm = 10 cm   1 cm = 0.1 dm

100 millimeters

0 10 20 30 40 50 60 70 80 90 100 mm
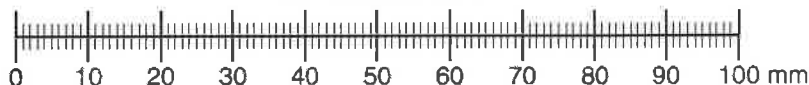
1 m = 1,000 mm   1 mm = 0.001 m
1 dm = 100 mm   1 mm = 0.01 dm
1 cm = 10 mm   1 mm = 0.1 cm

Use your tape measure or ruler to help you fill in the answers below.

1. a. 2 m = _____ mm   **b.** 4 km = _____ m   **c.** 3 m = _____ cm

2. a. 2 m = _____ dm   **b.** 4 dm = _____ mm   **c.** 5 dm = _____ cm

3. a. 6.2 cm = _____ mm   **b.** 2.5 m = _____ cm   **c.** 1.3 km = _____ m

4. a. _____ mm = 2.4 cm   **b.** _____ dm = 2.3 m   **c.** _____ cm = 0.3 dm

5. a. _____ mm = 6.6 cm   **b.** _____ cm = 0.08 m   **c.** _____ m = 0.006 km

6. a. 1.35 cm = _____ mm   **b.** _____ cm = 0.47 dm   **c.** _____ cm = 0.003 m

Name _____ Date _____ Time _____

Add or Subtract Decimals Using a Savings Account

Complete the table. Remember to add for a deposit or interest and to subtract for a withdrawal.

Date	Transaction		Current Balance
January 2	Deposit	$100.00	$ *100.00*
January 14	Deposit	$14.23	+ $ *14.23* $ *114.23*
February 9	Withdrawal	$16.50	$ _____ $ _____
February 11	Deposit	$33.75	$ _____ $ _____
February 25	Withdrawal	$16.50	$ _____ $ _____
March 10	Deposit	$62.00	$ _____ $ _____
March 30	Withdrawal	$104.26	$ _____ $ _____
March 31	Interest	$0.78	$ _____ $ _____
April 1	Deposit	$70.60	$ _____ $ _____
April 22	Withdrawal	$45.52	$ _____ $ _____
April 28	Withdrawal	$39.51	$ _____ $ _____

How much money is in the account after the withdrawal on April 28?

_____

Name _____ Date _____ Time _____

Using a Formula to Find Area of a Rectangle

Fill in the table at the bottom of the page.
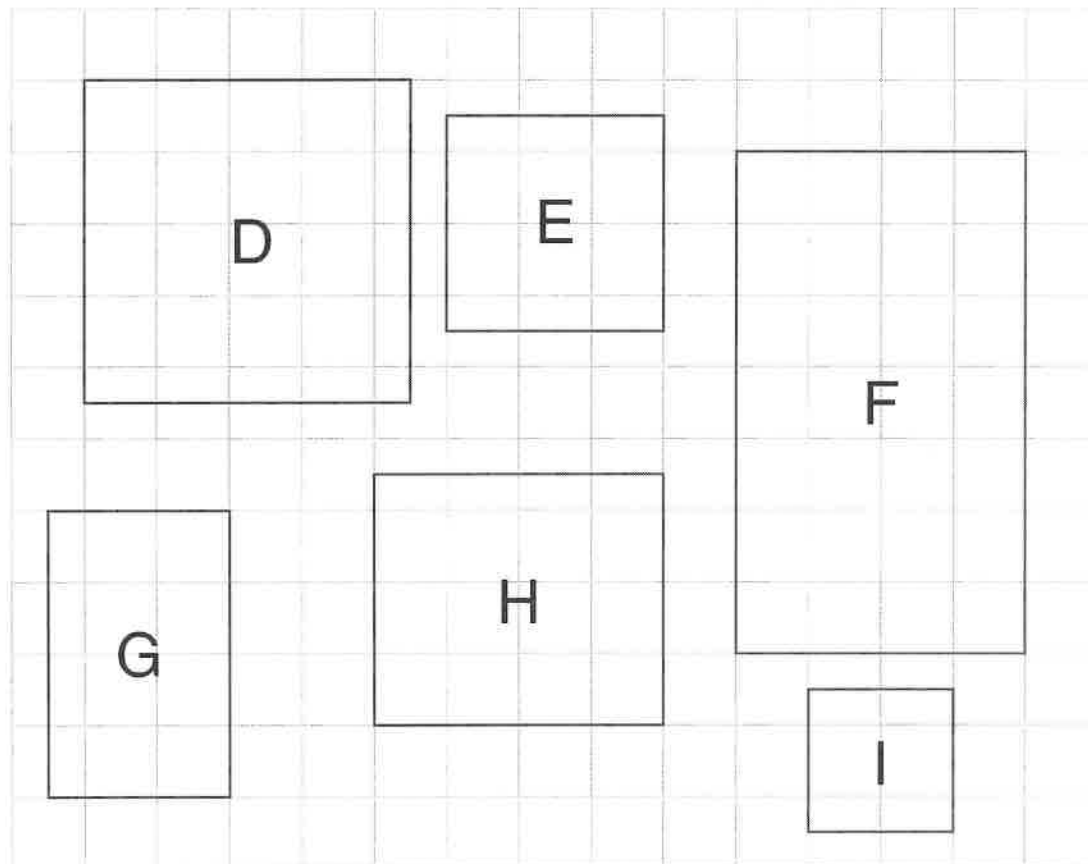
Rectangle	Length (of base)	Width (or height)	Area (using formula)
D	4.5 cm	4.5 cm	20.25 cm²
E	_____ cm	_____ cm	_____ cm²
F	_____ cm	_____ cm	_____ cm²
G	_____ cm	_____ cm	_____ cm²
H	_____ cm	_____ cm	_____ cm²
I	_____ cm	_____ cm	_____ cm²

S1

Solving Area Problems

Area of rectangle = length * width

Tennis can be played either by 2 people or by 4 people. When 2 people play, it is called a game of singles. When 4 people play, it is called a game of doubles.

Here is a diagram of a tennis court. The net divides the court in half.

```
                         Net
        ┌──────────────────┬──────────────────┐  ▲
        │       Alley      │                  │  │
        ├──────┬───────────┼──────────┬───────┤  │
        │      │           │          │       │  │
        │ Back │           │          │ Back  │  │
        │ Court│           │          │ Court │  │
        │      │  Service  │ Service  │       │  11 m
        │      │           │          │       │  │
        │      │  Courts   │ Courts   │       │  │
        │      │           │          │       │  │
        │ 5.5 m│    6 m    │          │       │  │
        ├──────┴───────────┼──────────┴───────┤  │
   1.4 m│       Alley      │                  │  ▼
        └──────────────────┴──────────────────┘
        |◄──────────── length = ? ────────────►|
```
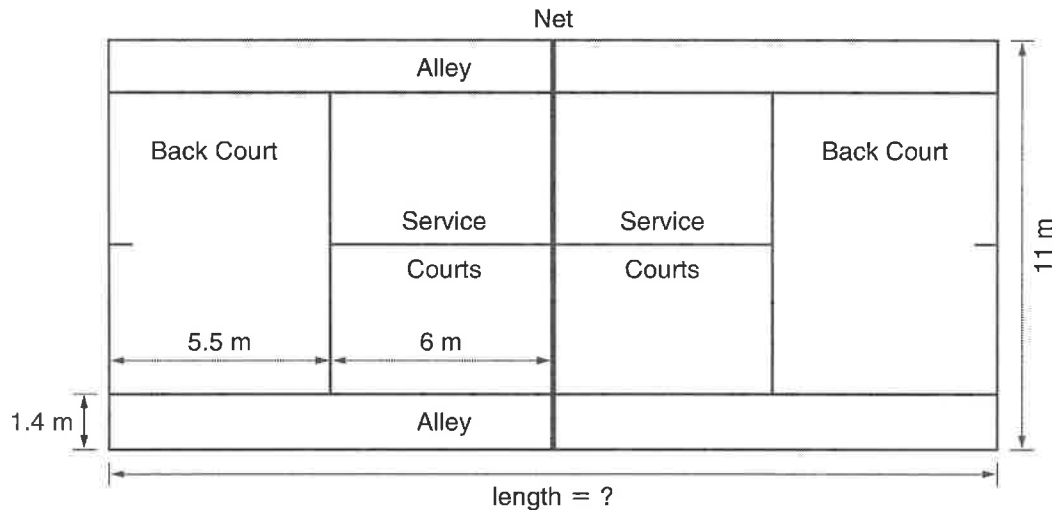
The two *alleys* are used only in doubles. They are never used in singles.

1. What is the total length of a tennis court? _____

2. The court used in a game of doubles is about 11 meters wide. Each alley is about 1.4 meters wide. What is the width of the court used in a game of singles? _____

3. What is the **area** of a singles court? _____

4. What is the **area** of a doubles court? _____

5. Do you think a player needs to cover more court in a game of singles or in a game of doubles? Explain.

_____

_____

_____

_____

Interpreting Data on a Line Plot

1. Look at the line plot below.

Pages Read by Each Student

Number of Students

```
                      X
            X   X           X
    X   X   X   X   X   X   X
  <-+---+---+---+---+---+---+---+->
   28  29  30  31  32  33  34  35
```
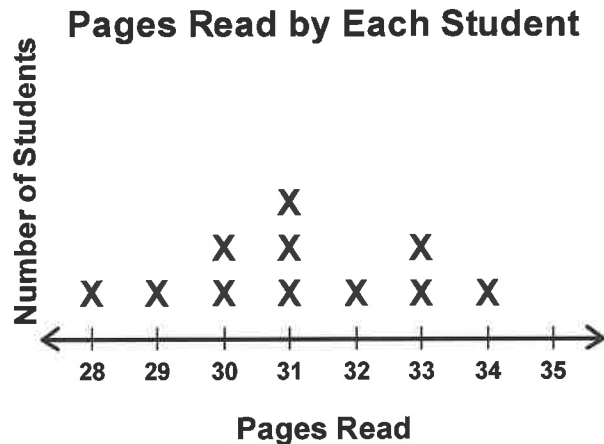
Pages Read

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.

Math Problems Completed

Number of Students

```
                          X
                      X   X
                  X   X   X
      X   X   X   X   X   X   X
  <-+---+---+---+---+---+---+---+->
   22  23  24  25  26  27  28  29
```

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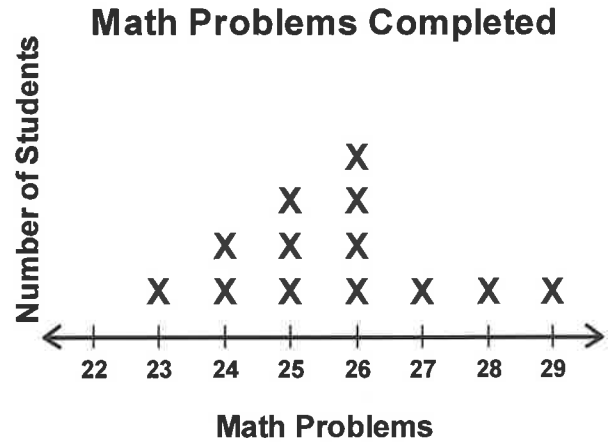
a. What is the difference between the most problems completed and the fewest problems completed?

_____

b. What is the mode? _____

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

Length of Runs

Number of Days

```
                          X       X               X
            X           X X       X       X       X
            X       X   X X       X       X       X       X
            X       X   X X       X       X       X       X
  <-----+-------+-------+-------+-------+-------+-------+-------+-------+----->
        0      1/2      1      1 1/2     2     2 1/2     3     3 1/2     4
```

Length (miles)
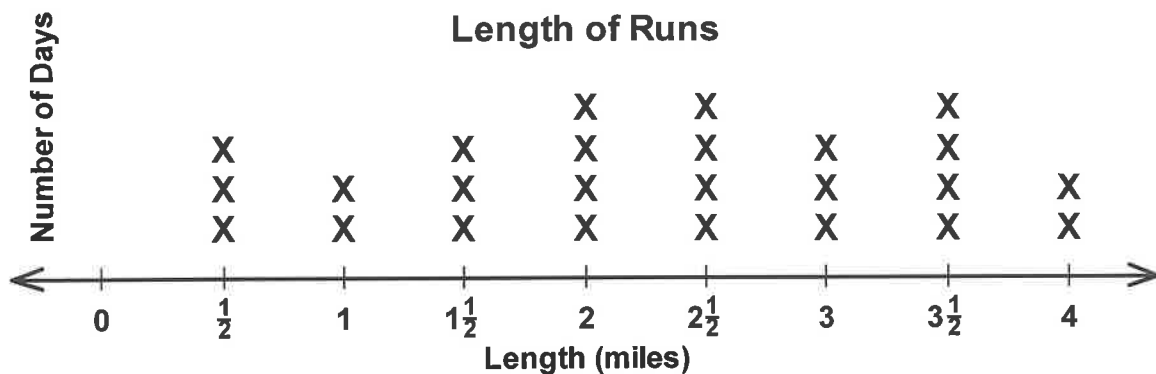
a. How much longer was his longest run than his shortest run? _____ miles

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? _____

Estimating Angle Measures Without Tools

Use a straightedge to draw the following angles. Add an arc with an arrowhead to show the rotation. Do **not** use a protractor.

Example:

∠A: any angle that measures more than 45° and less than 90°
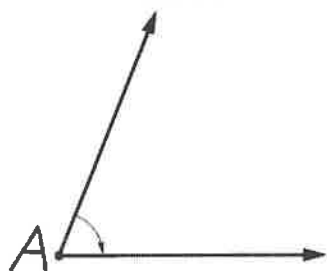
1. ∠B: any angle that measures more than 120° and less than 180°

2. ∠C: any angle that measures more than 225° and less than 270°

∠A is called an **acute angle.**   ∠B is called an **obtuse angle.**   ∠C is called a **reflex angle.**

Write whether the angle is *acute*, *obtuse*, or reflex.
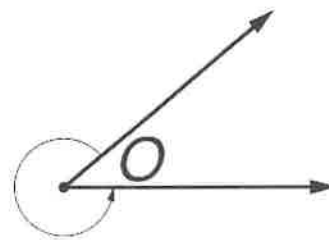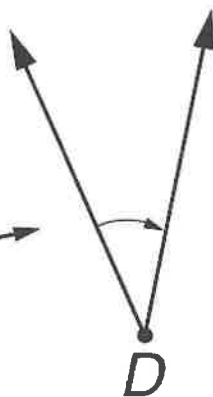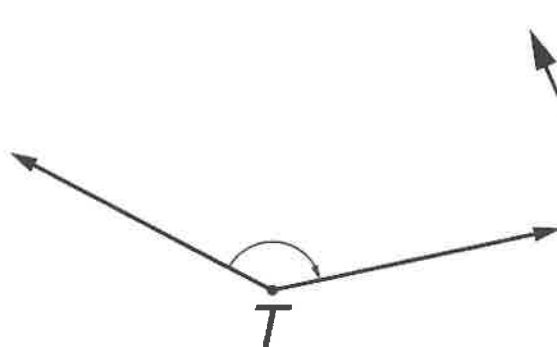
3. ∠T is _____.

4. ∠D is _____.

5. ∠O is _____.

Circle one. Do **not** use a protractor.

6. Angle T measures   0° to 60°   60° to 120°   120° to 180°   180° to 240°

7. Angle D measures   0° to 45°   45° to 90°   90° to 135°   135° to 180°

8. Angle O measures   0° to 45°   45° to 90°   240° to 300°   300° to 360°

Estimating Angle Measures Without Tools

1. Use a straightedge to draw the following angles. Do **not** use a protractor.

A: any angle that measures less than 35°

B: any angle that measures more than 260°

∠A is a/n _____
(acute, obtuse, reflex) angle.

∠B is a/n _____
(acute, obtuse, reflex) angle.

2. Write whether the angle is *acute, obtuse,* or *reflex.* Do **not** use a protractor.
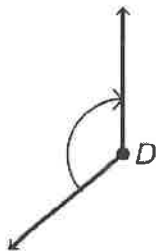
∠D is _____

Circle one.
Angle D measures:

120° to 150°.

150° to 180°.

180° to 210°.

210° to 240°.
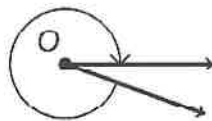
∠O is _____

Circle one.
Angle O measures:

0° to 30°.

30° to 60°.
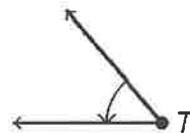
300° to 330°.

330° to 360°.

∠T is _____

Circle one.
Angle T measures:

0° to 30°.

30° to 60°.

300° to 330°.

330° to 360°.

Grade 4: Geometry

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
CCSS.Math.Content.4.G.A.1
Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

CCSS.Math.Content.4.G.A.2
Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

CCSS.Math.Content.4.G.A.3
Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Parallel and Intersecting Line Segments and Lines

Use a straightedge.

A •   •   •   B

1. Draw line segments *AB* and *CD*.
   Are line segments *AB* and *CD* parallel?

   •   •   •   •   •

   _____

   C •   •   •   D

2. Draw line segment *EF*.
   Are line segments *AB* and *EF* parallel?

   •   •   E   •   F

   _____

Use a straightedge and a sharp pencil to draw the following. Be sure to mark points and label the line segments and lines.

3. Draw line segment, $\overline{YZ}$, that is parallel to $\overline{AB}$.

   •————————————•
   A   B

4. Draw a line segment, $\overline{CD}$, that intersects $\overleftrightarrow{EF}$.

   ◄——•———•———————►
      E   F

5. Draw two intersecting lines $\overleftrightarrow{MY}$ and $\overrightarrow{AN}$.

6. Draw and label three parallel line segments. Draw and label a line that intersects all three line segments.

Identifying Parallel and Intersecting Line Segments in Quadrangles

Quadrangles (Quadrilaterals)

These polygons are quadrangles (quadrilaterals).

Identify pairs of parallel line segments in each of the quadrangles below.

If the quadrangle has no pairs of parallel line segments, write *none*.

Example:

A ___ B
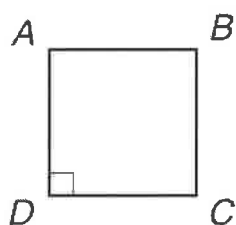
Parallel segments:

$\overline{AD}$ and $\overline{BC}$; $\overline{AB}$ and $\overline{DC}$

D ___ C

square

1.

E, F, H, G
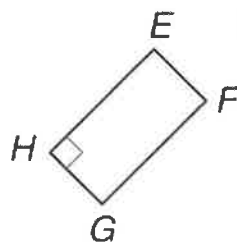
rectangle

Parallel segments:

_____

_____

2.

I, J, L, K
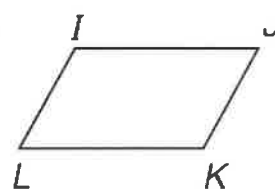
parallelogram

Parallel segments:

_____

_____

3.

M, R, N, P
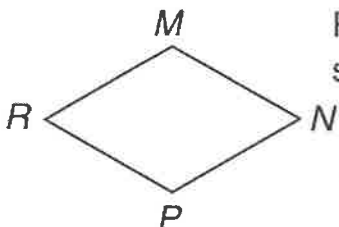
rhombus

Parallel segments:

_____

_____

4.

S, T, U, W
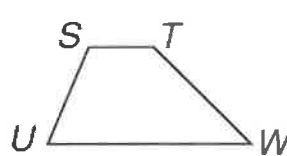
trapezoid

Parallel segments:

_____

_____

5.

X, V, Y, Z
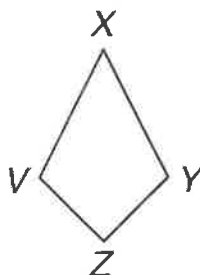
kite

Parallel segments:

_____

_____

6. Name one pair of intersecting line segments in the figure in Problem 5.

_____

_____

Multiple Lines of Symmetry

Use a transparent mirror to help you draw lines of symmetry for the following figures. Each figure has more than one line of symmetry.
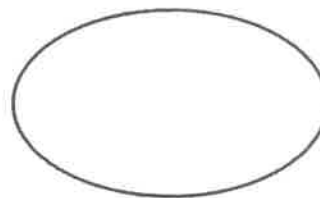
Example:

1.

2.

3.

4.

5.
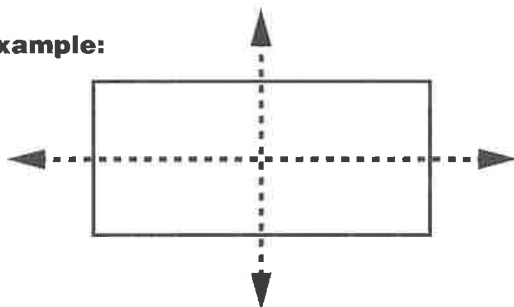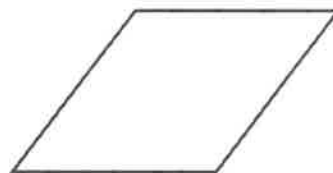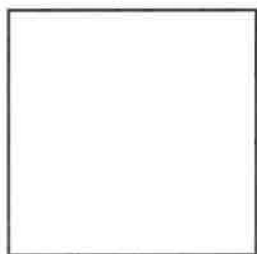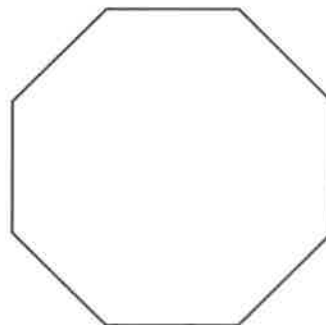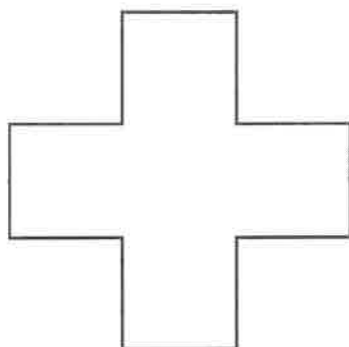
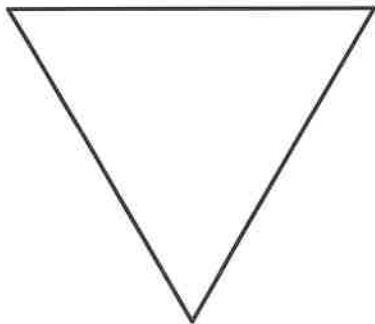# Multiple Lines of Symmetry
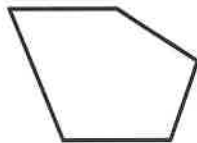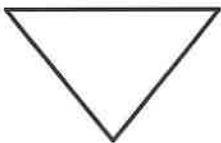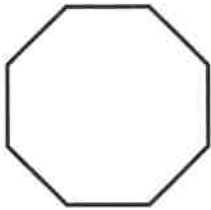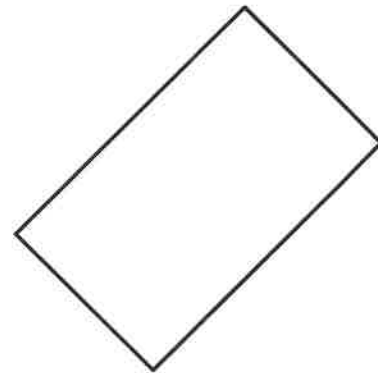
1. Circle the shapes that have line symmetry.	2. Draw the line(s) of symmetry.
3. Draw the line(s) of symmetry.	4. Draw a shape with 2 lines of symmetry. Then draw the 2 lines of symmetry.