

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

- Give each student a piece of ribbon. Have students measure their ribbons to the nearest quarter-inch. Have each student go to the board and write an X above the appropriate length.

Ask students to describe the data shown on the line plot. Ask: *How long is the longest ribbon? What length of ribbon is shown most often?*

Mums	1
Daisies	1
Lilies	1

Try again. This time, after you display the data, tell how many people there are for the survey.

2	
3	
4	
5	
6	

Make a tally chart to show the number of 2x, 3x, 4x, 5x and 6x in a different sentence.

Levelled Homework

Retelling Master

Name _____ Reaching 15-1

Making Line Plots

Dorothy measured the lengths of the fingers on her left hand. She also measured the height of her brother's line plot to Dorothy's neck to create the line plot below. Dorothy wants to create the line plot to compare the data of her finger and thumb measurements.



- What numbers should Dorothy use as the scale of the line plot?
2, 2.1, 2.1, 2.2
- How many Xs of data points should Dorothy have on the line plot?
5 Xs

- Complete this line plot to show Dorothy's data.
The lengths of Dorothy's fingers in inches

2 inches
- How long is Dorothy's shortest finger?
2 inches
- Use Tools. Which length is used more than once?
2 inches
- How long is her longest finger?
2.3 inches

Also available in print

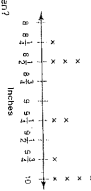
Practice Master

Name _____ Practice 15-1

Making Line Plots

Mylin measured the lengths of the books in the top shelf of her bookcase. She made a line plot to show the data.

- How many books are on the top shelf?
11 books
- What length of book is shown most often?
10 inches



- Write a line plot that displays the lengths of the books on the bottom shelf. Lengths of the books on bottom shelf in inches
 $9\frac{1}{2}$ in., $10\frac{1}{2}$ in., $9\frac{1}{2}$ in., $10\frac{1}{2}$ in., 11 in., $10\frac{1}{2}$ in., $9\frac{1}{2}$ in.
- Use Tools. Which shelf has the most books? Which shelf has the most same-sized books?
The top shelf has the most same-sized books.
- Writing to Explain Does Mylin keep the 2 longest books on the top or the bottom shelf? The 2 longest books are on the bottom shelf because $10\frac{1}{2}$ and 11 are on the line plot for the bottom shelf.

Also available in print

Enrichment 15-1

What Does the Survey Say?

The tally chart on the right shows the results of a class vote for favorite school day. Use the tally chart to find your way through the maze.

Day	Votes
Monday	HLI
Tuesday	HLI, II
Wednesday	HLI, III
Thursday	III
Friday	HLI, HLI, II

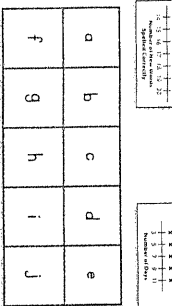
- one more than the votes for Monday.
- two less than the votes for Friday.
- twice the number of votes as Tuesday.
- the votes for Monday and Tuesday combined.
- three less than the votes for Wednesday.
- the votes for Wednesday and Thursday combined.
- three times the number of votes for Monday.

Monday	3	13	17	5
Tuesday	7	12	6	2
Wednesday	6	10	14	13
Thursday	1	1	1	1
Friday	7	1	1	1

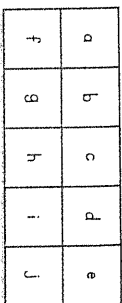
Also available in print

for the data.

* Ask each pair to use the line plot to find the most common number, greatest number, the least number, and the difference between the greatest and least numbers.



Make up other questions about the data in one of the line plots. Ask your partner to enjoy the answers with 0-9 tiles.



Make up other questions about one of your line plots. Ask your partner to display the answers with 0-9 tiles.

Report Back To check understanding, ask a child to repeat and complete this sentence: *You can organize data by placing a above a number line to make a [line plot]*

Repeating Master

Solving Problems Involving Line Plots

Repeating 15-2

Eight people in a class measured the length of their steps and got the following measurements: 1.6 feet, 1.8 feet, 1.9 feet, 1.7 feet, 1.9 feet, 1.8 feet, 1.8 feet, and 1.7 feet.



What is the most common step length?

What is the difference between the greatest step length and the least step length?

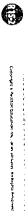
You can draw a line plot to find out.

The most common step length is 1.8 feet. The difference between the greatest step length and least step length is 0.3 feet.

For 1-3, use the data set below which lists the number of books each student in Mr. Kent's class read.

2, 2½, 3½, 4, 3½, 2, 3½, 4, 3½, 4, 3½

- Make a line plot of the data.
- What is the most common number of books read in the last month?
3½ books
- Use tools. What is the difference between the greatest and least number of books read?
2½ books



Also available in print

Levelled Homework

Practice Master

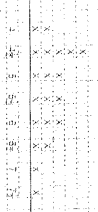
Solving Problems Involving Line Plots

Practice 15-2

For 1-4, use the data set below which lists the length of time in seconds it takes for each student in Ms. Sousa's class to say the alphabet.

5, 4, 4½, 6, 5, 6½, 7, 5½, 7½, 6, 4½, 4½, 4, 6, 4½, 5½, 5, 6½

1. Make a line plot of the data.



- Use tools. What is the most common time it takes a student to say the alphabet?
4½ seconds
- Writing to Explain: Yun says that the difference between the least amount of time it takes a student to say the alphabet and the greatest amount of time is 4½ seconds. Do you agree? Explain.
No! Sample answer: The greatest time is 7½ seconds, and the least time is 4 seconds. 7½ - 4 = 3½ seconds.

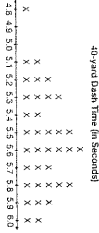
- Reason: Aron student joins Ms. Sousa's class. That means there will be one more data point on the line plot. What is the new difference between the greatest length of time and the least length of time?
A 4½ seconds B 4 seconds C 3½ seconds D 3 seconds

Also available in print

Solving Problems Involving Line Plots

Enrichment 15-2

40-yard Dash Time (in Seconds)



1. What does this line plot show?

40-yard dash times in seconds

- After looking at the line plot, Kris says that the most common 40-yard dash time was 5.3 seconds. Do you agree with him? Explain your answer.
No. The most common 40-yard dash time was 5.6 seconds since 6 people finished with that time. Only 4 people finished with a time of 5.3 seconds.
- What is the difference between the fastest time recorded and the slowest time recorded?
1.2 seconds

- If two more runners finished the 40-yard dash with a time of 5.5 seconds, how would the results of the data change?
The most common time would no longer be 5.6 seconds. It would be 5.5 seconds.
- Write a question that can be answered by the line plot, and give the answer. How many more people finished with a time of 5.8 seconds than finished with a time of 5.2 seconds?
2 people

Also available in print

substitute the length and width into the appropriate formulas to verify the area and perimeter.

- Have students find another way to make a rectangle that covers 18 squares. Have them find the same information that they found for their first rectangle.
- Repeat the activity with rectangles that cover 24 squares.

1. Draw another rectangular garden on grid paper. Repeat steps 1–4 for your garden.

Grid Activity • 15-3

2. Draw three rectangular gardens that each have a perimeter of 20 feet. Give the area of each of these gardens.

Grid Activity • 15-3

a. Perimeter: 32 feet
b. Perimeter: 24 feet
c. Perimeter: 28 feet
d. Perimeter: 36 feet

Partner Talk Listen for language that describes how to use formulas. For example, a student might say, “When I find the area, I multiply.” or “I add each dimension two times when I find the perimeter.”

Levelled Homework

Retrieving Master
Renee
15-3

Solving Perimeter and Area Problems

1. Find the length of the rectangle.

$A = 63$ and $w = 7$

$A = \ell \times w$

$63 = \ell \times 7$

(Think if $63 = \ell \times 7$, then $\ell = 63 \div 7$)

$\ell = 9$

So the length is 9 feet.

2. Find the width of the rectangle.

$P = 30$ and $\ell = 11$

$P = 2\ell + 2w$

$30 = 2(11) + 2w$

$30 = 22 + 2w$ (Think if $90 = 22 + 2w$, then $2w = 30 - 22$)

$2w = 8$ (Think if $2 \times w = 8$, then $w = 8 \div 2$)

$w = 4$

So the width is 4 inches.

Also available in print

Practice Master
Practice
15-3

Solving Perimeter and Area Problems

Use the formulas for perimeter and area of rectangles to solve each problem.

1. Find x .

$2x = 28$ and $A = 34$ sq ft

14 ft

2. Find y .

$y = 18$ in. and $P = 66$ in.

18 in.

3. Find the length. Then find the perimeter.

$\ell = 11$ ft, $P = 28$ ft

$w = 8$ in., $A = 96$ sq in.

4. Find the width. Then find the area.

$w = 25$ in. and $P = 40$ in.

5. Michael designs and makes quilts. Answer questions 5–8 about the dimensions of his quilts. You may want to use a sketch to help you solve the problem.

5. He made a baby quilt that was 3 feet wide. Its perimeter was 16 feet. What was its area?
 $A = 15$ sq ft

6. He made a queen-sized quilt that was 8 feet long. Its area was 64 square feet. What was its perimeter?
 $P = 32$ ft

7. Reason: He wanted to make another quilt with an area of 42 square feet. What are its possible dimensions if they must be whole numbers?
 1 ft \times 42 ft, 2 ft \times 21 ft, 3 ft \times 14 ft, 6 ft \times 7 ft. The quilt that is 6 ft \times 7 ft makes the most sense because the others are too narrow.

8. Perseus: The perimeter of another quilt had to be 34 feet because he only had that much fabric. It was 8 feet long. What was its area?
A 18 sq ft B 72 sq ft C 144 sq ft D 292 sq ft

Also available in print

Enduring Master
Enduring
15-3

How Does Your Garden Grow?

Use sketches and formulas to help you solve the problems. Show your work.

Two cousins, Amy and Zach each have 24 feet of fencing to make rectangular pens for their garden. Amy spent her 24 feet of fencing to make a pen that is 6 feet by 9 feet. Zach spent to know which pen has the greater area.

1. If Amy and Zach use all of the fencing, what will the perimeter of each pen be?
 24 feet

2. What is the area of Amy's pen?
 $P = 2\ell + 2w$
 $24 = 2(6) + 2w$
 $24 = 12 + 2w$
 $12 = 2w$
 $6 = w$

3. What is the area of Zach's pen?
 $P = 2\ell + 2w$
 $24 = 2(8) + 2w$
 $24 = 16 + 2w$
 $8 = 2w$
 $4 = w$

4. Whose pen has the greater area?
Amy's pen has a bigger area because 36 square feet is greater than 32 square feet.

Amy's pen is $6 \times 9 = 54$ sq ft.
Zach's pen is $8 \times 4 = 32$ sq ft.

Also available in print

equivalency. Students verify the equivalency using the diagram.

- Add a row for pints. Students state and check capacity equivalencies with pints, quarts, and gallons.
- Add a row for cups. Students state and check capacity equivalencies with cups, pints, quarts, and gallons.
- Have students make a bar diagram to show $1\text{ c} = 8\text{ oz}$. Ask them to state equivalencies using fluid ounces and pints, quarts, and gallons.

Change objects in your classroom. Decide which unit of weight you would use to measure each one.

Find other examples of things you see everyday. Decide which unit of weight you would use to measure each one.

Report Back To check understanding, ask a student to repeat and complete this sentence: [Ton]

Report Back

Name _____ Practice 15-4

Solving Measurement Problems

Leticia has a 5-gallon aquarium. He fills the aquarium using a 2-quart container. How many times will he have to fill the 2-quart container to fill the aquarium?

Use a bar diagram to see how the units are related.



$4\text{ qt} = 1\text{ gal}$ or $2\text{ qt} = \frac{1}{2}\text{ gal}$
So, Leticia has to fill the container 2 times to fill one gallon in the aquarium.
Since there are 5 gallons, he must fill the container 2×5 , or 10 times.

In 1-2, use the diagrams shown to help solve the problem.

1. It took Amber 5 hours 16 minutes to finish a race. Her time at the halfway marker was 2 hours 49 minutes. How long did it take Amber to complete the second half of the race?
 $1\text{ h} = 60\text{ min}$, so $5\text{ h } 16\text{ min} = 2\text{ h } 76\text{ min}$
 $4\text{ h } 76\text{ min} = 2\text{ h } 49\text{ min} + 2\text{ hours } 27\text{ minutes}$
2. Reason: Jeremy uses 10 pieces of twine for each box he packs for shipping. How many yards of twine does he need to wrap 5 boxes?
 $2\frac{1}{2}\text{ yd}$ of twine

Also available in print

Level of Homework

Practice Master

Name _____ Practice 15-4

Solving Measurement Problems

In 1, use the diagram shown to help solve the problem.

1. Tanya has 2½ pints of juice. She has juice glasses that hold 5 fluid ounces. How many glasses can she fill with juice?
8 glasses



In 2-5, draw a diagram to help solve each problem.

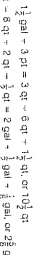
2. Reason: A race is 10 kilometers long. Markers will be placed at the beginning and end of the race course and at each 500-meter mark. How many markers are needed to mark the 10 kilometers?
21 markers: Check students' drawings.
3. On Monday, students at a summer camp spent 1 hour 37 minutes swimming in a pool. On Tuesday, they spent 2 hours 48 minutes at the pool. How long did the students spend at the pool in the afternoon?
1 hour 37 minutes: Check students' drawings.
4. Persevere: The mass of a liter of air is 1.3 kilograms. Randy's cat has a mass of 5,000 grams. How many times greater is the mass of the tiger than the mass of Randy's cat?
27 times greater: Check students' drawings.
5. Draw out 2½ yards of fabric from an 8-yard roll of fabric. Then he cuts a piece of fabric from the roll. How much fabric is left on the roll?
 $A\frac{3}{8}\text{ yd}$ $B\frac{3}{8}\text{ yd}$ $C\frac{6}{8}\text{ yd}$ $D\frac{8}{8}\text{ yd}$

Also available in print

Name _____ Enrichment 15-4

Solving Measurement Problems

You can use a diagram to state more than two measurement units. How much fluid does each piece hold?
 $\frac{1}{2}$ gallon of water, 9 cups of juice, and 3 pints of apple juice make?
2 qt = ½ gal = 2 qt = 2 qt = ½ qt or 1½ qt
1½ qt = 3 qt = 2 qt = 2 qt = ½ gal = 1 gal or 2½ gal
The recipe will make 10½ quarts or 2½ gallons of fruit punch.



1. A chef mixes a soup base using 2½ gallons of water, 10½ quarts of chicken stock, and 1½ quarts of beef stock. How many quarts of soup does the chef make? How many gallons? How many pints?
 $2\text{ qt} = \frac{1}{2}\text{ gal} = 3\text{ qt} = 2\text{ qt} = 6\text{ qt} = 1\frac{1}{2}\text{ qt}$ or $1\frac{1}{2}\text{ qt}$
 $10\frac{1}{2}\text{ qt} = 6\text{ qt} = 2\text{ qt} = 2\text{ gal} = 1\frac{1}{2}\text{ gal}$ or $1\frac{1}{2}\text{ gal}$
The recipe will make 10½ quarts or 2½ gallons of fruit punch.
2. Shelly spent 48 seconds doing sit-ups, ½ hour riding her bike, and 6½ minutes stretching. How many minutes did Shelly spend on these activities in all?
107½ minutes
3. A chef cuts 16 inches off a spool of ribbon that is 10 yards long. The chef then cuts off a piece that is 2½ yards long. Finally, the chef cuts a piece that is 4½ feet long. How many feet of ribbon are left on the roll?
198 inches: 52 yards: 161 feet
4. A chef can make 2½ quarts of orange juice, 4½ pints of milk, and 5 cups of pineapple juice to make a smoothie. How many cups can the chef fill? Remember: 1 pint = 2 cups
24 cups

Also available in print

- Repeat by including price tags with amounts under \$10 and with each student having \$10 with which to pay.
- Repeat including more price tags and additional bills.

\$3.35	\$3.27	\$17.10	\$0.29
\$2.25	\$14.69	\$9.10	\$3.27
\$17.10	\$2.20	\$2.25	\$14.69
\$4.35	\$9.43	\$9.43	\$9.38

\$130	\$10.65 - \$6.53
\$9.75 - \$5.25	\$1.50 - \$1.50
\$3.18 + \$1.20	\$10.65 - \$6.53
\$6.25 + \$2.01	\$3.33 + \$6.66
\$9 - \$1.50	\$6.25 + \$6.25
\$1.23 + \$2.88 + \$1.19	\$3.12 - \$3.00
\$9.87 - \$3.00	\$141 + \$141

Partner Talk Listen for reasoning. For example, a student might say, "We have to regroup because we can use ten pennies to make 1 dime."

Levelled Homework

Practice Master

Name _____

Solving Problems Involving Money

Reaching 15-5

Christine buys a loaf of bread from the bakery that costs \$3.59. She pays for the loaf with a \$5 bill. What is Christine's change? First, start with the cost of the bread. Use coins and bills until you reach the amount Christine paid.

\$5.00 → \$3.60 → \$3.65 → \$3.75 → \$4.00 → \$5.00

Second, count the change. Count coins and bills in reverse order. Christine's change is \$1.41.

List the coins and bills you would use to make the amount of change for each situation. Then tell the amount of change.

1. Bryce bought a map that cost \$7.35. He used a \$10 bill to pay for the map. What is his change?
Sample answer: 1 nickel, 1 dime, 1 half-dollar, 2 \$1 bills, \$2.65
2. Neen bought a pair of running shoes that cost \$34.29. She paid for the shoes with two \$50 bills. What is her change?
Sample answer: 1 penny, 2 dimes, 1 half-dollar, 1 \$5 bill, \$5.71
3. Reason bought some groceries that cost a total of \$22.68. He used a \$20 bill and a \$10 bill to pay for the groceries. What are two different ways he could receive his change?
Sample answer: 2 pennies, 1 nickel, 1 quarter, 2 \$1 bills, 1 \$5 bill, 2 pennies, 3 dimes, 7 \$1 bills, \$7.32

Also available in print

Name _____

Solving Problems Involving Money

Fluency 15-5

Tell the amount of change for each situation.

1. Kyla bought a DVD that cost \$19.25 including tax. She gave the sales clerk a \$20 bill. How much change should Kyla receive?
\$0.77
2. Marial Math Sean uses a \$5 bill and two quarters to pay for a souvenir ring that costs \$4.38. What is his change?
\$1.15
3. Zoey bought a new skateboard that costs \$26.79. How much change should she get if she paid for the skateboard with two \$50 bills?
\$3.21
4. Reason Vases buys a model train that costs \$5.55. Why is his change \$0.45?
Sample answer: To receive fewer coins in change, \$3.50

5. Critique Reasoning Julia spent \$7.26 on lunch. She gave the cashier two \$5 bills to pay the bill and received \$2.54 in change. Did she receive the correct change? Explain. No, she should have received \$2.62 in change.
6. Reason Brad paid for a book that cost \$19.40 with a \$20 bill to make his change. What are two other different combinations of coins and bills that can be used to make the change?
Sample answer: 1 dime, 1 half-dollar, 1 \$1 bill, 1 \$5-bill, 1 \$1 bill, 1 \$5-bill, 6 dimes, 6 \$1 bills
7. \$20 bill and two \$5 bills. How much change should she receive?
A \$1.84 B \$1.16 C \$3.28 D \$3.84

Also available in print

Name _____

Solving Problems Involving Money

Enriched 15-5

The table shows the prices of animal figurines for sale at the zoo gift shop. Use the table to solve each problem.

Animal	Price
African lion	\$9.78
Bengal tiger	\$11.23
Polar bear	\$10.41
Grey wolf	\$8.56
Eastern Lowland gorilla	\$13.09

1. Kayla and Heidi each buy a figurine. Kayla pays for the tiger using a \$10 bill and two \$1 bills. Heidi pays for her figurine using a \$20 bill and two \$5 bills. How much change does each girl receive?
Kayla: \$0.77; Heidi: \$9.02
2. Parker buys one of each of the three least expensive figurines. How much change should he receive if he pays for the figurines with two \$50 bills?
\$11.25
3. Mady receives \$4.59 in change when she pays for one of the Polar bear figurines with a \$10 bill and a \$5 bill. Which figurine did Mady buy?
Polar bear
4. Dylan receives \$10.22 in change when he pays for one of the African lion figurines with a \$50 bill. Which figurine did Dylan buy?
African lion
5. Carter buys one of the figurines and a figurine that costs \$8.99 in change. Which figurine did Carter buy?
Grey wolf
6. Sabrina bought two of the same figurine. She received \$7.54 in change when she paid for the items using a \$10 bill and a \$20 bill. Which figurine did Sabrina buy?
Bengal tiger

Also available in print

information into a table? [So we can see a pattern.]

Have students draw a picture for the number of tables and fill in the table at the same time.

Have students look at the table they made and ask: *How are the number of tables and number of guests related?* [After the first table, the number of guests increases by 2.]

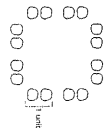
Reasoning Master

Name _____

Reasoning 15-6

Problem Solving:
Solve a Simpler Problem and Make a Table

Squares: A student is making a pattern of squares out of cotton balls. Each unit on a side of the pattern is made up of 2 cotton balls. How many cotton balls will the student need to make a pattern that is 4 units high and 4 units wide?



Read and Understand

Step 1: What do you know?
There are 2 cotton balls in each unit. The pattern is 4 units high and 4 units wide. Show 2 units and you try to solve it all.

Plan and Solve

Step 2: What strategy will you use?
Problem 1: How many cotton balls are needed for a 2-unit by 2-unit square?
Problem 2: How many cotton balls are needed for a 3-unit by 3-unit square?
Problem 3: How many cotton balls are needed for a 4-unit by 4-unit square?

There are 2 cotton balls for each unit on the side. How many cotton balls are needed for a 2-unit square? How many cotton balls are needed for a 3-unit square? How many cotton balls are needed for a 4-unit square?

Square units	1	2	3	4
Cotton balls needed	4	9	16	32

Answer: 32 cotton balls are needed.

Look Back and Check

Step 4: Is your answer correct?
Yes, all of my computations are correct, and I have the correct pattern.

1. Joan works for 6 hr each weekday, and 8 hr total on the weekends. She earns \$5 an hour on weekdays and \$9 an hour on weekends. How much money does she earn in a week?
 $6 \times 5 = 30$; $30 + 36 = 66$
 $8 \times 9 = 72$; $72 + 180 = 252$

Also available in print

How many square meters are shown? How many pigs will fit in the eighth barrel?

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How many square meters are shown? How many pigs will fit in the eighth barrel?

Labeled Homework

Practice Master

Name _____

Practice 15-6

Problem Solving:
Solve a Simpler Problem and Make a Table

Sam needs to cut a piece of sheet metal into 5 pieces. It takes Sam 2 minutes to make each cut.

- How many cuts will Sam make? **7 cuts**
- Written to Explain: How would making a table help you to find the number of minutes it took Sam to cut the sheet metal into 8 pieces?

Making a table would help you to find a pattern in the number of minutes it took Sam to make the 7 cuts.

3. How long will it take Sam to turn the sheet metal into 8 pieces? Write your answer in a complete sentence.
It will take Sam 35 minutes to make 7 cuts.

Sharon is having a birthday party with her 11 friends and they are telling a story. Each group member tells for 3 minutes.

- How many people are in each group? **4 people**
- How many minutes does each group take to tell a story? **12 minutes**

5. How many minutes does it take for all three groups to tell their stories? **36 minutes**

7. If Sharon divided her friends into 4 groups and each person still got the same time to talk, how long would it take to tell the stories?
A 16 minutes B 36 minutes C 48 minutes D 144 minutes

Also available in print

Consider all different sizes of triangles. How many triangles are in this drawing?

How many of these squares are in this drawing?

Repeat steps 1 - 4 for your problem.

Tournament Time

Name _____

Enrichment 15-6

Tournament Time
Valleyview School is holding a hair-court basketball tournament. Each team in the tournament has three players. Each time a team loses, the team is eliminated from the tournament. So, half of the teams are eliminated each round.

- Thirty-two teams sign up for the tournament. How many players are taking part in all? **96 players**
- How many games will be played until there is one winning team left? **31 games**

3. Two games can be played on one basketball court at the 7 basketball courts.

- How many players can play at once? **84 players**
- How many teams out of the 32 in the tournament can play at once? **28 teams**

4. Each round of a tournament eliminates half the teams playing.

- How many rounds must the play go before a tournament with 64 teams ends with a single team winner? **6 rounds**
- How many games in all will be played? **63 games**

Also available in print

Next have students look for streets that are perpendicular. Have them highlight those streets in pink.

Then have students look for streets that intersect, but are not perpendicular. Have them highlight those streets in green.

Levelled Homework

square point plane exact

directions surface intersect directions

intersect point parallel point

exact point directions intersect

You want if you are the first to get four connected rectangles, like this: Play Again!

Levelled Homework 16-1

You want if you are the first to get four connected rectangles, like this: Play Again!

Levelled Homework 16-1

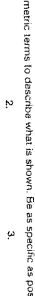
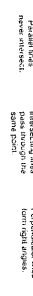
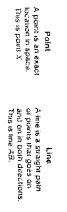
END Report Back To check understanding, ask a student to repeat and complete this sentence: _____ [point]

Repeating Home

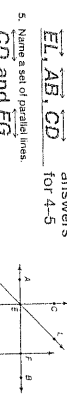
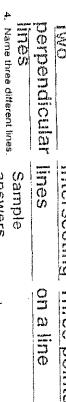
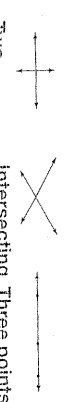
Name _____ Repeating 16-1

Points, Lines, and Planes

Here are some important geometric terms.



Use geometric terms to describe what is shown. Be as specific as possible.



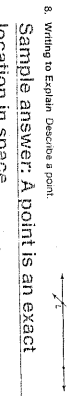
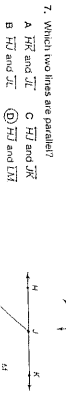
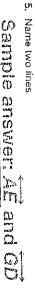
Also available in print

Practice Master

Name _____ Practice 16-1

Points, Lines, and Planes

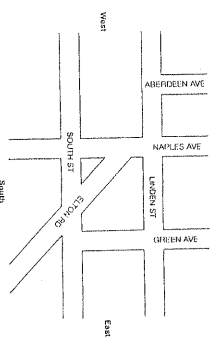
Use geometric terms to describe what is shown. Be as specific as possible.



Also available in print

Name _____ Enrichment 16-1

Street Smarts



- Name 2 streets that run north and south. intersect South Street, and are parallel to each other. **Naples Avenue and Green Avenue**
- Name 2 streets that are parallel and run east and west. **Linden Street and South Street**
- Name a street that intersects Linden Street at a right angle and intersects no other street. **Aberdeen Avenue**
- Name a street that intersects South Street, but NOT at a right angle. **Elton Road**
- Three parallel streets intersect an east-west street at right angles. Name the three streets. **Linden Street**

Also available in print

type of line or angle called for.

- Each student must explain to the others how his or her type of line or angle meets the criteria.
- Allow all students to have a turn choosing the type of line or angle.

8. Use segment perpendicular to \overline{AC}

9. Line segment perpendicular to \overline{AB}

a	b	c	d	e
f	g	h	i	

Make nine different drawings, one for each of the nine descriptions listed above.

Center Activity • 16-2

1. Line segment perpendicular to \overline{AC}

a	b	c	d	e
f	g	h	i	

Name several lines, line segments, rays, and angles shown in the diagram.

Center Activity • 16-2

EMD Partner Talk Listen for language that includes reasoning. For example, a student might say, "We chose an angle, so we should look for descriptions of angles."

Levelled Homework

Reasoning Master

Name _____ Reasoning 16-2

Line Segments, Rays, and Angles

Here are some important geometric terms.

Line segment: A part of a line that has two endpoints. They are not rays.

Ray: A part of a line that has one endpoint. They are not rays.

Right angle: A right angle is an angle that measures 90 degrees.

Obtuse angle: An obtuse angle is an angle that measures more than 90 degrees.

Acute angle: An acute angle is an angle that measures less than 90 degrees.

Straight angle: A straight angle is an angle that measures 180 degrees.

Use geometric terms to describe what is shown. Be as specific as possible.

1. _____

2. _____

3. _____

Obtuse angle _____

Straight angle _____

Line segment _____

4. Name three different rays. **Sample answer:** \overline{FG} , \overline{EI} , \overline{ED} for 4-5

5. Name two different line segments. **Sample answer:** \overline{FB} , \overline{AF}

Also available in print

Practice Master

Name _____ Practice 16-2

Line Segments, Rays, and Angles

Use geometric terms to describe what is shown. Be as specific as possible.

1. _____

2. _____

3. _____

4. _____

Obtuse angle _____

Line segment _____

5. Name two line segments. **Sample answer:** \overline{AE} , \overline{BD}

6. Name two obtuse angles. **Sample answer:** $\angle BCA$, $\angle DCE$

7. Which is the geometric term for angle $\angle XZY$?
 A. Acute angle B. Right angle C. Straight angle

8. Writing to Explain Describe an acute angle. **Sample answer:** An acute angle is an angle which measures less than 90°.

Also available in print

Enrichment

Name _____ Enrichment 16-2

Shapes in Shapes

Study the figure. Then answer each question.

1. How many rectangles are there in the figure? **12**

2. How many triangles are there in the figure? **12**

3. How many squares are there in the figure? **3**

4. Name them. **EAIE, GBCL, FBCE**

5. How many rectangles are there in the figure? **3**

6. Name them. **EAIE, GBCL, FBCE**

7. How many triangles are there in the figure? **12**

8. Name them. **EAIE, GBCL, FBCE**

9. How many squares are there in the figure? **3**

10. Name them. **EAIE, GBCL, FBCE**

11. How many rectangles are there in the figure? **12**

12. Name them. **EAIE, GBCL, FBCE**

13. How many triangles are there in the figure? **12**

14. Name them. **EAIE, GBCL, FBCE**

15. How many squares are there in the figure? **3**

16. Name them. **EAIE, GBCL, FBCE**

Also available in print

Have students write $360 \div 4 = 90$ then divide. Ask: *What is the circle measure that the line 3:00 shows?* [90°]
Repeat with 6:00 and 9:00.

180° You need to know the first to get four connected rectangles, like this.

The angle is a straight angle.	The angle is a right angle.	The angle is a right angle.	The angle is a right angle.
The angle is 180°.	The angle is 90°.	The angle is 90°.	The angle is 90°.
The angle is 90°.	The angle is 90°.	The angle is 90°.	The angle is 90°.

Center Activity 18

180° You need to know the first to get four connected rectangles, like this.

The angle is a straight angle.	The angle is a right angle.	The angle is a right angle.	The angle is a right angle.
The angle is 180°.	The angle is 90°.	The angle is 90°.	The angle is 90°.
The angle is 90°.	The angle is 90°.	The angle is 90°.	The angle is 90°.

Center Activity 18

360° Report Back To check understanding, ask a student to repeat and complete this sentence: *The name of an angle that measures 180 degrees is _____ [a straight angle]*

Levelled Homework

Retaining Master

Repeating 16-3

Understanding Angles and Unit Angles

You can find the measure of an angle using fractions of a circle.
The angle is $\frac{1}{2}$ of a circle.
What is the measure of this angle?
Divide to find the angle measure of $\frac{1}{2}$ of a circle.
Remember, $\frac{1}{2}$ means 1 of 2 equal parts, so divide by 2 to find the angle measure.
Number of degrees $360 \div 2 = 180$ degrees. Number of degrees in whole circle $360 \div 6 = 60$ degrees. The measure of the angle is 60 degrees.
For Exercise 1, show the work you do to find the measure of the angle.
1. Use Structure A circle is divided into 9 equal parts.
What is the measure of this angle?
Write an equation using division to find the measure of the angle.
The measure of this angle is $360 \div 9 = 40$ degrees.

2. Janet cut a round slice of watermelon into 5 equal pieces. What is the angle of each piece? [72 degrees]
The measure of this angle is 72 degrees.
3. Frank cut a pie into 10 equal slices. There are only 3 slices left. [108 degrees]
The measure of the angle for the 3 slices that are left is 108 degrees.
4. Maria cut a pizza into 6 equal slices. She put a slice of pizza on 3 plates. What is the measure of the angle for the slices that are left? [225 degrees]

Also available in print

Practice Master

Practice 16-3

Understanding Angles and Unit Angles

In 1-3, find the measure of each angle.

1. The angle is $\frac{1}{3}$ of the circle.
30 degrees

2. A circle is divided into 20 equal parts. What is the angle measure of three of those parts?
54 degrees

3. A circle is divided into 8 equal parts. What is the angle measure of two of those parts?
90 degrees

4. Reasoning Kurt cut pizzas into wedges measuring 40 degrees. If each person eats one piece of pizza, how many people could he feed with two whole pizzas?
18 people

5. Sam cut a pie into equal slices. There are only 3 slices left. The angle measure for the three slices is 72°. How many 15 slices?

6. Writing to Explain A circle is divided into 18 equal parts. What is the angle for the angle for each part? Explain.
20°. 100°. There are 360° in a circle, so each part will measure $360 \div 18 = 20$. 5 parts will measure $20 \times 5 = 100$.

7. Brian cut an extra large round pizza into 12 equal slices. Seven of the pieces were eaten. What angle? [150°]

Also available in print

Enrichment 16-3

Understand Angles and Unit Angles

M. Mason has a circular garden. He plants a different kind of plant in each section of his garden.
Find the angle measure for each section of the garden.
Fraction Part of Garden Angle Measure
1. $\frac{1}{2}$ strawberries 90 degrees
2. $\frac{1}{3}$ raspberries 60 degrees
3. $\frac{1}{4}$ peas 90 degrees
4. $\frac{1}{6}$ flowers 60 degrees
5. $\frac{1}{3}$ tomatoes 120 degrees
6. $\frac{1}{4}$ peppers 90 degrees
7. What is the sum of all the angles of the garden sections?
360 degrees

8. Label the angles in the circle with the name of the plant in that section.

raspberries
tomatoes
peas
peppers
strawberries
flowers

Also available in print

of paper to form a right angle.

- Tell students that the angle at each small vertex of the pattern block is 30° . Ask: *How many pattern blocks did you use? [3] How much is $30^\circ + 30^\circ + 30^\circ$? [90°] How many degrees does the right angle have? [90°]*

- Draw angles that can be measured with 30° angles and repeat.

Reaching Master

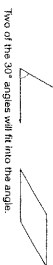
Name _____

Reaching
16-4

Measuring with Unit Angles

You can use an angle you know to find the measure of an angle.

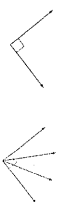
Find the measure of the angle below.



Add: $30^\circ + 30^\circ = 60^\circ$. The measure of the angle is 60° .

Use the beige pattern block to find the measure of the angle.

1.



90°

2. Be Precise Explain how you found the measure of the angle.

Sample answer: I put the smaller angle of the beige block inside the angle with one side next to one of the angle's rays and traced around it. Then I placed the beige block next to the angle I drew. I measured the angle next to the other ray with the beige block and it was 30° . Then I added the angle measures that fit into the large angle. $30^\circ + 30^\circ + 30^\circ = 90^\circ$.

Also available in print

15°	60°	150°	135°
135°	110°	90°	120°
30°	25°	10°	15°
150°	45°	110°	25°

You want if you are the first to get four connected rectangles, like Play against **Level Activity 9**

75°	160°	22°	170°
90°	55°	105°	15°
130°	22°	170°	40°
55°	180°	75°	160°

You want if you are the first to get four connected rectangles, like Play against **Level Activity 9**

Partner Talk Listen for evidence that a student describes the process of measuring angles appropriately and includes the word degrees when stating the measure of an angle.

Levelled Homework

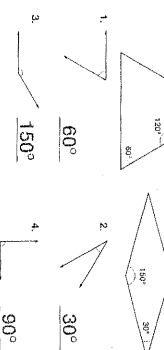
Practice Master

Name _____

Practice
16-4

Measuring with Unit Angles

In 1-5, find the measure of each angle. Use pattern blocks to help.

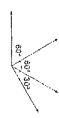


5. What is the measure of this angle?

- A 105°
- B 120°
- C 135°
- D 150°

6. Communicate Explain how you found the measure of the angle in Exercise 5. Use pictures, words, and numbers in your explanation.

Sample answer: I used the beige and red pattern blocks. I used the smaller angle of the red block to draw two 60° angles. Then I used the smaller angle of the beige block to draw one 30° angle. $60^\circ + 60^\circ + 30^\circ = 150^\circ$.



Also available in print

Name _____

Enrichment
16-4

Measuring with Unit Angles

Find the measure of the angles in each letter, using pattern blocks. Tell which pattern blocks you used and which angles of the blocks you used.



1. Letter A 60° and 120° ; Sample answers: Use the large and small angles of the red pattern block. Use smaller angle of the beige pattern block.

2. Letter T All angles are 90° . Sample answers: Use a 90° angle of orange square. Use smaller angle of beige pattern block.

3. Letter O 120° angles; Sample answers: Use green triangle pattern block. Use large angles of blue pattern block.

4. Make your own design using pattern blocks. Find the angles in your design. Answers will vary. Check students' drawings.

Also available in print

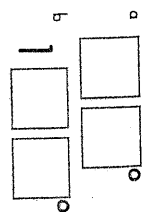
Now ask them to measure the other angle along that line.

Ask: *What is the sum of the two angles?* [180°]

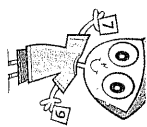
Ask: *How would you draw angles of 130° or 125°?*

15°	150°	30°	140°	25°
15°	165°	40°	125°	55°

Use your finger to trace a different angle on the protractor. Ask your partner to find the measure of that angle.



Use your finger to trace an angle on the protractor. Ask your partner to identify the measure of that angle with this.



Report Back To check understanding, ask a student to repeat and complete this sentence: *_____ is a _____ angle with the same endpoint [Two rays that have the same endpoint]*

Levelled Homework

Reporting Master

Name _____ Knowledge 16-5

Measuring Angles

An angle is formed by two rays that meet at a common endpoint called the vertex. The angle is measured in degrees (°). An angle can be measured or created using a protractor.

To measure an angle:

Place the protractor's center on the vertex of the angle, and the 0° mark on one of the angle's rays. Read the number in degrees where the other ray of the angle crosses the protractor.

To create an angle:

Open a dot to show the vertex of the angle. Place the center of the protractor on this vertex point. Draw another point at the 0° mark, and another point at the angle degree mark. Draw rays from the vertex through the other points.

For Exercises 1 through 3, measure the angles.



For Exercises 4 through 9, draw the angles. Check students' drawings.

4. 65° 5. 90° 6. 145°
7. 75° 8. 135° 9. 180°

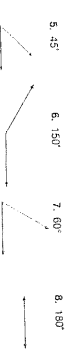
Practice Master

Name _____ Practice 16-5

Measuring Angles

For Exercises 1 through 4, use a protractor to measure the angle.

1. 55° 2. 115° 3. 90° 4. 15°



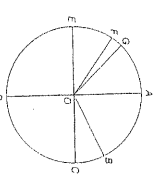
10. Start, Sam, Sara, and Sawyer have equalized pieces of pie. When the 4 pieces were put together they form a 100° angle. What is the angle of each piece?
- A 100° B 50° C 25° D 15°

11. Writing to Explain: Gail and her 3 friends all share half a pie. Gail and her friends each eat an equal-sized piece. They believe each piece has an angle equal to 25°. Are their calculations correct? Explain.
- No, 180° divided evenly among 4 people creates angles of 45°.

Name _____ Enrichment 16-5

Name that Angle

Below is a circle with center point O. Each point on the outside of the circle connected to point O creates an angle. Using a protractor and the diagram to answer the following questions.



1. What is the measurement of $\angle COF$? 90°
2. What is the measurement of $\angle FOG$? 10°
3. What is the measurement of $\angle COE$? 145°
4. What is the measurement of $\angle EOC$? 180°
5. Does $\angle EOC = \angle COE$? What are their measurements? Yes, both are 180°

6. Does $\angle COA = \angle EOC$? What are their measurements? Yes, both are 90°
7. What is $\angle FOG + \angle AOB$? 110°
8. What is $\angle FOG + \angle COF$? 100°
9. Name the 3 angles that $\angle EOD$ is equal to: $\angle COD, \angle EOA, \angle AOC$

Also available in print

Also available in print

Also available in print

making two smaller angles. Have each partner use a protractor to measure one of the angles. Have them switch angles and measure again. Once they have verified the angle measures, have them record them.

- Have each pair add the 2 angle measures and record the resulting number sentence. Have one partner reassemble the pieces into a right angle. Have the other partner measure the 2-part angle to confirm that it measures 90° .

100°	48°	77°	60°
90°	68°	80°	38°
77°	37°	68°	48°
45°	38°	37°	70°

You will find you are first to get four connected rectangles. Use Play again!

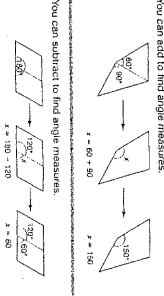
34°	97°	58°	83°	36°	80°	45°	38°
29°	74°	45°	90°	56°	72°	59°	
73°	79°	50°	50°	30°	90°	47°	94°
40°	43°	58°	59°	36°	67°	25°	85°

You will find you are first to get four connected rectangles. Use Play again!

Reaching Master

Reaching 16-6

Adding and Subtracting Angle Measures



Angles $\angle TUV$ and $\angle UVW$ together, make the larger angle, $\angle TWV$. Add or subtract. Write the missing angle measure.

Angle Measure \angle	$\angle TUV$	$\angle UVW$	$\angle TWV$
1.	120	45	165
2.	105	50	155
3.	100	70	170
4.	125	25	150
5.	112	36	148

6. Reason: Use the picture at the right. Abby is making a square. She glues two pieces along an edge as shown. She needs a third piece to fill the space between these two pieces. What size corner-angle does the third piece need to have in order to fill the space with no gaps? The third piece needs to have a 60° corner-angle.

Also available in print

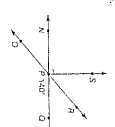
Levelled Homework

Practice Master

Practice 16-6

Adding and Subtracting Angle Measures

- Use the diagram. Add or subtract to find the angle measure.
1. What is the measure of $\angle WPO$? 40°
 2. What is the measure of $\angle SPQ$ if the measure of $\angle RPQ$ is 40° ? 50°
 3. If a line segment PT is drawn dividing $\angle SPQ$ into two equal parts, what are the measures of the two smaller angles? 45°
 4. Use the diagram.



1. Draw line segment PT so that it divides $\angle RPQ$ into two smaller parts. Check students' drawings.
 2. What is the measure of the new angle $\angle CPQ$ you formed?
- Students' answers should correspond with their drawings in step 1.
3. Write an equation and solve it to find the measure of $\angle PQC$. Equations and solutions will vary depending on students' drawings. Sample equations:
 $x = 140 - 55$, $x = 85$; $100 = x + 140$, $x = 40$
 $x = 140 - 55$, $x = 85$; $100 = x + 140$, $x = 40$
 4. $\angle CAW$ and $\angle WAI$ together form $\angle CAI$. $\angle CAW$ is a right angle. What must be true about $\angle CAI$?
 A. It is an obtuse angle.
 B. It is a straight angle.
 C. Its measure is greater than 90° .
 D. Its measure is greater than 180° .
6. Writing to Explain Use the diagram above. Show how that $\angle OPY$ and $\angle SPY$ are both smaller than the measure of $\angle OPW$ from 1b) to find the measure of $\angle SPY$ is the right? Explain. No: Explanations should include the recognition that $\angle OPY$ and $\angle SPY$ are not side by side (do not share a common ray)—there is part of $\angle OPB$ that is not included in either of those 2 angles.

Also available in print

Fundament 16-6

Angles in Circles

A circle can be divided into equal-size parts, or angles, many different ways. When you multiply the angle measure by the number of parts, the product is 360.

90° angles divide a circle into 4 equal parts. $90^\circ \times 4 = 360^\circ$.
 Use a protractor. Write the missing information in rows 1 and 2. Then write some angles of your own to complete the table.

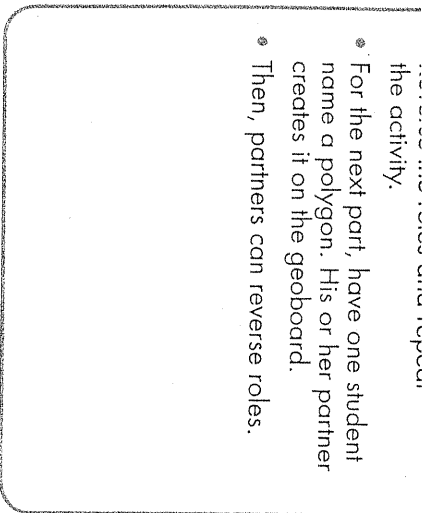
Angle	Number in Circle	Number Sentence
1. 90°	4	$90^\circ \times 4 = 360^\circ$
2. 30°	12	$30^\circ \times 12 = 360^\circ$
3.		
4.		
5.		

Check students' work. The additional whole-number angles possible are: 1°, 2°, 3°, 4°, 5°, 6°, 8°, 9°, 10°, 12°, 15°, 18°, 20°, 24°, 36°, 45°, 60°, 72°, 120°, 180°, 360°.

Also available in print

the activity.

- For the next part, have one student name a polygon. His or her partner creates it on the geoboard.
- Then, partners can reverse roles.



Activity 16-7 Play again! Tell how many vertices there are in the shape that you choose.

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Activity 16-8 Play again! Describe or draw a different shape that has the name you choose.

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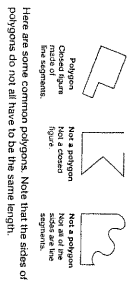
Report Back To check understanding, ask a student to repeat and complete this sentence: *The point where two sides meet in a polygon is called a _____.* [Vertex]

Leveled Homework

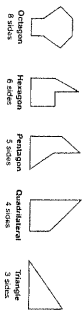
Retrieving Master

Name _____ Reaching 16-7

Polygons are closed plane figures that are made up of line segments. All of the line segments connect. All of the sides of a polygon are straight, not curved.



Here are some common polygons. Note that the sides of polygons do not all have to be the same length.



Sample answers:

- Draw an example of each type of polygon. How many sides and vertices does each one have?
- Hexagon 6, 6
 - Quadrilateral 4, 4
 - Pentagon 5, 5
 - Octagon 8, 8

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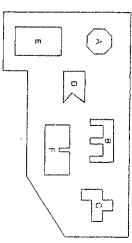
Practice Master

Name _____ Practice 16-7

Draw an example of each polygon. How many sides and vertices does each one have?

- Quadrilateral 4; 4
- Octagon 8; 8
- Heptagon 6; 6

The map shows the shapes of buildings in Polygon Park. Identify the polygons that are lettered.



- Octagon 7, B
 - Pentagon 10-sided polygon 12-sided polygon
 - Quadrilateral 9, F
 - Which is the point where sides meet in a polygon?
A. edge B. endpoint C. side D. vertex
11. Writing to Explain Describe two polygons by the number of vertices and sides each has.
A square has 4 sides and 4 vertices.
A pentagon has 5 of each.

Also available in print

Name _____ Enrichment 16-7

Each figure is made of at least 2 polygons. Draw a line or lines to show the figures. How many polygons are there? Write the name of each polygon.

- Square; rectangle
- Parallelogram; rectangle
- Trapezoid; equilateral triangle
- Parallelogram; acute triangle
- Isosceles triangle; rectangle
- Right triangle; pentagon

Also available in print

of various sizes. Ask, "How many triangles can you make with 12 straws?" [4]

- Have students make 4 triangles, and glue them to the paper.
- Then, they should name them by the length of sides and write why each is named that way.
- Next, have the students go back and classify the triangles by the size of the angles and justify the name.

1. a right, scalene triangle

h, not a triangle

a	b	c	d
e	f	g	h

Draw a triangle for each description in a-h below.

2. equilateral triangle
A scalene triangle?

3. equilateral triangle?
Which triangle is a right scalene triangle?

a	b	c	d
e	f	g	h

Draw triangles to make your own puzzle like this one. Ask your team to solve your puzzle.

Levelled Homework

Researching Master

Name _____ Researching 16-8

Triangles

Equilateral triangle All sides are the same length.

Isosceles triangle At least two sides are the same length.

Scalene triangle No sides are the same length.

Right triangle One angle is a right angle.

Acute triangle All three angles are acute angles.

Obtuse triangle One angle is an obtuse angle.

Classify each triangle by its sides and then by its angles.

1. Scalene; right

2. Equilateral; acute

3. Isosceles; acute

4. Scalene; obtuse

Also available in print

Practice Master

Name _____ Practice 16-8

Triangles

Classify each triangle by its sides and then by its angles.

1. Scalene right triangle

2. Isosceles obtuse triangle

3. Equilateral acute triangle

4. Scalene acute triangle

5. Isosceles acute triangle

Write the name of each triangle.

6. Which is a triangle with one right angle?
A. Equilateral triangle B. Obtuse triangle C. Right triangle D. Acute triangle

7. Writing to Explain Why can't a triangle have more than one obtuse angle?
Sample answer: The three lines of a triangle will not meet if there are 2 obtuse angles.

Also available in print

Enrichment

The Mixed Up Patterns

Draw or write what comes next in the patterns below.

1. $\triangle \triangle \triangle \triangle \triangle \triangle$ $\triangle \triangle \triangle \triangle \triangle \triangle \triangle \triangle \triangle \triangle$

2. $\star \star \star \star \star \star \star \star$ $\star \star \star \star \star \star \star \star \star$ $\star \star \star \star \star \star \star \star$ $\star \star \star \star \star \star \star \star \star \star \star \star$

3. $\Delta \Delta \Delta \Delta \Delta \Delta \Delta \Delta$ $\Delta \Delta \Delta \Delta \Delta \Delta \Delta \Delta \Delta \Delta \Delta \Delta$

4. $\circ \circ \circ \circ$ $\circ \circ \circ \circ$ $\circ \circ \circ \circ$ $\circ \circ \circ \circ$ 50

5. 555 444 666 330 **777 22R**

6. XXOX XXOX XXOX XXOX XXOX

7. $\square \square \square \square$ $\square \square \square \square$ BB

8. 15 110 23 110 123 1,1000 1,123

Also available in print

its attributes.

One student takes enough string to create each of the five figures: rhombus, trapezoid, parallelogram, rectangle, and square. His or her partner may glue the string to the paper.


Then, have partners list what is alike in each of the shapes.

Have partners tell how a square is also a rhombus, rectangle, and parallelogram.


Recognizing Quads

Name _____


Reaching 16-9




Square
Four congruent sides and all angles are right angles.




Rectangle
Two sets of opposite sides are parallel.




Parallelogram
Opposite sides are parallel.



Rhombus
Opposite sides are parallel and all sides are congruent.







Trapezoid
There is only one pair of parallel sides.



Quadrilateral
A closed figure with 4 sides.

Write the name of each quadrilateral.

-  _____
-  _____
-  _____
-  _____

Also available in print

Levelled Homework

D quadrilateral

E parallelogram

F rhombus

G acute

H rhombus

I trapezoid

Make up a "Think Together" question about quadrilaterals. Challenge your classmates to think together to answer your question.

Levelled Homework

D quadrilateral

E parallelogram

F rhombus

G acute

H rhombus

I trapezoid






Make up a "Think Together" question about quadrilaterals. Challenge your classmates to think together to answer your question.

Practice Master

Name _____

Practice 16-9

Write all the names you can use for each quadrilateral.

-  Square, parallelogram, rhombus, rectangle
-  Rectangle, parallelogram
-  Parallelogram
-  Trapezoid
-  Rhombus, parallelogram

6. Which is NOT a quadrilateral?
 A rhombus B rectangle C right triangle D trapezoid

7. Writing to Explain Explain why a square can never be a trapezoid.

Sample answer: A square cannot be a trapezoid because it has two pairs of parallel sides.

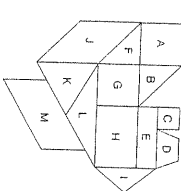
Also available in print

Doodles

Name _____

Enrichment 16-9

Doodles made this doodle while talking on the phone. Name each shape. Draw: Be as specific as possible.



- Square
- Right isosceles triangle
- Square
- Square
- Rectangle
- Trapezoid
- Right isosceles triangle
- Square
- Rectangle
- Isosceles obtuse triangle
- Rhombus
- Equilateral acute triangle
- Isosceles obtuse triangle
- Parallelogram

Also available in print

Have students fold a piece of construction paper in half. Tell them to cut along the fold to make shapes with at least one line of symmetry.

Activity You will be the first to get four connected rectangles, like this.

0	1	6	0
2	5	4	6
0	6	3	2
4	2	5	1

Level Activity **Play Again!**

Activity You will be the first to get four connected rectangles, like this.

Level Activity **Play Again!**

Report Back To check understanding, ask a student to repeat and complete this sentence: *When a figure can be folded on a line to form two equal halves that fit on top of each other, that figure is _____ [symmetric]*

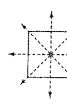
Levelled Homework

Repeating Master

Name _____ Repeating 16-10

Line Symmetry

Symmetric figures are figures that can be folded to make two halves that match each other. The lines that divide a symmetric figure into matching parts are called lines of symmetry.



This square has 4 lines of symmetry. If you fold the square along any of the dashed lines, the two halves will lie on top of each other.

Tell if each line is a line of symmetry.

1. yes no

2. yes no

3. yes no

4. yes no

Tell how many lines of symmetry each figure has.

5. _____

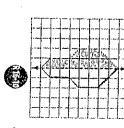
6. _____

7. _____

8. _____

Reasoning How many lines of symmetry does the letter R have? _____

10. Complete the drawing so that the figure is symmetric.



Also available in print

Practice Master

Name _____ Practice 16-10

Line Symmetry

Tell if each line is a line of symmetry.

1. yes no

2. yes no

3. yes no

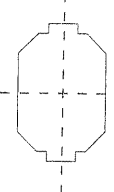
Tell how many lines of symmetry each figure has.

4. _____

5. _____

6. _____

7. Draw lines of symmetry.



8. How many lines of symmetry does a rhombus that is not a square have?
A 0 B 1 C 2 D 3

9. Writing to Explain Explain why a square is always symmetric.
Sample answer: All squares have four equal sides and can be divided into equal halves by 4 lines of symmetry.

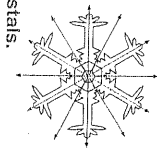
Also available in print

Name _____ Enrichment 16-10

Let It Snow!

Snow crystals usually form as 6-sided stars, but are different in detailed appearance.

- Draw all lines of symmetry on the snow crystal to the right.
- Draw your own snow crystal design. Make sure it has symmetry.



Check that students' drawings show asymmetrical snow crystals.

4. Decide which design you like best. Explain why you chose that design. Check that students' answers include an explanation of which they like best.

Also available in print

Have students identify the angles and sides.

- Help students read the definition of the right triangle. *What is a right angle? Which triangle has a right angle?*
- Guide students in placing the definition beneath the right triangle.

- Have students measure the sides of each triangle. Ask them to identify the triangle whose sides are all equal in length.

Reaching Master

Name _____ Reaching 16-11

Problem Solving: Make and Test Generalizations

When you make a generalization, you make a broad statement about something that a group has in common. A generalization helps you find patterns. When you make a generalization, it is important to test it to be sure it is correct.

Example: $1 \times 24 = 24$, $1 \times 81 = 81$
 $1 \times 100 = 100$

In some cases, it is possible to find more than one generalization.

Example: Jessica found a new pattern: 3 and 4.

Generalization #1: The things Jessica found are all odd numbers.

Generalization #2: The things Jessica found are all even numbers.

Test: Don't you wish you had a pencil and a ruler? Write down the numbers you are all odd. By generalizations are correct.

Test: Don't you wish you had a pencil and a ruler? Write down the numbers you are all even. By generalizations are correct.

1. Randy has 2 items, 6 marbles, and 1 orange in his desk drawer. What generalization can you make about these things? **They are all round.**

2. This week, Sandy was out sick on Monday and Tuesday. Last week, Janet was out sick on Thursday and Friday. The week before, Elisa was out sick on Wednesday and Thursday. What generalization can you make about these three students' absences? Can you make a second generalization? **They were each sick for 2 days. Yes, they were all absent because they were sick.**
3. Write down the first three multiples of 15, 20, and 35. What generalization can you make about all multiples of 15, 20, and 35? **Sample answer: All multiples of 5 end in 5 or 0.**

Also available in print

Number	Area
10	
20	
30	
40	
50	

Number	Area
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

6. Show the factors for these multiples of five.

Level Ability 7

Partner Talk Listen for the words *area* and *perimeter*. For example, a student might say, "We should count squares to find the *area*, and we should find the distance around the border to get the *perimeter*."


Levelled Homework


Practice Master


Name _____ Practice 16-11

Problem Solving: Make and Test Generalizations

For Exercises 1 through 3, use the images to make a generalization and test your answer.

1.  **All shapes are quadrilaterals because they all have 4 sides.**

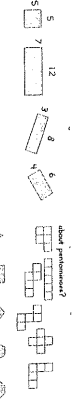
2.  **All shapes have at least 2 acute angles.**

3.  **All shapes are rectangles because they have 4 sides and 4 right angles.**

4. Which statement below is a good generalization about all polygons?
 - A. All polygons have right angles.
 - B. All polygons are closed figures.
 - C. All polygons have 4 sides.
 - D. All polygons are quadrilaterals.

5. Writing to Explain: Try to draw a triangle with 2 right or obtuse angles. What generalizations can you make about obtuse angles? **Sample answer: A triangle will never have more than 1 right or obtuse angle.**

Also available in print



5. A polygon is a straight line segment that can be drawn in a polygon to connect two of its vertices. A side of a polygon can never be a straight line segment. Make your own polygon. Copy and paste it into the box. Label the number of sides and the number of angles it has?

Level Ability 8

Name _____ Enrichment 16-11

Make Hundreds

When you add, use mental math. Mental math helps find tens and hundreds.

Look at each number in the puzzle board. Find two numbers in the box whose sum equals that number. You can use each number only once. Do not use pencil and paper to do these calculations.

115	79	293	374	305	66	189	172	485
128	326	34	435	85	427	415	147	431

Puzzle Board		
100	200	300
66 + 34	85 + 115	172 + 128
253 + 147	79 + 421	411 + 189
400	500	600
374 + 326	305 + 495	485 + 415
700	800	900

What clues did you use to solve this puzzle? **Check students' methods. Students should be making hundreds.**

Also available in print

Have students discuss the patterns that they see. Draw a box around the basic fact. Underline the zeros in each first factor and in the quotients.

Repeat these steps with other examples as time permits.

Repeating Master

Using Mental Math to Divide

When dividing numbers that end in zero, you can use basic division facts, as well as patterns, to help you divide mentally. For example:

When You Think	Find 210 ÷ 7 =	Find 4,200 ÷ 6 =
First, find the basic fact: 210 ÷ 7 = 30 3 tens or 30	210 ÷ 7 = 30	4,200 ÷ 6 = 700 42 hundreds ÷ 6 = 71 hundreds or 700
When You Write		

- Divide. Use mental math.
- $250 \div 5 = 50$
 - $7,200 \div 9 = 800$
 - $3,200 \div 4 = 800$
 - $2,800 \div 7 = 400$
 - $810 \div 9 = 90$
 - $5,000 \div 5 = 1,000$
7. Number Sense What basic fact would you use to help solve $5,000 \div 5$?
8. In 1 week, there are 7 days. How many weeks are in 210 days? **30 weeks**
9. How many weeks are there in 420 days? **60 weeks**

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Levelled Homework

Practice Master

Using Mental Math to Divide

- Divide. Use mental math.
- $1,250 \div 5 = 250$
 - $1,400 \div 2 = 700$
 - $3,300 \div 5 = 660$
 - $1,600 \div 4 = 400$
 - $240 \div 8 = 30$
 - $3,600 \div 4 = 900$
 - $1,600 \div 2 = 800$
 - $8,270 \div 3 = 90$
 - $4,200 \div 7 = 600$
 - $10,640 \div 8 = 80$
 - $2,000 \div 5 = 400$
 - $42,320 \div 8 = 40$
 - $1,200 \div 2 = 600$
 - $14,160 \div 6 = 200$

- The fourth grade performed a play based on the story of Cinderella. There was one chair for each person present.
- On Friday, 140 people came to the play. The chairs in the auditorium were arranged in 7 equal rows. How many chairs were in each row? **20 chairs**
 - There were 8 equal rows set up for Saturday's performance. There were 240 people at the play on Saturday. How many chairs were in each row? **30 chairs**
 - Which is the quotient of $5,000 \div 8$? **700**
18. Writing to Explain Explain why the following answer is not correct: $1,000 \div 5 = 2,000$
When you divide by a whole number the quotient can never be larger than the dividend. The answer is 200.

Also available in print

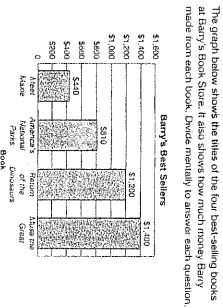
1. **Partner Talk** To check understanding, ask a student to repeat and complete this sentence: *To divide 2,800 by 7, the basic fact you use to divide the hundreds is [28 ÷ 7 = 4]*

2. **Partner Talk** To check understanding, ask a student to repeat and complete this sentence: *To divide 2,800 by 7, the basic fact you use to divide the hundreds is [28 ÷ 7 = 4]*

3. **Partner Talk** To check understanding, ask a student to repeat and complete this sentence: *To divide 2,800 by 7, the basic fact you use to divide the hundreds is [28 ÷ 7 = 4]*

4. **Partner Talk** To check understanding, ask a student to repeat and complete this sentence: *To divide 2,800 by 7, the basic fact you use to divide the hundreds is [28 ÷ 7 = 4]*

Barry's Best Sellers



- Barry charged \$7 for each copy of *A Matter of Time*. How many total copies did Barry sell? **200 copies**
- Barry charged \$4 for each copy of *Return of the Dinosaurs*. How many total copies did Barry sell? **300 copies**
- Barry charged \$5 for each copy of *A Matter of Time*. How many total copies did Barry sell? **90 copies**
- Barry began charging \$5 for each copy of *A Matter of Time*. How many total copies did Barry sell? **90 copies**
- Which book did Barry sell the most copies of? **Return of the Dinosaurs**

Also available in print