PRACTICE TEST

Answer the questions.

1. Part A

Which picture shows a fraction that is equivalent to $\frac{1}{3}$?

Ⓐ

Ⓑ

Ⓒ

Ⓓ

Part B

Explain your answer for Part A. Use multiplication to show that the fractions are equivalent.

Sample answer: Shading two of six equal pieces shows the same area as shading one of three equal pieces: $\frac{1}{3} = \frac{1 \times 2}{3 \times 2} = \frac{2}{6}$.

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2. Which of the following inequalities is true?

Ⓐ $\frac{1}{5} < \frac{1}{6}$

Ⓑ $\frac{3}{5} > \frac{4}{5}$

Ⓒ $\frac{5}{12} > \frac{1}{2}$

Ⓓ $\frac{4}{9} < \frac{4}{5}$

3. Select THREE fractions that are less than $\frac{1}{4}$.

Ⓐ $\frac{1}{6}$

Ⓑ $\frac{2}{5}$

Ⓒ $\frac{1}{8}$

Ⓓ $\frac{1}{3}$

Ⓔ $\frac{4}{8}$

Ⓕ $\frac{1}{10}$

4. Write $\frac{2}{4}$ as the sum of unit fractions.

Write your answer in the box.

$\frac{2}{4} = \frac{1}{4} + \frac{1}{4}$

5. Which equations are ways to decompose $\frac{4}{8}$. Select TWO answers.

Ⓐ $\frac{4}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$

Ⓑ $\frac{4}{8} = \frac{2}{8} + \frac{1}{8}$

Ⓒ $\frac{4}{8} = \frac{5}{8} + \frac{3}{8}$

Ⓓ $\frac{4}{8} = \frac{2}{8} + \frac{1}{8} + \frac{1}{8}$

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6. Select THREE equations that represent ways to decompose $\frac{7}{3}$.

Ⓐ $\frac{7}{3} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$

Ⓑ $\frac{7}{3} = \frac{1}{7} + \frac{1}{7} + \frac{1}{7}$

Ⓒ $\frac{7}{3} = \frac{4}{3} + \frac{3}{3}$

Ⓓ $\frac{7}{3} = \frac{5}{3} + \frac{1}{3} + \frac{1}{3}$

Ⓔ $\frac{7}{3} = \frac{5}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$

Ⓕ $\frac{7}{3} = \frac{8}{3} + \frac{1}{3}$

7. What is $4\frac{3}{10} - 1\frac{9}{10}$?

Write your answer in the box.

$2\frac{4}{10}$ or $2\frac{2}{5}$

8. Add $1\frac{2}{12} + 1\frac{3}{12} + 2\frac{8}{12}$. Show your work.

Sample answer: Add the fraction parts: $\frac{2}{12} + \frac{3}{12} + \frac{8}{12} = \frac{13}{12}$. $\frac{13}{12} = 1\frac{1}{12}$.

Add the whole number parts: 1 + 1 + 2 = 4. Combine the parts:

$4 + 1\frac{1}{12} = 5\frac{1}{12}$.

9. Which product is greatest?

Ⓐ $8 \times \frac{1}{10}$

Ⓑ $4 \times \frac{3}{4}$

Ⓒ $3 \times \frac{2}{3}$

Ⓓ $5 \times \frac{1}{3}$

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10. Which number makes the equation true?

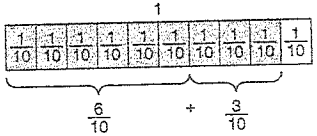
$____ \times \frac{2}{5} = 2\frac{2}{5}$

Ⓐ 2
Ⓑ 4
Ⓒ 6
Ⓓ 8

11. Part A

Sandy hikes $\frac{6}{10}$ mile and then stops for lunch. After lunch, Sandy hikes $\frac{3}{10}$ mile more. Draw a model to represent how far Sandy hikes.

Sample answer:



Part B

How far does Sandy hike in all? Write an equation that shows how you solved the problem. Explain your answer.

Sample answer: I can add $\frac{6}{10}$ and $\frac{3}{10}$ to find how far Sandy hikes in all. $\frac{6}{10} + \frac{3}{10} = \frac{9}{10}$. Sandy hikes $\frac{9}{10}$ mile.

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12. Select TWO fractions that are equivalent to 0.7.

Ⓐ $\frac{7}{10}$
Ⓑ $\frac{70}{10}$
Ⓒ $\frac{7}{100}$
Ⓓ $\frac{70}{100}$

13. Write the numbers in the box that complete the sum of $\frac{6}{10} + \frac{14}{100}$.

$\frac{6}{10} + \frac{14}{100} = \frac{\boxed{74}}{\boxed{100}}$

14. Write the symbol in the box that correctly completes the comparison.

2.17 [>] 2.07

15. Select THREE numbers that are greater than 0.76.

Ⓐ 0.67
Ⓑ 7.6
Ⓒ 0.8
Ⓓ 0.7
Ⓔ 0.77
Ⓕ 0.6

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You can convert from a larger unit of length to a smaller unit by multiplying.

THINK ABOUT IT

How could you find how many yards are in 15 feet?

EXAMPLE

How many feet are in 4 yards?

Think: 1 yard = 3 feet

Since there are 3 feet in 1 yard, multiply 3 feet by 4 to convert yards to feet.

3 feet × 4 = 12 feet

So, there are 12 feet in 4 yards.

EXAMPLE

How many cups are in 3 pints?

Think: 1 pint = 2 cups

Since there are 2 cups in 1 pint, multiply 2 cups by 3 to convert pints to cups.

2 cups × 3 = 6 cups

So, there are 6 cups in 3 pints.

EXAMPLE

How many ounces are in 2 pounds?

Think: 1 pound = 16 ounces

Since there are 16 ounces in 1 pound, multiply 16 ounces by 2 to convert pounds to ounces.

16 ounces × 2 = 32 ounces

So, there are 32 ounces in 2 pounds.

TURN AND TALK

Discuss how to use mental math to convert from minutes to seconds.

EXAMPLE

How many seconds are in 5 minutes?

Think: 1 minute = 60 seconds

Since there are 60 seconds in 1 minute, multiply 60 seconds by 5 to convert minutes to seconds.

60 seconds × 5 = 300 seconds

So, there are 300 seconds in 5 minutes.

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GUIDED INSTRUCTION

1. Use customary units. Write the unit you would use to measure each item.
   - length of a crayon
   - liquid volume of a washing machine
   - weight of a car

HINT, HINT

Length units are inches, feet, yards, and miles. Liquid volume units are cups, pints, quarts, and gallons. Weight units are ounces, pounds, , and tons.

Step One Think about relative sizes of length.

A license plate is about 1 foot long.

A crayon is shorter than 1 foot.

Measure the length of a crayon in inches.

Step Two Think about relative sizes of liquid volume.

A large container of milk is 1 gallon.

A washing machine holds more liquid than a large container of milk.

Measure the liquid volume of a washing machine in gallons.

Step Three Think about relative sizes of weight.

A loaf of bread weighs about 1 pound.

A car weighs more than a loaf of bread.

Measure the weight of a car in tons.

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SKETCH IT

You can draw a picture or diagram to show the same information as the table and find the answer to who spends more time reading.

2. Over the weekend, Dina spends 3 hours reading. Clark spends 150 minutes reading. Who spends more time reading?

Step One Make a table that relates hours to minutes.

1 hour = 60 minutes

Hours	Minutes
1	60
2	120
3	180

Step Two Compare 3 hours to 150 minutes.

3 hours = [180] minutes

180 minutes [>] 150 minutes

So, 3 hours > 150 minutes.

Step Three Use the inequality to solve the problem.

Dina spends [more] time reading.

HINT, HINT

Think about the relationship between the two units. Use multiplication to check if the measurements are equivalent.

3. Select THREE statements of equivalent measurements that are true.

Ⓐ 4 feet = 48 inches

Ⓑ 4 yards = 16 feet

Ⓒ 3 pints = 8 cups

Ⓓ 3 gallons = 15 quarts

Ⓔ 2 pounds = 32 ounces

Ⓕ 2 minutes = 120 seconds

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How Am I Doing?

What questions do you have?

Find something in the room and guess its length in feet. How can you use multiplication to convert the length to inches?

During the week, what activity do you spend the greatest number of seconds doing? Are seconds the best way to measure the length of that activity?

TURN AND TALK

A student wants to measure the width of his math book. Which customary unit should the student use? Work with a partner to explain your reasoning.

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

1. Order the customary units of volume from least volume to greatest. In the boxes, write each unit in order from 1 (least volume) to 4 (greatest volume).

quart	cup	pint	gallon

1. cup
2. pint
3. quart
4. gallon

HINT, HINT

There are 12 inches in one foot.

2. How many inches are in 6 feet?

Write your answer in the box.

6 feet = 72 inches



3. James has 3 gallons of punch. How many quarts of punch does he have?

(A) 6 quarts
(B) 8 quarts
(C) 10 quarts
(D) 12 quarts

4. Write the word in the box that correctly completes the sentence.

Kelly's bicycle weighs less than 1 ton.

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5. Select FOUR statements of equivalent measurements that are true.

(A) 1 hour = 60 minutes
(B) 2 feet = 20 inches
(C) 3 minutes = 180 seconds
(D) 4 yards = 12 feet
(E) 4 minutes = 200 seconds
(F) 10 quarts = 20 pints

6. Which length is less than 5 yards?

(A) 75 inches
(B) 12 feet
(C) 15 feet
(D) 200 inches

7. Which is the best estimate for the length of time it takes to watch a movie?

(A) 20 seconds
(B) 2 minutes
(C) 2 hours
(D) 20 hours

8. Greg reads for 300 seconds. Petra reads for 1 hour. Hallie reads for 70 minutes. Which lists the readers in order of reading time from greatest to least?

(A) Hallie, Petra, Greg
(B) Petra, Greg, Hallie
(C) Greg, Hallie, Petra
(D) Hallie, Greg, Petra

WORK SPACE

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WORK SPACE

9. Write the symbol in the box that correctly completes the comparison.

2 lb [>] 30 oz

10. Brianne says that there are about 64 ounces of ham in her sandwich. Is this a reasonable estimate? If not, what is a reasonable estimate? Explain your answer.

Sample answer: No, this is not reasonable. 1 pound is 16 ounces. 16 + 16 + 16 + 16 = 64, so 64 ounces is 4 pounds. That is too much ham for one sandwich. A reasonable estimate is about 4 ounces of ham.

11. Part A

Ms. Temple needs 5 quarts of juice to serve at a party. She has 8 pints. Does Ms. Temple have enough juice? Make a table that relates quarts to pints. Explain your answer.

Sample answer: 5 quarts = 10 pints
10 pints > 8 pints
She does not have enough juice to serve at the party.

Part B

How many more cups of juice does Ms. Temple need to have 24 cups of juice? Explain your answer.

Sample answer:
Ms. Temple has 4 quarts of juice.
4 quarts = 8 pints. 1 pint = 2 cups.
8 pints × 2 cups = 16 cups. 24 − 16 = 8,
so Ms. Temple needs 8 more cups of juice.

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EXIT TICKET

4.MD.1, 4.MD.1a

Now that you have mastered comparing customary units and converting from a larger customary unit to a smaller customary unit, let's solve the problem in the Real-World Connection.

Emily has 5 feet of rope. Her packing list for a camping trip says to bring 56 inches of rope.

Complete the table to see how many inches of rope she has.

Number of Feet	Number of Inches
1	12
2	24
3	36
4	48
5	60

Does Emily have enough rope? Explain your answer.

Yes, Emily has enough rope for the camping trip.
Sample answer: I first use multiplication to find out how many inches are in 5 feet. I know that there are 12 inches in 1 foot. I multiply 5 feet by 12 and get 60 inches. So, Emily has 60 inches of rope. I compare this to the amount of rope she needs, 56 inches. 60 inches is greater than 56 inches. So, Emily has enough rope for the camping trip.

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EXAMPLE

How many milliliters are in 2 liters?

1 L = 1,000 mL

Multiply by 1,000 to convert liters to milliliters.

2 × 1,000 milliliters = 2,000 milliliters

So, there are 2,000 mL in 2 L.

EXAMPLE

How many grams are in 5 kilograms?

1 kg = 1,000 g

Multiply by 1,000 to convert kilograms to grams.

5 × 1,000 grams = 5,000 grams

So, there are 5,000 g in 5 kg.

TURN AND TALK

Discuss how to use mental math to convert units in the metric system.

GUIDED INSTRUCTION

TIPS AND TRICKS

Use a benchmark item to help you decide the best unit. The width of your index finger is about 1 cm. Compare the length of a grasshopper to the width of your finger. You can use this same method for volume and mass.

1. Write the metric unit you would use to measure each item.
   - length of a grasshopper
   - liquid volume of a soup pot
   - mass of a pencil

Step One Decide which metric unit of length is best for the length of a grasshopper.

A dime is 1 mm thick and is too small.

100 centimeters are in 1 meter.

A grasshopper is much less than 1 meter long.

So, measure the length of a grasshopper in centimeters.

Step Two Decide which metric unit of liquid volume is best for the volume of a soup pot.

A large bottle of water holds 1 liter.

A soup pot holds as much or more than a bottle of water.

So, measure the volume of a soup pot in liters.

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Step Three Decide which metric unit of mass is best for the mass of a pencil.

A large book has a mass of about 1 kilogram.

A pencil has much less mass than a large book.

So, measure the mass of a pencil in grams.

2. Use metric units. Choose the better estimate for each item.
   - Is the mass of a watermelon 9 grams or 9 kilograms?
   - Is the liquid volume of a spoonful of cough syrup 15 milliliters or 15 liters?

Step One Decide which metric unit of mass is best for the mass of a watermelon.

A paper clip has a mass of about 1 gram.

A big book has a mass of about 1 kilogram.

The better estimate is 9 kilograms for the mass of a watermelon.

Step Two Decide which metric unit of liquid volume is best for the volume of a spoonful of cough syrup.

A medicine dropper can hold about 1 milliliter of liquid.

A large bottle of water can hold about 1 liter of liquid.

The better estimate is 15 milliliters for the liquid volume of a spoonful of cough syrup.

3. Which length is NOT more than 2 meters?

   (A) 200 centimeters
   (B) 300 centimeters
   (C) 3,000 millimeters
   (D) 2 kilometers

SKETCH IT

Drawing a hundred grid might help you see the relationship between centimeters and meters since 100 centimeters are in 1 meter.

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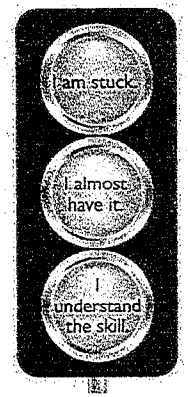
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TURN AND TALK

Each punch bowl has 2 liters of juice in it. There are 3 punch bowls at the party. If Jenny buys 8,000 milliliters of juice, will she have enough punch to fill all three of the punch bowls? Work with a partner to explain how you found the answer.

Color in the traffic signal that shows how you are doing with the skill.



How Am I Doing?

What questions do you have?

Can you find something in the room to measure in meters? How can you use multiplication to record its length in centimeters?

What is an item you might measure in grams and one that is best measured in kilograms?

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INDEPENDENT PRACTICE

Answer the questions.

1. Write the word in the box that correctly completes the sentence.

   Val's cat has a mass that is [more] than 10 grams.

2. Which is the best estimate for the liquid volume of a large fish tank?

   (A) 2 milliliters
   (B) 20 milliliters
   (C) 20 liters
   (D) 2,000 milliliters

3. Which length is less than 4 meters?

   (A) 5,000 millimeters
   (B) 3,000 centimeters
   (C) 300 centimeters
   (D) 1 kilometer

4. Write the symbol in the box that correctly completes the comparison.

   7 kg [>] 5,000 g

WORK SPACE

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5. How many millimeters are in 10 centimeters?
Write your answer in the box.

10 centimeters = [100] millimeters

▶ HINT, HINT
There are 1,000 grams in one kilogram.

6. Select the THREE statements of equivalent measurements that are true.

(A) 10 liters = 1,000 milliliters
(B) 2 kilograms = 2,000 grams
(C) 3 kilometers = 300 meters
(D) 4 meters = 4,000 centimeters
(E) 5 liters = 5,000 milliliters
(F) 600 centimeters = 6,000 millimeters

WORK SPACE

7. Order the metric units of length from smallest to largest. In the boxes, write each unit in order from 1 (smallest) to 4 (largest).

meter	kilometer	millimeter	centimeter

1 [millimeter]
2 [centimeter]
3 [meter]
4 [kilometer]

8. Which is the best estimate for the height of a ladder?

(A) 500 millimeters
(B) 50 centimeters
(C) 5 meters
(D) 5 kilometers

9. What symbol makes the comparison true? Write >, <, or =.
Write your answer in the box.

75 millimeters [<] 8 centimeters

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10 Part A
Ally needs 275 centimeters of ribbon to wrap presents. She has 3 meters of ribbon. Does Ally have enough ribbon? Make a table that relates meters to centimeters. Explain your answer.

Sample answer:
3 meters = 300 centimeters
300 centimeters
> 275 centimeters
Yes, she has enough ribbon.

Meters	Centimeters
1	100
2	200
3	300

Part B
Ally knows how to tie a special kind of bow. The bow requires 300 millimeters of ribbon. How many special bows can Ally make with 3 meters of ribbon? Explain your answer.

Sample answer:
Ally has 3 meters of ribbon.
3 meters = 300 centimeters
1 centimeter = 10 millimeters
300 × 10 millimeters = 3,000 millimeters
3,000 ÷ 300 = 10, so Ally can make 10 bows.

11 Frank says that his mug of hot chocolate holds about 3 milliliters. Is his estimate reasonable? If not, what is a reasonable estimate? Explain your answer.

Sample answer: No, his estimate is not reasonable.
A medicine dropper holds about 1 milliliter.
3 milliliters would not be very much liquid.
A reasonable estimate is about 300 milliliters of hot chocolate.

WORK SPACE

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EXIT TICKET

4.MD.1, 4.MD.1b, 4.MD.1c

Now that you have mastered converting from a larger metric unit to a smaller metric unit, let's solve the problem in the Real-World Connection.

Jack waters his neighbor's flowers while she is away. His watering instructions say to use 5 liters of water on the flower bed. Jack's watering can holds 1,000 milliliters.

Complete the table that relates liters to milliliters.

Liters	Milliliters
1	1,000
2	2,000
3	3,000
4	4,000
5	5,000

How many times does Jack need to fill the watering can to completely water the flowers?

Jack must fill his water can 5 times to give the flower bed 5 liters of water. I first use multiplication to find out how many milliliters are in 5 liters. I know that there are 1,000 milliliters in 1 liter. I multiply 5 liters by 1,000 and got 5,000 milliliters. Jack's watering can holds 1,000 milliliters, or 1 liter. So, Jack must fill his water can 5 times to give the flower bed 5 liters of water.

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TIPS AND TRICKS

Always remember to check your answer to make sure your planning and solving was correct.

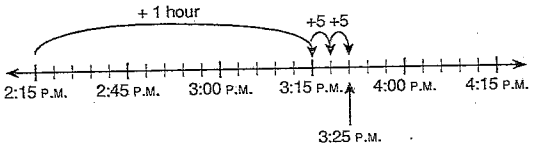
EXAMPLE

Dora's soccer practice starts at 2:15 P.M. and lasts for 1 hour and 10 minutes. At what time does Dora's soccer practice end?

Step One Read and Understand. Find the time Dora's soccer practice ends.

Step Two Plan. Draw a model and label it to show the start time. Divide the model into intervals of 5 minutes. Count forward 1 hour, then 5 minutes at a time.

Step Three Solve.



2:15 plus 1 hour is 3:15. Count 10 minutes more, by 5s: 3:20, 3:25.

Dora's soccer practice ends at 3:25 P.M.

Step Four Check. The answer makes sense.

You can use equivalent measurements and equations to solve measurement word problems.

TURN AND TALK

Is it easier in this problem to convert meters to centimeters or centimeters to meters? Why?

EXAMPLE

Leona has 3 meters of one color fabric. She has 150 centimeters of another fabric. Leona needs 4.25 meters of fabric to complete her costume.

Does Leona have enough fabric?

Step One Read and Understand. Find the total amount of fabric Leona has and compare it to the amount she needs.

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Step Two Plan.

Use equivalent measures. Multiply to express 3 meters as centimeters and 4.25 meters as centimeters.

Add to find the total amount of fabric.

Compare the amounts.

Step Three Solve.

1 m = 100 cm, so 3 × 100 cm = 300 cm

300 cm + 150 cm = 450 cm

4.25 m = 4 plus $\frac{25}{100}$ m = 425 cm

450 > 425

So, Leona has enough fabric.

Step Four Check. Leona has 3 m + 1 m + 50 cm = 4 m + 50 cm. She needs 4 m + 25 cm, so the answer makes sense.

GUIDED INSTRUCTION

1. Jana has 2 feet of rope. She needs to divide the rope into 3 equal pieces. How long should each piece be?

Step One Read and understand the problem.

Divide 2 feet into 3 equal pieces, and find the length of each piece.

Step Two Plan.

Find the number of inches in 2 feet.

Divide the number of inches by 3.

Step Three Solve.

1 foot = 12 inches

2 × 12 inches = 24 inches

24 inches ÷ 3 = 8 inches

Each length of rope should be 8 inches.

Step Four Check.

If each piece is 8 inches, that is 24 inches together (8 × 3 = 24). 24 inches = 2 feet, so the answer is correct.

THINK ABOUT IT

You can often check your work by using the reverse operation and working backwards.

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2. It takes 1 hour and 20 minutes for Randy to ride his bike from home to his grandmother's house. If Randy arrives at 1:00 P.M., what time did he leave?

Step One Read and understand the problem.

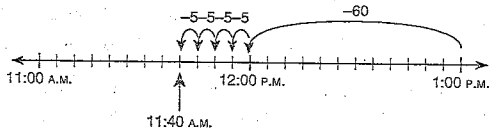
Find the time that Randy left home if he arrives at his grandmother's house at 1 P.M. and it takes 1 hour and 20 minutes to get there.

Step Two Plan.

Draw a model.

Start at 1 P.M. and work back 1 hour and 20 minutes.

Step Three Solve.



1 hour = 60 minutes

60 minutes before 1 P.M. is 12 P.M.

20 minutes before 12:00 P.M. is 11:40 A.M.

Randy leaves at 11:40 A.M.

Step Four Check the answer.

If Randy leaves at 11:40 A.M., 1 hour later is 12:40 P.M., and 20 minutes after that is 1 P.M.

So, the solution is correct.

SKETCH IT

If you are not sure what operation to use to solve a problem, draw a diagram. The diagram may help you understand what you know and what you need to find out.

3. Which number correctly completes the statement?
Skylar spent $\frac{1}{4}$ of her money buying a gift for her mother.

If Skylar spent $30 on her mother's gift, she had $_____ to start.

Ⓐ 60
Ⓑ 80
Ⓒ 100
Ⓓ 120

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How Am I Doing?

What questions do you have?

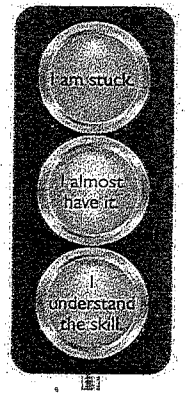
What are the four steps to solving measurement word problems?

What is an example where you needed to solve a measurement problem about money, time, or distance?

TURN AND TALK

Liam bought a T-shirt for $12.79, including tax. He paid with a $20 bill. What change will he receive? If the clerk gives him the fewest bills and coins possible, what bills and coins will he get back? On a separate sheet of paper, work with a partner to list the steps you would follow to find the answers.

Color in the traffic signal that shows how you are doing with the skill.



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WORK SPACE

INDEPENDENT PRACTICE

Answer the questions.

1. Lola runs in a race that is 3 miles long. There are rest stops for water every $\frac{1}{3}$ mile including the final stop. How many rest stops are there in all?

   (A) 3
   (B) 6
   (C) 9
   (D) 12

2. Together, Rick and Lars have $1.20. They want to share the money equally. How much money should each boy get?

   Write your answer in the box.

   $ [0.60]

3. Maya's scout meeting started at 10:30 A.M. It ended 1 hour and 45 minutes later. What time did Maya's scout meeting end?

   (A) 11:30 A.M.
   (B) 12: 00 A.M.
   (C) 12:15 P.M.
   (D) 1:15 P.M.

4. Write the number in the box that correctly completes the statement.

   José spent $\frac{1}{5}$ of his money buying a video game.

   If José spent $12 on the video game, he had $ [60.00] to start.

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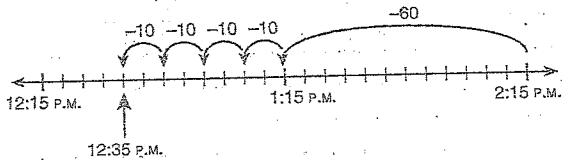
5. Kendra practiced softball for 15 minutes on Monday, 25 minutes on Tuesday, 40 minutes on Thursday, and 30 minutes on Friday. What is the total time Kendra spent practicing?

   Write your answer in the boxes.

   [1] hour and [50] minutes

6. Frank needs to be at his friend's house at 2:15 P.M. At what time should he leave if the trip takes 100 minutes? Draw a diagram. Explain your answer.

   Sample answer:



   100 minutes is 60 minutes + 40 minutes.
   1 hour is 60 minutes. Count back 1 hour: 1:15 P.M.
   Then count back by 10s for a total of 40: 1:05 P.M.,
   12:55 P.M., 12:45 P.M., 12:35 P.M.
   Check: 12:35 + 1 hour = 1:35 P.M.,
   plus 40 minutes = 2:15 P.M.
   Frank should leave at 1:35 P.M.

7. Part A

   Ashley walks $1\frac{1}{2}$ kilometers to school. Denise lives closer and walks 850 meters to school. How much farther does Ashley walk?

   Write your answer in the box.

   [650] meters

HINT, HINT

There are 60 minutes in one hour.

SKETCH IT

A diagram can be a number line with a scale of measurements.

WORK SPACE

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WORK SPACE

Part B

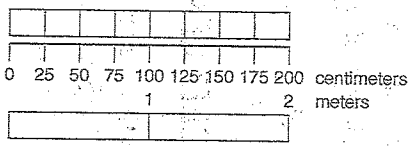
Explain how you solved the problem.

Sample answer: I converted $1\frac{1}{2}$ kilometers to 1,500 meters. Then I subtracted 850 meters from 1,500 meters and got 650 meters.

8. **Part A**

Mr. Clark is knitting a blanket that is 2 meters long. Every 25 centimeters, he changes the color of the yarn to make stripes. How many stripes will the blanket have? Draw a model to solve the problem.

Sample answer:



The blanket will have 8 stripes.

Part B

Show another way to solve the problem. Explain your answer.

Sample answer: 1 m = 100 cm. 2 m = 200 cm. 200 ÷ 25 = 8. A 2-meter blanket is 200 centimeters long. 200 centimeters divided into groups of 25 centimeters each makes 8 groups. The blanket will have 8 stripes.

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EXIT TICKET

4.MD.2

Now that you have mastered solving measurement word problems, let's solve the problem in the Real-World Connection.

Nita and Olive have $1.50 in quarters. They want to share the quarters equally. How many quarters should each girl get? How much money does each girl get?

Each girl will get 3 quarters, which equals $0.75.

Read and Understand: Find how many quarters make $1.50. Divide them into 2 equal groups. Find the dollar amount of each group.

Plan: Make a drawing, knowing that 1 quarter = $0.25 and 1 dollar = 100 cents.



Solve: 6 quarters make $1.50. Half of 6 is 3, and 3 quarters is $0.75. So, each girl will get 3 quarters, or $0.75.

Check: I know that 4 quarters make a dollar, and 2 quarters make $\frac{1}{2}$ a dollar, or $0.50. So, 6 quarters makes sense, and 75 + 75 = 150.

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EXAMPLE

Dean is making fruit punch. He mixes $1\frac{1}{2}$ liters of orange juice with 2 liters of ginger ale. Then he adds 450 milliliters of pineapple juice. What is the total volume of fruit punch in milliliters?

Step One Read and Understand. Find the total volume in milliliters.

Step Two Plan. Add to find the total number of liters. Two of the measurements are in liters (L) and one is in milliliters (mL). Use equivalent measures to change liters to milliliters.

1 L = 1,000 mL

Multiply to express liters as milliliters. Then find the sum.

Step Three Solve.

$1\frac{1}{2}$ liters + 2 liters + 450 milliliters = ?

$1\frac{1}{2}$ L + 2 L = $3\frac{1}{2}$ L

3 L = 3,000 mL and $\frac{1}{2}$ L = 1,000 ÷ 2 = 500 mL

3,000 mL + 500 mL + 450 mL = 3,950 mL

The total volume of the fruit punch is 3,950 milliliters.

Step Four Check. 450 milliliters is almost $\frac{1}{2}$ liter. The total of 4 liters = 4,000 milliliters, so the answer makes sense.

GUIDED INSTRUCTION

TURN AND TALK

Discuss how you can determine which operation you will use to solve word problems.

1. A softball team has 20 players. The team's water cooler holds 5 gallons of water. If the cooler is full, how many cups of water does each team member get?

Step One Understand the problem.

Find how many 1-cup servings are in 5 gallons.

Find how many servings each of 20 players gets.

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Step Two Plan.

Make a model that shows the relationship between gallons and cups.

1 gallon															
1 quart				1 quart				1 quart				1 quart			
1 pint		1 pint		1 pint		1 pint		1 pint		1 pint		1 pint		1 pint	
1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup

Convert 5 gallons to cups. Then divide by the number of players to find how many cups of water each player gets.

Step Three Solve.

1 gallon = 16 cups

5 gallons × 16 cups in each gallon = 80 cups

80 ÷ 20 = 4

Each team member gets 4 cups of water.

2. Theo has 3 water bottles. Each water bottle holds 1 quart. If Theo fills each water bottle, how many cups of water does Theo have?

Order the steps from 1–5 to solve the problem.

Step	Order
1 quart = 2 pints	2
3 × 1 quart = 3 quarts	1
1 pint = 2 cups	4
3 × 2 pints = 6 pints	3
6 × 2 cups = 12 cups	5

HINT, HINT

Read through all the options. If you know what is last, write 5 for the order. Then think about what happens first and write 1 for the order.

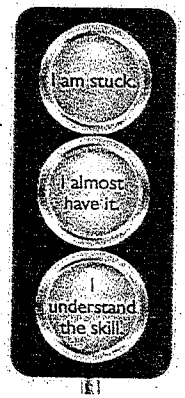
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TURN AND TALK

Work with a partner to write and solve a liquid volume problem and a mass word problem. For one of the problems have the answer given in a different unit than the one used in the problem. Share with classmates.

Color in the traffic signal that shows how you are doing with the skill.



How Am I Doing?

What questions do you have?

What are the steps in the problem-solving plan?

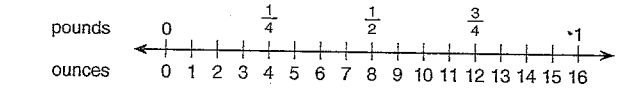
Will the steps in every problem-solving plan be the same? Explain why or why not.

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INDEPENDENT PRACTICE

Answer the questions.

1. Freida wants to buy 12 ounces of cheese at the deli counter. How many pounds of cheese should she ask for? Use the model to help.



Write your answer in the box.

12 ounces = $\frac{3}{4}$ pound

2. Francie learns that an adult female elephant weighs about 3 tons. A baby elephant, called a calf, weighs about 200 pounds. How much more does the mother weigh than her calf?

Order the steps from 1–3 to solve the problem.

Step	Order
6,000 − 200 = 5,800 pounds	3
1 ton = 2,000 pounds	1
3 × 2,000 pounds = 6,000 pounds	2

3. Reba pours a mixture of orange juice and cranberry juice in a pitcher, for a total of $1\frac{1}{2}$ liters. If the pitcher contains 800 milliliters of orange juice, how much cranberry juice is in the pitcher? Explain how you know.

Sample answer: There are 700 mL of cranberry juice.

$1\frac{1}{2}$ L = 1000 mL + 500 mL = 1,500 mL

1,500 mL − 800 mL = 700 mL

I converted $1\frac{1}{2}$ liters to 1,500 mL so that I could subtract 800 mL.

WORK SPACE

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HINT, HINT

There are two cups in a pint and two pints in a quart.

4. Which number correctly completes the statement?

Yasmin has a pitcher with 8 pints of iced tea and a pitcher with 1 quart of iced tea.

Altogether, Yasmin has _____ cups of iced tea.

(A) 24
(B) 20
(C) 16
(D) 12

5. Lara needs 2 kilograms of oats. How many 500-gram containers should she buy?

(A) 4
(B) 6
(C) 8
(D) 10

SKETCH IT

Draw a diagram that shows equivalent measures to help you solve a problem.

6. Seth has a rock that weighs 5,000 grams and a rock that weighs 4.5 kilograms. How much heavier is one rock than the other?

Write your answer in the box.

500 grams

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Part A

Tina wants to make 26 pints of lemonade. If she makes 3 gallons of lemonade, will she have enough? Draw a model. Explain.

Sample answer:

1 gallon															
1 quart				1 quart				1 quart				1 quart			
1 pint		1 pint		1 pint		1 pint		1 pint		1 pint		1 pint		1 pint	
1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup	1 cup

No, 3 gallons is not enough. There are 8 pints in 1 gallon. $3 \times 8 = 24$, so there are 24 pints in 3 gallons. $24 < 26$, so 3 gallons is less than 26 pints.

Part B

Tina finds a package of lemonade mix that makes 425 fluid ounces of lemonade. Is this enough for Tina? Explain.

Sample answer: Tina needs 26 pints of lemonade. 1 pint = 2 cups, so 26×2 cups = 52 cups. 1 cup = 8 fluid ounces. 52×8 fluid ounces = 416 fluid ounces. $416 < 425$, so the package will make enough.

HINT, HINT

One cup holds eight fluid ounces. There are two cups in a pint.

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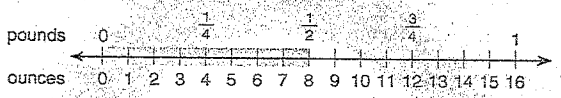
EXIT TICKET

4.MD.2

Now that you have mastered making a problem-solving plan, let's solve the problem in the Real-World Connection.

Make a problem-solving plan. How many pounds of cherries would Mabel like if she wants 8 ounces of cherries?

Mabel should ask for $\frac{1}{2}$ pound of cherries.



Understand. Find the equivalent number of pounds for 8 ounces.

Plan. Use a model that shows the relationship between ounces and pounds.

Solve and Check.

1 pound = 16 ounces.

$\frac{1}{2}$ pound = 8 ounces out of 16.

$\frac{8}{16} = \frac{1}{2}$

There are 16 ounces in 1 pound.

8 ounces and $\frac{1}{2}$ a pound are equivalent measures.

1 pound = 16 ounces

$\frac{1}{2}$ pound = 8 ounces

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The perimeter of a shape is the distance around the outside of a shape.

- The perimeter is measured in units such as inches, feet, centimeters, or meters.
- The perimeter of a rectangle can be found with the formula: *Perimeter* = 2 × (*length* + *width*)
- To find the perimeter of a square, multiply the side length by 4.

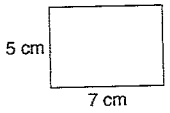
The area of a shape is the measure of the inside region or surface.

- The area is measured in square units such as square inches, square feet, square centimeters, or square meters.
- A square unit is a square with sides of 1 unit.
- The area of a rectangle can be found with the formula: *Area* = *length* × *width*

EXAMPLE

Find the perimeter of the rectangle.

Use the formula *Perimeter* = 2 × (*length* + *width*).



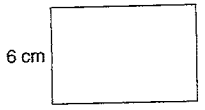
$P = 2 \times (7 + 5) = 24$

The perimeter is 24 centimeters.

EXAMPLE

Find the area of the rectangle.

Use the formula *Area* = *length* × *width*.



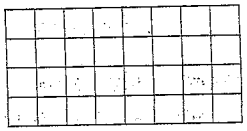
$A = 9 \times 6 = 54$

The area is 54 square centimeters.

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GUIDED INSTRUCTION

1. Find the area and perimeter of the rectangle.



TURN AND TALK

How do you know the length of each side of the rectangle?

Find the Area

Step One Find the length and width.

The length is the number of columns.

The width is the number of rows.

The length is 8 units.

The width is 4 units.

Step Two Substitute the length and width into the area formula.

Multiply the length times the width to find the area.

$A = l \times w$
$A = 8 \times 4$

$A = 8 \times 4$
$A = 32$

The area is 32 square units.

SKETCH IT

You can make a drawing to help you "see" the problem.

Find the Perimeter

Step One Substitute the length and width into the perimeter formula.

$P = 2 \times (l + w)$
$P = 2 \times (8 + 4)$

Step Two Solve.

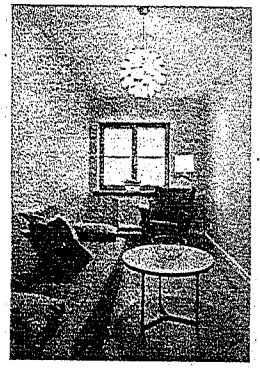
$P = 2 \times (8 + 4)$
$P = 24$

The perimeter is 24 units.

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2. The area of a rectangular room is 24 square yards. The length of the room is 6 yards. What is the perimeter of the room?

Step One Use the formula for the area of a rectangle to find the width.

$A = l \times w$

24 = 6 × w

Step Two Divide the area by the length to find the width.

$24 \div 6 = 4$

The width is 4 yards.

Step Three Substitute the length and width into the perimeter formula.

$P = 2 \times (l + w)$

$P = 2 \times (6 + 4)$

Step Four Solve.

$P = 2 \times 10$

$P = 20$

The perimeter is 20 yards.

HINT, HINT

First, step out the problem to find the area and perimeter. Then compare your findings to each answer choice to see if it makes sense.

3. Charlie is going to paint a rectangular wall that has no windows. The wall is 12 feet long and 8 feet high. Which sentences are correct? Select THREE answers.

Ⓐ Charlie needs to find the area to know how much paint he needs.

Ⓑ Charlie needs to find the perimeter to know how much paint he needs.

Ⓒ The area of the wall is 40 square feet.

Ⓓ The area of the wall is 96 square feet.

Ⓔ The perimeter of the wall is 40 feet.

Ⓕ The perimeter of the wall is 96 feet.

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How Am I Doing?

What questions do you have?

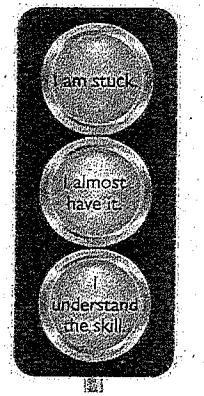
How do you find the area and the perimeter of a rectangle?

How do you find the length or width of a rectangle when given the area? Explain what other information you would need.

TURN AND TALK

Work with a partner. Choose a rectangular object in your classroom. Use metric units to measure the length and width of the object to find the area. Then, use customary units to measure the length and width of the object to find the perimeter. Show your work.

Color in the traffic signal that shows how you are doing with the skill.



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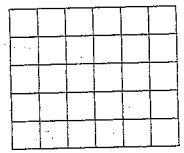
WORK SPACE

INDEPENDENT PRACTICE

Answer the questions.

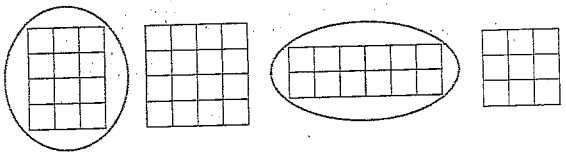
1. Which number correctly completes the statement?

   The area of the rectangle is ___ square units.

   Ⓐ 5
   Ⓑ 6
   Ⓒ 11
   Ⓓ 30

2. Circle TWO rectangles that have an area of exactly 12 square units.

3. A rug has a length of 5 feet and a width of 3 feet. Which statements are true? Select TWO answers.

   Ⓐ The area of the rug is 15 square feet.
   Ⓑ The area of the rug is 16 square feet.
   Ⓒ The perimeter of the rug is 15 feet.
   Ⓓ The perimeter of the rug is 16 feet.

TIPS AND TRICKS

Make sure you include the correct units. Otherwise, your answer may be marked incorrect.

4. A rectangle has an area of 36 square inches. The length of the rectangle is 9 inches. What is the width of the rectangle?

   Write your answer in the box.

   4 inches

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5. Which number correctly completes the statement?

   The perimeter of a square is 24 inches.

   Each of its sides has a length of ___ inches.

   Ⓐ 4
   Ⓑ 6
   Ⓒ 8
   Ⓓ 12

6. A rectangular garden has a length of 9 meters and a width of 5 meters. Write the numbers in the box to show the perimeter and area of the garden.

   Perimeter = 28 meters

   Area = 45 square meters



WORK SPACE

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HINT, HINT

Think of all possible length and width measurements that result in a perimeter of 20 inches. Calculate the area for each pair of lengths and widths. Then, select the greatest area.

7 **Part A**

The perimeter of a rectangle is 20 inches. What is the greatest area that the rectangle can have?

Write your answer in the box.

25 square inches

Part B

Explain how you found your answer. Include the dimensions of your rectangle in your explanation.

Sample answer: I found pairs of addends that have sums of 10 and then multiplied the addends. I made a list of all possible rectangles: 9 by 1, 8 by 2, 7 by 3, 6 by 4, and 5 by 5. Since $5 \times 5 = 25$ and the other pairs have lesser products, the 5-by-5 rectangle has the greatest area.

HINT, HINT

Find the length of the rectangle before finding the perimeter.

8 The area of a rectangle is 30 square centimeters. The width of the rectangle is 3 centimeters. What is the perimeter of the rectangle?

Ⓐ 10 centimeters
Ⓑ 13 centimeters
Ⓒ 26 centimeters
Ⓓ 30 centimeters

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EXIT TICKET

4.MD.3

Now that you have mastered finding the area and perimeter of a rectangle, let's solve the problem in the Real-World Connection.

Sanjay's family is moving into a new home. Sanjay wants to cover the floor of his room with carpeting. His room is 15 feet long and 9 feet wide. How much carpeting will Sanjay need?

Sanjay will need 135 square feet of carpeting to cover the floor of his room.

$A = l \times w$

$A = 15 \times 9$

$A = 135$

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GUIDED INSTRUCTION

TURN AND TALK

Discuss how you know what fractional measurement to use to divide the number line.

1. Data points for the length of pieces of chalk to the nearest $\frac{1}{4}$ inch are shown. Make a line plot to represent the data.

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

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

Step One Determine the shortest and longest lengths.

The shortest length is [3] inches.

The longest length is [$4\frac{3}{4}$] inches.

Step Two Find the fraction of an inch to use in the graph.

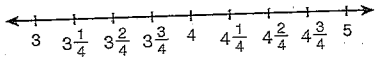
Each mixed number has [4] as the denominator.

Step Three Decide how to create the number line.

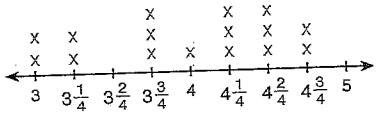
Using whole numbers, the number line should go from [3]

to [5] in intervals of [$\frac{1}{4}$].

Step Four Create the number line.



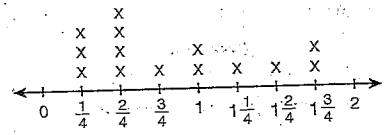
Step Five Place an X for each piece of data or measurement. The top row of numbers above already been added.



Number of Inches

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2. The line plot shows the number of books of raffle tickets that Mark sold each day. Which statements match the data? Select THREE answers.



Number of Books

Ⓐ Mark sold raffle tickets on 14 different days.

Ⓑ Mark sold more than 1 book on 6 days.

Ⓒ Mark sold $\frac{2}{4}$ book on the most days.

Ⓓ Mark sold less than 1 book on 8 days.

Ⓔ Mark sold $1\frac{3}{4}$ more books on his best day than his worst day of selling.

HINT, HINT

Each X mark represents a different day.



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SKETCH IT

Use your own paper to draw a line plot. Create ten measurements to the nearest eighth that are between 0 and 1 and plot them on your line plot. Then write and solve three questions about your line plot.

Color in the traffic signal that shows how you are doing with the skill.



How Am I Doing?

What questions do you have?

How can you use data to make a line plot?

Can you divide the number line into different measurements and graph the same data points? Explain why or why not.

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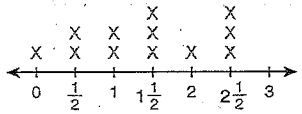
INDEPENDENT PRACTICE

Answer the questions.

1. The number of hours that Trevor spent on his computer each day for 12 days is shown. He rounded each data point to the nearest half hour.

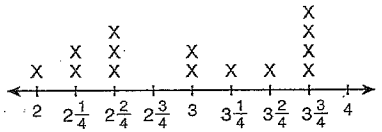
$2\frac{1}{2}$, 1, 1, $1\frac{1}{2}$, $\frac{1}{2}$, $2\frac{1}{2}$, 2, $1\frac{1}{2}$, $\frac{1}{2}$, 0, $2\frac{1}{2}$, $1\frac{1}{2}$

Complete a line plot of the data.



Number of Hours

2. The line plot shows the number of miles that Katie jogged each day for 2 weeks. She rounded each data point to the nearest $\frac{1}{4}$ mile.



Number of Miles Jogged

Write the number in the box that correctly completes the statement. $3\frac{3}{4}$

The distance Katie jogged most often was [$3\frac{3}{4}$] miles.

TIPS AND TRICKS

When you are making a line plot, you may want to make a tally table. The tally table can help you organize your data or check your work.

WORK SPACE

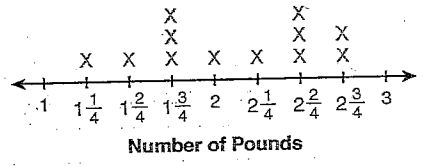
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WORK SPACE

3. The number of pounds of packaged chopped meat sold at Kutcher's Butcher Shop is shown. Each data item is rounded to the nearest $\frac{1}{4}$ pound.

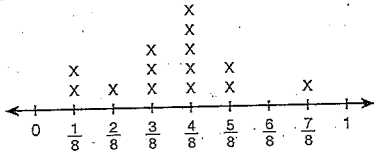
$1\frac{3}{4}, 1\frac{1}{4}, 2, 1\frac{2}{4}, 2\frac{2}{4}, 2\frac{1}{4}, 1\frac{3}{4}, 2\frac{2}{4}, 2\frac{3}{4}, 1\frac{3}{4}, 2\frac{2}{4}, 2\frac{3}{4}$

Complete a line plot of the data.



Number of Pounds

4. The line plot shows the part of a book Marcus read each day for 2 weeks.



Part of Book Read

Which statement best matches the data?

Ⓐ Marcus read exactly half of a book more days than not.

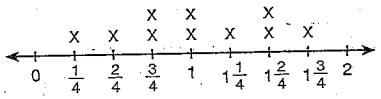
Ⓑ Marcus read more than half of a book four times.

Ⓒ The difference between the greatest and least amount of reading Marcusdid was $\frac{6}{8}$ of a book.

Ⓓ On the two days that Marcus read the most, he read $1\frac{5}{8}$ books.

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5. The line plot shows the time to the nearest $\frac{1}{4}$ hour it took Mr. Collins to drive to work on each the last 10 workdays.



Number of Hours

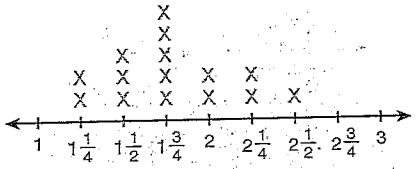
What is the total number of hours Mr. Collins drove? Write your answer in the box.

$10\frac{1}{4}$ hours

6. The length of movies in Robbie's collection to the nearest $\frac{1}{4}$ hour is shown.

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

Complete a line plot of the data.



Number of Hours

WORK SPACE

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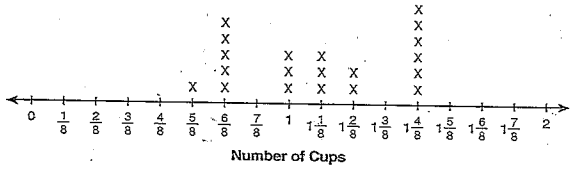
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HINT, HINT

You can rewrite mixed numbers as improper fractions.

WORK SPACE

7. The amount of water in different glasses to the nearest $\frac{1}{8}$ cup is shown in the line plot.



What is the difference between the glass with the most water and the glass with the least water?

Ⓐ $\frac{7}{8}$ cup

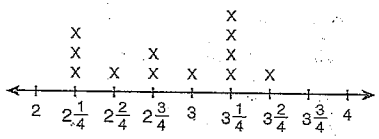
Ⓑ 1 cup

Ⓒ $1\frac{1}{8}$ cups

Ⓓ $2\frac{1}{8}$ cups

8. Part A

The line plot shows the height of stacks of pennies to the nearest $\frac{1}{4}$ inch.



If the two tallest stacks are combined, what would be the new height? Write your answer in the box.

$6\frac{3}{4}$ inches

Part B

Explain how you found your answer.

Sample answer: The two tallest stacks are $3\frac{2}{4}$ inches and $3\frac{1}{4}$ inches. Since they are being combined into one stack, I added $3\frac{2}{4} + 3\frac{1}{4} = 6\frac{3}{4}$ inches.

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EXIT TICKET

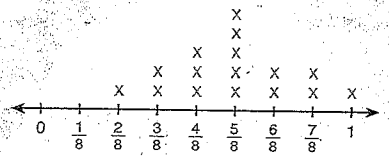
4.MD.4

Now that you have mastered the line plot, let's solve the problem in the Real-World Connection.

Gary measured the weight of several books to the nearest $\frac{1}{8}$ pound. His data is shown below.

$\frac{3}{8}, \frac{5}{8}, \frac{4}{8}, \frac{5}{8}, \frac{6}{8}, \frac{3}{8}, \frac{7}{8}, \frac{5}{8}, \frac{6}{8}, \frac{4}{8}, \frac{5}{8}, \frac{7}{8}, 1, \frac{5}{8}, \frac{2}{8}, \frac{4}{8}$

Create a line plot to organize Gary's data.



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PRACTICE TEST

CHAPTER 4

Answer the questions.

1. Write the symbol in the box that correctly completes the comparison.

   4 ft [<] 55 in.

2. How many feet are in 5 yards?

   Write your answer in the box.

   5 yards = [15] feet

3. Write the symbol in the box that correctly completes the comparison.

   5 kilograms [>] 500 grams

4. How many meters are in 10 kilometers?

   Write your answer in the box.

   10 kilometers = [10,000] meters

5. Davie read for 30 minutes on Monday, 60 minutes on Tuesday, 15 minutes on Thursday, and 25 minutes on Friday. What is the total time Davie spent reading?

   Write your answer in the boxes.

   [2] hours and [10] minutes

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6. Which number correctly completes the statement?

   Arlie spent $\frac{1}{3}$ of her money buying a sandwich.

   If Arlie spent $5 on the sandwich , she had $_____ to start.

   (A) 25
   (B) 20
   (C) 15
   (D) 10

7. Melissa has 2 fish tanks. Each fish tank holds 5 gallons of water. If Melissa needs to fill each tank, how many pints of water does she need?

   Order the steps from 1–5 to solve the problem.

Step	Order
1 quart = 2 pints	4
1 gallon = 4 quarts	2
2 tanks × 5 gallons = 10 gallons	1
40 × 2 pints = 80 pints	5
10 × 4 quarts = 40 quarts	3

8. Brenda has a book that weighs 3 pounds and a book that weighs 64 ounces. What is the difference in weight of the books?

   Write your answer in the box.

   [1] pound(s)

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9. Part A

Pauline needs 4 quarts of lemonade to serve at a party. She has 7 pints. Does Pauline have enough lemonade? Make a table that relates quarts to pints. Explain your answer.

Sample answer: 4 quarts = 8 pints
8 pints > 7 pints
She does not have enough lemonade to serve at the party.

Quarts	Pints
1	2
2	4
3	6
4	8
5	10

Part B

How many more cups of lemonade does Pauline need to have 30 cups of lemonade? Explain your answer.

Sample answer:
Pauline has 7 pints of lemonade. 1 pint = 2 cups. 7 × 2 cups = 14 cups.
30 − 14 = 16, so Pauline needs 16 more cups of lemonade.

10. Select TWO statements of equivalent measurements that are true.

- (A) 1,000 milliliters = 10 liters
- (B) 1 kilogram = 1,000 grams
- (C) 30 kilometers = 300 meters
- (D) 4 meters = 4,000 millimeters
- (E) 50 liters = 5,000 milliliters
- (F) 6,000 centimeters = 600 millimeters

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11. Part A

The perimeter of a rectangle is 24 inches. What is the greatest area that the rectangle can have?

Write your answer in the box.

36 square inches

Part B

Explain how you found your answer. Include the dimensions of your rectangle in your explanation.

Sample answer: I found pairs of addends that have sums of 12 and then multiplied the addends. I made a list of all possible rectangles: 11 by 1, 10 by 2, 9 by 3, 8 by 4, 7 by 5, and 6 by 6. Since 6 × 6 = 36, and the other pairs have lesser products, the 6-by-6 rectangle has the greatest area.

12. A rectangular box has a length of 12 inches and a width of 6 inches. Write the numbers in the box to show the perimeter and area of the box.

Perimeter = 36 inches

Area = 72 square inches

13. Can a rectangle have the same area and perimeter? Use what you know about the units for area and perimeter to explain your answer.

Sample answer: A rectangle cannot have the same area and perimeter because area is measured in square units and perimeter is measured in units.

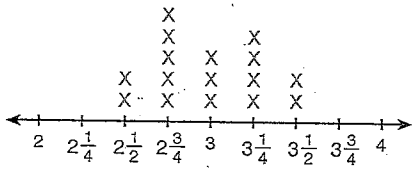
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14. The lengths of the football games that the Block family watched to the nearest $\frac{1}{4}$ hour is shown.

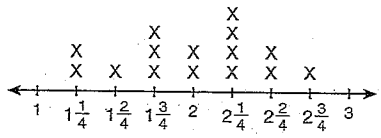
$3\frac{1}{4}, 2\frac{3}{4}, 3, 3\frac{1}{2}, 2\frac{3}{4}, 3\frac{1}{4}, 2\frac{1}{2}, 3\frac{1}{4}, 3, 2\frac{3}{4}, 3\frac{1}{4}, 2\frac{3}{4}, 2\frac{1}{2}, 3\frac{1}{2}, 2\frac{3}{4}, 3$

Complete a line plot of the data.



Number of Hours

15. The weights of cans of food to the nearest $\frac{1}{4}$ pound are shown in the line plot.



Number of Pounds

What is the combined weight of the two lightest cans?

Write your answer in the box.

$2\frac{2}{4}$ pounds

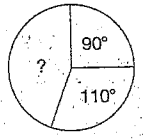
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TIPS AND TRICKS

You can tell if an angle is obtuse or acute by looking at it. Compare it to a right angle; is it larger or smaller?

2. Find the missing angle measure. Then classify the angle.



Step One Add the known angle measures.

$90° + 110° = 200°$

Step Two Subtract the total from the number of degrees in a circle.

$360° - 200° = 160°$

The missing angle measures 160°.

Step Three What type of angle is it?

The angle is obtuse because the angle measure is $> 90°$.

HINT, HINT

Remember, an acute angle measures $< 90°$.

3. Which will form an acute angle? Select TWO answers.

- (A) Dividing a circle into 4 equal sections
- (B) Dividing a circle into 9 equal sections
- (C) Moving $\frac{1}{2}$ turn around a circle
- (D) Moving $\frac{1}{6}$ turn around a circle
- (E) Making 100 one-degree turns

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How Am I Doing?

What questions do you have?

Would an angle measuring $\frac{1}{10}$ of a turn be larger than an angle measuring $\frac{1}{6}$ of a turn?

Where do you see acute or obtuse angles in everyday life?

SKETCH IT

Find 10 angles in the room you are in. On a separate sheet of paper, sketch each angle and classify it as a right angle, straight angle, acute angle, or obtuse angle.

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

SKETCH IT

Try sketching some of the angles by drawing a circle and then using it to draw the angle described.

WORK SPACE

1. Which forms an obtuse angle?

   Ⓐ Moving $\frac{1}{3}$ turn around a circle

   Ⓑ Moving $\frac{1}{4}$ turn around a circle

   Ⓒ Dividing a circle into 5 equal parts

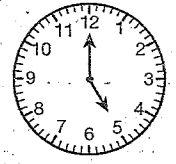
   Ⓓ Making 78 one-degree turns

2. Mark placed his model airplane on a turntable. The turntable rotates one degree each second. After 90 seconds, what is the measure of the angle of rotation in degrees?

   Write your answer in the box.

   90 °

3. Which number correctly completes the statement?



   The hands on the clock form an angle that measures _____ degrees.

   Ⓐ 30

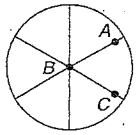
   Ⓑ 60

   Ⓒ 120

   Ⓓ 150

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4. The circle is divided into equal parts. What is the measure of angle *ABC* in degrees?



   Write your answer in the box.

   60 °

5. After 30 minutes, a rotating spotlight has made a $\frac{1}{3}$ turn. What is the measure of the angle of rotation in degrees?

   Ⓐ 30°

   Ⓑ 60°

   Ⓒ 100°

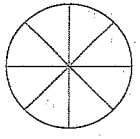
   Ⓓ 120°

6. Part A

   Miguel drew a circle and divided it into equal sections. Each section had an angle measurement of 45°.

   Draw lines to separate the circle into equal sections each having an angle measurement of 45°.

   Sample answer:



WORK SPACE

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WORK SPACE

Part B

Bradley drew a larger circle than Miguel. He divided his circle into 8 equal sections. Do the sections in Bradley's circle have a greater angle measurement than the sections in Miguel's circle? Explain how you know.

Sample answer: No; the sections have the same angle measurement. Bradley's circle is divided into 8 equal sections. To find the angle measurement of each section, divide 360° by 8. Each section has an angle measurement of 45°. 45° is the same as Miguel's circle.

7. Which phrase describes an angle?

(A) the intersection of two lines
(B) two rays meeting at a common endpoint
(C) a circle intersected by a line
(D) a circle intersected by two lines

8. An angle that is $\frac{1}{4}$ of a circle has what measure?

(A) 45°
(B) 90°
(C) 120°
(D) 180°

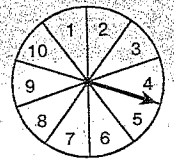
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EXIT TICKET

4.MD.5, 4.MD.5a, 4.MD.5b

Now that you have mastered understanding angle measurement, let's solve the problem in the Real-World Connection.

Cody is making a spinner for the school carnival. He takes a circle and divides it into 10 sections. To check if each section is the same size, he measures each angle. If the sections are equal, what will be the measure of each angle?



Sample answer: The measure of each angle will be 36°.
There are 10 equal sections, so each section is $\frac{1}{10}$ of a full turn.
360° ÷ 10 = 36°

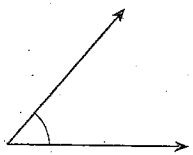
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GUIDED INSTRUCTION

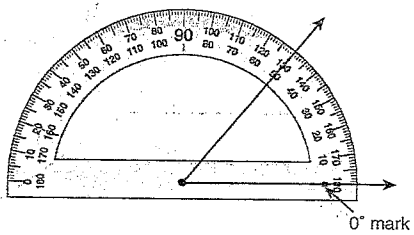


TIPS AND TRICKS

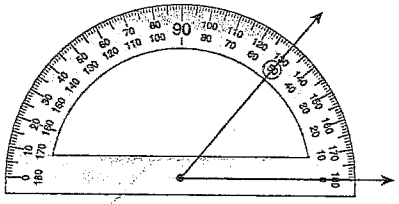
Estimate the measure of the angle first, then see if the angle measure makes sense when you use the protractor.

1. Find the angle measure. Classify the angle.

Step One Place the center of the protractor on the vertex and align one of the rays with the 0° mark.



Step Two Read the number where the other ray crosses. Use the inner scale because the first ray is aligned with the 0° mark on the inner scale.



The angle measure is 50°.

Step Three Classify the angle.

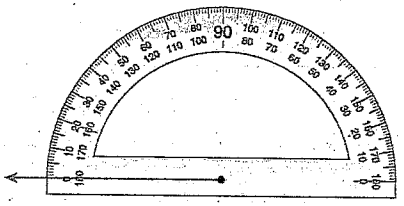
Since the angle measure is $< 90°$, it is an acute angle.

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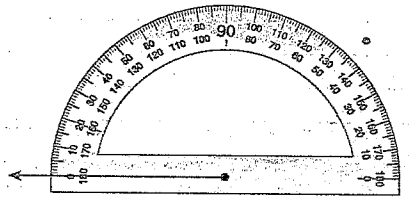
2. Draw an angle that measures 135°.

Step One Use the protractor's straight edge to draw the first ray.

Step Two Place the center mark of the protractor on the endpoint of the ray. Align the ray with the 0° mark.

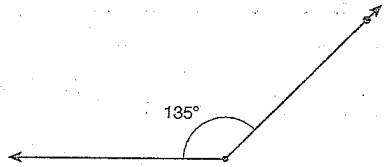


Step Three Find the 135° mark on the protractor. Use the same scale as the 0° mark of the first ray. Place a point.



Step Four Use a straight edge to connect the point with the endpoint of the first ray.

Label the angle with the measurement.



TURN AND TALK

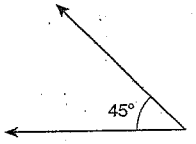
Notice that 90° is in the middle for both scales. Why is this the case?

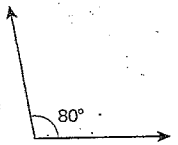
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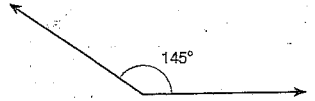
SKETCH IT

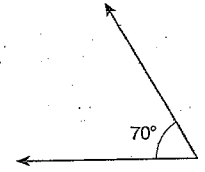
Use a protractor to draw each angle and determine if the measure given for each answer choice is correct.

3. Which angle measures that are correct? Select TWO answers.

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

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How Am I Doing?

What questions do you have?

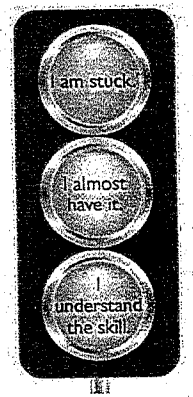
If you drew an angle that was supposed to measure 120° without using a protractor, how close do you think you would be?

How could you use your knowledge of angle measures and protractors in real-life?

TURN AND TALK

Working in a small group, use a protractor to find the angles in your teacher's last name. Write out your teacher's last name using all capital letters on a large sheet of paper, then examine the letters for angles. Use a protractor to measure each angle and carefully record the results. Add the angle measures together. Compare your results with another group and discuss any differences. If time allows, find the angles in your own last name.

Color in the traffic signal that shows how you are doing with the skill.



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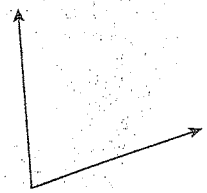
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INDEPENDENT PRACTICE

Answer the questions.

1. Use a protractor to measure the angle. Select the correct measure.

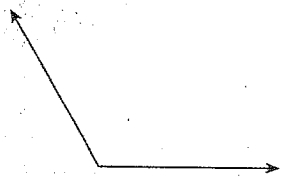


Ⓐ 75°
Ⓑ 85°
Ⓒ 95°
Ⓓ 105°

HINT, HINT

Be sure to align one of the rays with a 0° mark before reading the measurement where the other ray crosses the scale.

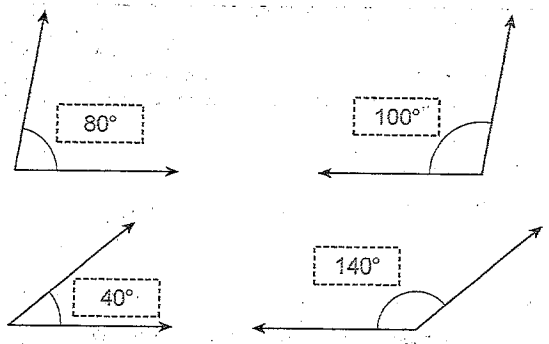
2. What is the measure of the angle in degrees?



Write your answer in the box.

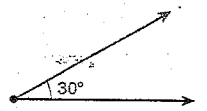
120°

3. Write the number to label each angle with its measure.

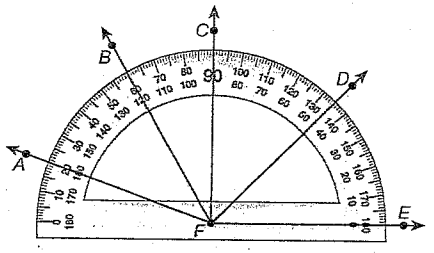


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4. Mark built a skateboard ramp. The ramp formed a 30° angle with the ground. Use a protractor to complete the drawing of the angle of the ramp.



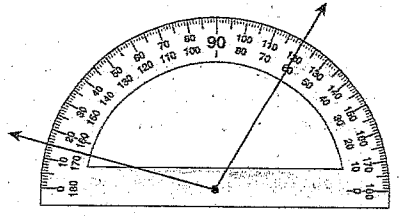
5. Which statement is true?



Ⓐ ∠*DFE* measures 35°.
Ⓑ ∠*BFE* measures 60°.
Ⓒ ∠*AFD* measures 135°.
Ⓓ ∠*BFC* measures 30°.

6. Part A

A student said this angle is an obtuse angle that measures 120°. What error did the student make? Correct his error.



Sample answer: The student did not align one of the rays with the 0° mark. The angle is an obtuse angle that measures 105°.

WORK SPACE

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TIPS AND TRICKS

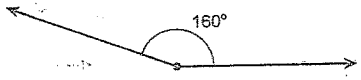
Remember that an obtuse angle measures more than 90 degrees.

WORK SPACE

Part B

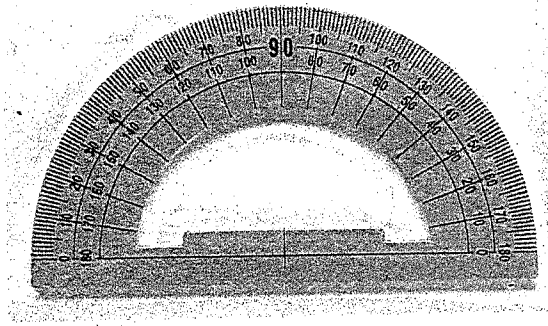
Draw an example of an obtuse angle. Label its measure.

Sample answer:



Eddie said that sometimes it does not matter which scale on the protractor you use to measure an angle. Do you agree? Explain your answer.

Sample answer: Yes, I agree with Eddie. For a 90° angle, the measure would be the same with either the inner or the outer scale.



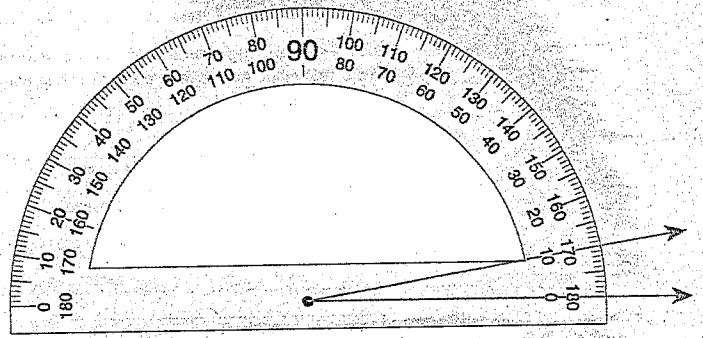
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EXIT TICKET

4.MD.6

Now that you have mastered measuring and drawing angles, let's solve the problem in the Real-World Connection.

Mr. Cho likes the ramp on the front of his neighbor's shed and wants to build one for his own shed. His ramp will form a 10° angle with the ground. He wants to make a sketch of his ramp. Use the image of a protractor and a ruler to draw a 10° angle over the protractor.



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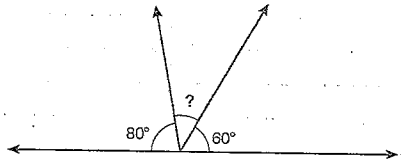
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GUIDED INSTRUCTION

THINK ABOUT IT

Do you think the unknown angle will be acute or obtuse?

1. A straight line has an angle measure of 180°. Find the missing angle measure.



Step One Identify the measure of the whole angle.

The whole angle measures 180°

Step Two Find the sum of the known angle measures.

80° + 60° = 140°

Step Three Subtract.

180° − 140° = 40°

2. Zack has two skateboard ramps. One ramp measures 12°. The other ramp measures 25°. He places one ramp on top of the other. What is the angle measure of the combined ramps?

Step One Identify the angle measures.

One ramp measures 12°

The other ramp measures 25°

Step Two Find the sum of the angle measures.

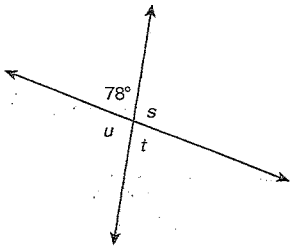
12° + 25° = 37°

Step Three Solve.

The angle of the combined ramps is 37°

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3. Two lines intersect to form four angles. One angle measures 78°.



Which angle measurement is correct?

(A) $s = 78°$

(B) $u = 102°$

(C) $t = 12°$

(D) $u + t = 90°$

HINT, HINT

Remember that if two angles that combine to form a straight line, the sum of their angle measures is 180°.

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SKETCH IT

Draw a right angle. Then draw a ray that divides the right angle into two smaller angles. Use a protractor to measure one of the angles and label it. Then write and solve a number sentence to find the measure of the other angle.

Color in the traffic signal that shows how you are doing with the skill.



How Am I Doing?

What questions do you have?

If you wanted to find the combined measure of two angles that share a side and a vertex, what would you have to do?

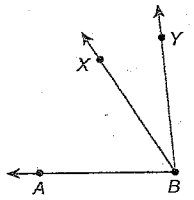
You see angles combined in many circular objects. What is something that you see in everyday life that is divided into several angles?

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INDEPENDENT PRACTICE

Answer the questions.

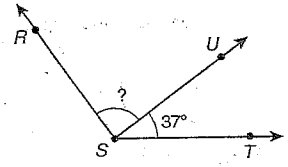
1. Angle *ABY* measures 85°.



Angle *XBY* is 25°. What is the measure of angle *ABX*?

Ⓐ 25°
Ⓑ 60°
Ⓒ 85°
Ⓓ 110°

2. The measure of angle *RST* is 125°.



What is the measure of angle *RSU*?

Write your answer in the box.

88 °

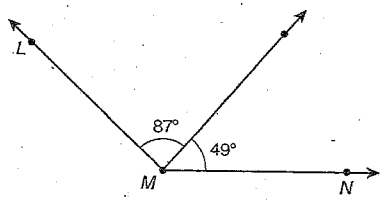
WORK SPACE

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3. Which number correctly completes the statement?



Angle *LMN* has a measure of _____ degrees.

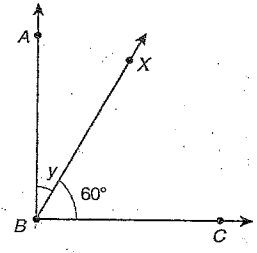
Ⓐ 93
Ⓑ 125
Ⓒ 136
Ⓓ 180

HINT, HINT

A right angle's measure is 90°.

4. Angle *ABC* is a right angle.

What is true about the angles? Select TWO answers.

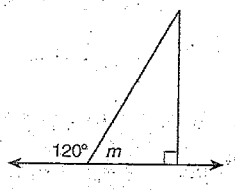


Ⓐ $60° + y = 180°$
Ⓑ $y = 30°$
Ⓒ $180° - 90° = y$
Ⓓ The measure of angle *ABX* is 120°.
Ⓔ Angle *ABX* is an acute angle.

5. What is the measure of angle *m*?

Write your answer in the box.

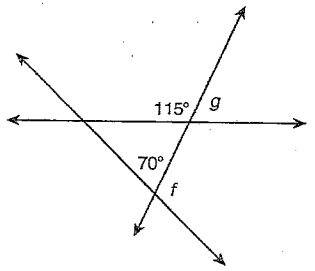
60 °



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6. Part A

What is the measure of angle *g*?



Write your answer in the box.

65 °

Part B

Explain how you found your answer to Part A.

Sample answer: I know that a straight line has a measure of 180°. The angle with the missing measure forms a straight line with the angle that measures 115°. $115° + g° = 180°$. I subtracted $180° - 115°$ to find the value of angle *g*. $g = 65°$.

7. A sprinkler turned 30° the first hour and 25° the second hour. At the end of the third hour, the sprinkler was at a 90° angle from its starting position. Find the angle the sprinkler turned during the third hour. Explain your answer.

Sample answer: The sprinkler turned 35° the third hour. I wrote an equation using *t* for the unknown angle: $30° + 25° + t = 90°$. I added 30° and 25° and then subtracted that sum from 90°.

TURN AND TALK

What is the measure of an angle that forms a straight line?

WORK SPACE

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EXIT TICKET

4.MD.7

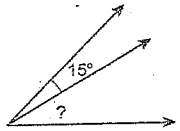
Now that you have mastered adding and subtracting angles, let's solve the problem in the Real-World Connection.

Gianna is playing a video game in which she must feed bananas to a gorilla. She sets the banana launcher to a 45° angle and launches a banana. She misses. She decides to decrease the angle of the launcher by 15°. What is the measure of the new angle?

Sample answer: The measure of the new angle is 30°

The whole angle measures 45°, and 15° needs to be subtracted.

45° − 15° = 30°.



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- A line segment is a part of a line. It has two endpoints.

line segment

- A ray is part of a line. It has one endpoint and goes in one direction without end.

ray

- An angle is formed when two rays meet at a common endpoint.

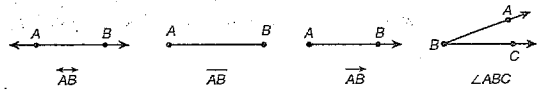
angle

Lines can be named by how they relate to each other.

- Parallel lines never cross and are always the same distance apart.
- Intersecting lines cross at one common point.
- Perpendicular lines are lines that intersect at right angles.

EXAMPLE

Name lines, line segments, rays, and angles using points and symbols.

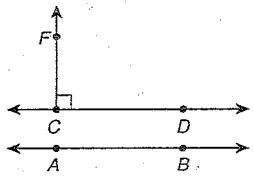


Say, "line *AB*," "line segment *AB*," "ray *AB*," and "angle *ABC*."

EXAMPLE

$\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{CD}$ ($\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$).

$\overrightarrow{CF}$ intersects and is perpendicular to $\overleftrightarrow{CD}$ ($\overrightarrow{CF} \perp \overleftrightarrow{CD}$).

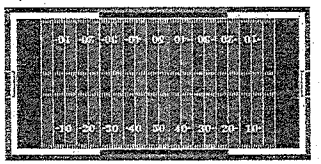


HINT, HINT

The square shape above point *C* tells you that angle *FCD* is a right angle.

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- When lines intersect, they form angles. If the angles are right angles, the lines are perpendicular.



There are many places where you see parallel and perpendicular lines, such as a football field.

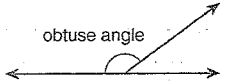
GUIDED INSTRUCTION

1. Draw a line and a ray that intersect at Point *C* to form an obtuse angle. Label the obtuse angle.

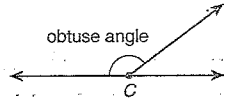
Step One Draw a line. A line has arrows on both ends to show that it continues on in both directions.



Step Two Draw a ray that intersects with the line. The angle formed should be obtuse, or greater than 90°.



Step Three Label the point where the line and ray meet. Use the letter *C*.



SKETCH IT

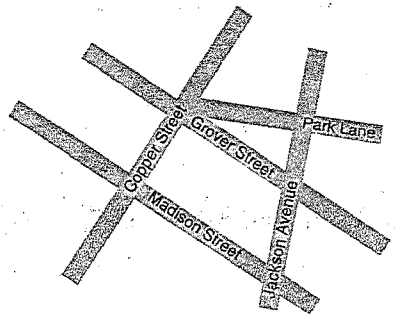
You can draw many shapes using a straightedge and a protractor. Experiment with different shapes and angles.

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HINT, HINT

Not all intersecting lines are perpendicular lines. Intersecting lines all form an angle, but only perpendicular lines form a right angle. A square symbol at the vertex can be used to show that the angle formed by two lines is a right angle.

2. In the map shown, which streets are parallel? Which streets are perpendicular?



Step One Identify the streets that are parallel. They will stay the same distance apart and never intersect.

Grover Street and Madison Street are parallel.

Step Two Identify the streets that are perpendicular. They will intersect at right angles.

Grover Street and Copper Street are perpendicular.

Madison Street and Copper Street are perpendicular.

HINT, HINT

Remember, parallel lines never cross and are always the same distance apart.

3. Circle THREE letters that have parallel lines.

(H) (E) A T (M)

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How Am I Doing?

What questions do you have?

What is an example of perpendicular lines found in your classroom?

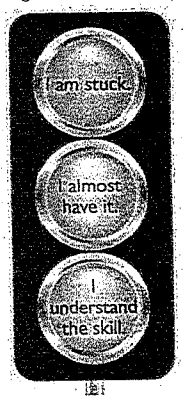
What is an example of parallel lines in your classroom?

If you drew a triangle, what type of geometric tools would you use?

SKETCH IT

In the margin below or on a separate sheet of paper, draw examples of intersecting lines, perpendicular lines, and parallel lines.

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

TIPS AND TRICKS

Remember the difference between a line and a line segment.

1. Select TWO objects that are correctly labeled.

Ⓐ line

Ⓑ ray

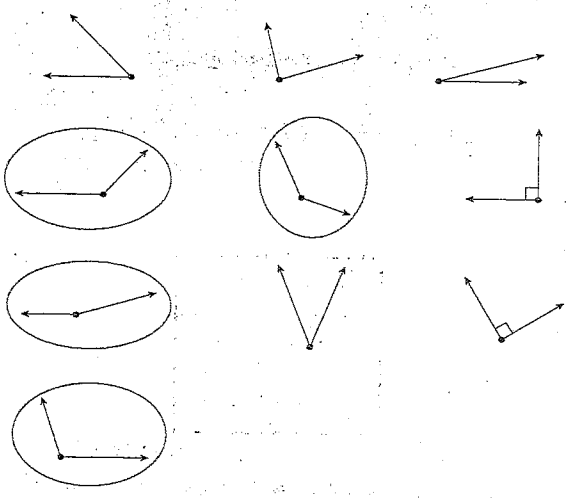
Ⓒ acute angle

Ⓓ point

HINT, HINT

The corner of a sheet of paper is a right angle. You can use a corner of a sheet of paper to compare each angle to a right angle. Is it less than a right angle or is it greater than a right angle?

2. Circle FOUR angles that are obtuse.

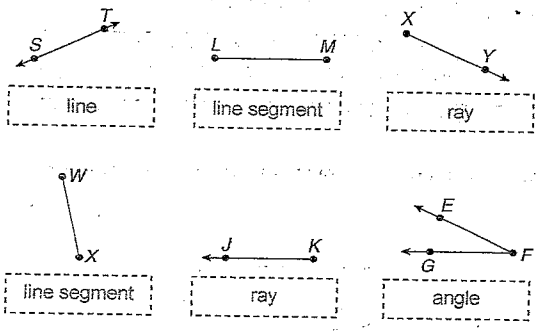


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3. Use the words in the box to label each object below.

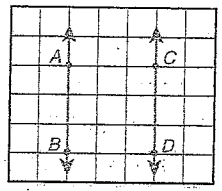
Words can be used more than once. Write each word in the appropriate box.

line	ray	line segment	angle



4. Use the grid to draw two vertical lines so that line AB is parallel to line CD.

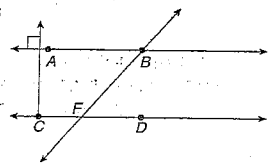
Sample answer:



5. Lee drew this diagram. Line AB is parallel to line CD.

What type of angle is formed by $\overleftrightarrow{CD}$ and $\overrightarrow{CA}$?

Write your answer in the box.



right

WORK SPACE

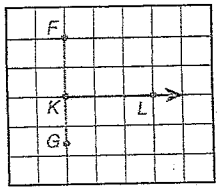
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WORK SPACE

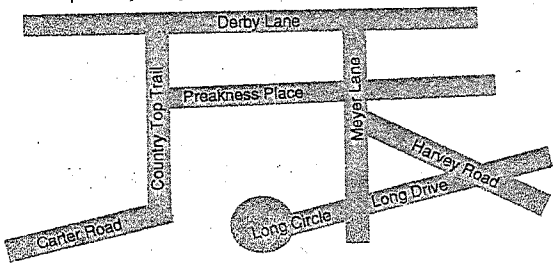
6. Use the grid to draw line segment *FG* perpendicular to ray *KL*.

Sample answer:



7. Part A

A map of Billy's neighborhood is shown.



Which streets on the map are parallel?

Sample answer: Derby Lane and Preakness Place are parallel. Country Top Trail and Meyer Lane are also parallel.

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Part B

Billy lives on Derby Lane. Zara lives on a street that is perpendicular to the street Billy lives on. Zara lives where two streets form an acute angle. Using the map shown in Part A, explain where Zara lives.

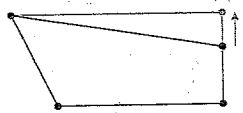
Sample answer: Zara lives on Meyer Lane. She either lives on the corner where Meyer Lane intersects Harvey Road or on the corner where Long Drive intersects Harvey Road.

WORK SPACE

8. Part A

Redraw the figure below, moving one point so that two sides are parallel.

Sample answer:



Part B

Describe how you changed the quadrilateral and why it has parallel sides now.

Sample answer: I moved one point, which made one side longer, but it moved the other side sharing that point so that it would be parallel to the side opposite. I know that the opposite sides are parallel because they stay the same distance apart along their length, never intersecting.

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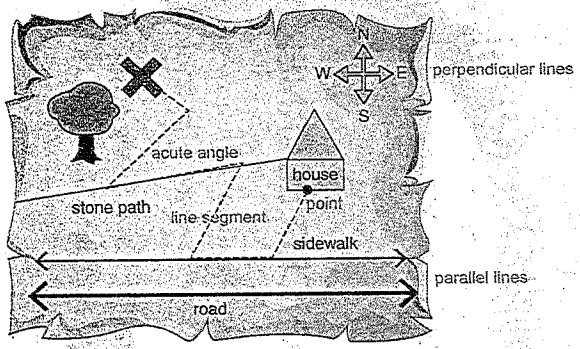
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EXIT TICKET

4.G.1

Now that you have mastered drawing and identifying geometric figures, let's solve the problem in the Real-World Connection.

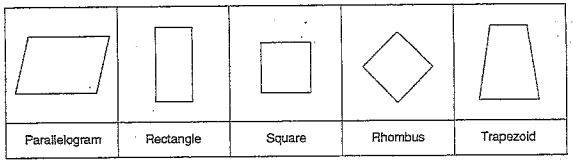
Carson is having a pirate party! He has hidden a treasure in his backyard for his friends to find. He makes a map to show where the treasure can be found. Without realizing it, he has drawn several geometric figures on his map. Label the map by identifying a point, a line segment, an acute angle, perpendicular lines, and parallel lines.



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- A rectangle has perpendicular sides. A square is one kind of rectangle.
- A rhombus has two pairs of parallel sides, and its sides are the same length.
- A trapezoid has one pair of parallel sides.



All triangles have 2 acute angles. The third angle defines the triangle.

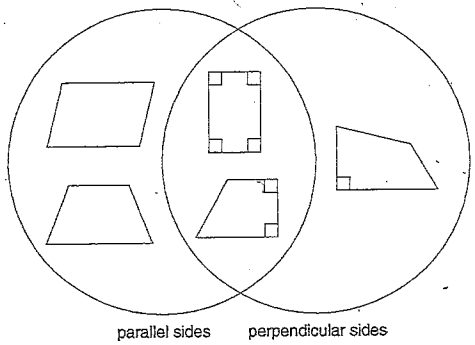
- Acute triangle: all angles measure $< 90°$.
- Right triangle: one angle measures $90°$.
- Obtuse triangle: one angle measures $> 90°$.

A Venn diagram uses circles to show similarities and differences. You can use a Venn diagram to sort quadrilaterals.

THINK ABOUT IT

Could you use a Venn diagram to sort other shapes?

EXAMPLE

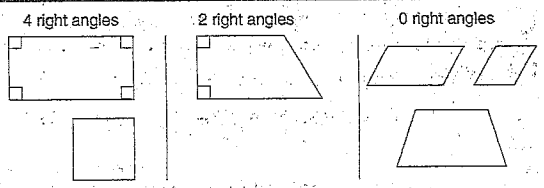


The quadrilaterals in the middle have both parallel sides and perpendicular sides. The ones on the left do not have perpendicular sides, while the one on the right does not have parallel sides.

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A quadrilateral can have 0, 1, 2, or 4 right angles.

EXAMPLE



TURN AND TALK

Can a quadrilateral have exactly 3 right angles? Why or why not?

You can classify a quadrilateral based on whether it has a right angle or not.

Triangles can be classified based on their angle measure.

EXAMPLE



acute triangle
all angles $< 90°$

right triangle
one angle $= 90°$

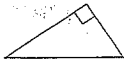
obtuse triangle
one angle $> 90°$

THINK ABOUT IT

Can a triangle have parallel sides? Why or why not?

GUIDED INSTRUCTION

1. Classify the triangle.



SKETCH IT

Can you draw a triangle with two right angles, or two obtuse angles?

Step One Identify the angles.

Two of the angles are acute.

The third angle is a right angle.

Step Two Label the triangle as acute, obtuse, or right.

The triangle is classified as a [right] triangle.

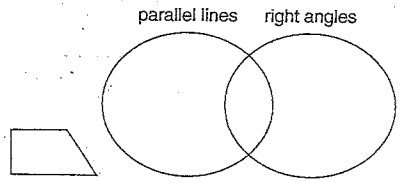
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HINT, HINT

In a Venn diagram, the area where the two circles overlap represents a set that has both characteristics.

2. Place the shape into the correct area of the Venn Diagram.



Step One Does the quadrilateral have parallel sides?

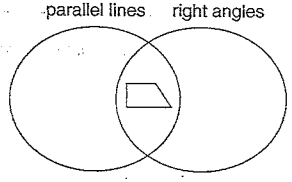
Yes, the top and bottom sides are parallel.

Step Two Does the quadrilateral have right angles?

Yes, the top and bottom sides are perpendicular to the left side.

Step Three Place the quadrilateral in the Venn diagram.

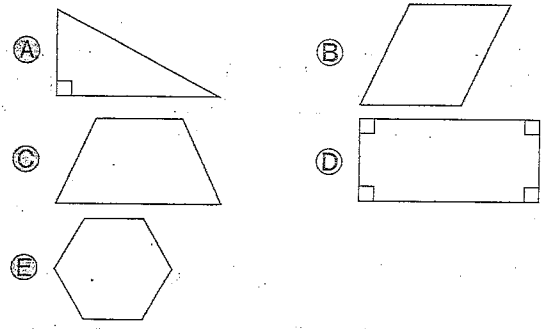
The trapezoid goes in the middle, in both circles.



HINT, HINT

Remember, a parallelogram has two pairs of parallel sides. Which of these choices do not have two pairs of parallel sides?

3. Select THREE shapes that are NOT parallelograms.



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How Am I Doing?

What questions do you have?

What is an example of a quadrilateral found in your classroom?

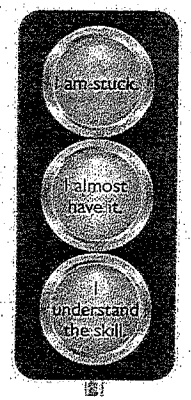
How many right angles does it have?

What do a rhombus and a rectangle have in common?

SKETCH IT

In the margin below, draw a shape that is a quadrilateral with two right angles and one pair of parallel sides.

Color in the traffic signal that shows how you are doing with the skill.



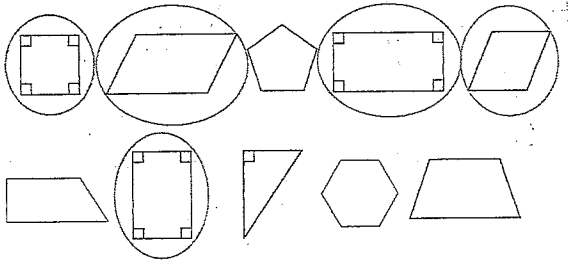
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INDEPENDENT PRACTICE

Answer the questions.

1. Circle FIVE shapes that are parallelograms.



SKETCH IT

Think about the definition of each type of shape. Try to draw the shape described.

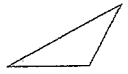
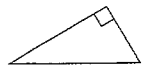
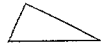
2. Which figure is NOT possible?

Ⓐ A quadrilateral with one right angle
Ⓑ A quadrilateral with four right angles
Ⓒ A quadrilateral with parallel sides and perpendicular sides
Ⓓ A triangle with two obtuse angles

HINT, HINT

In an acute triangle, all the angles are acute.

3. Which triangles are acute triangles? Select TWO answers.

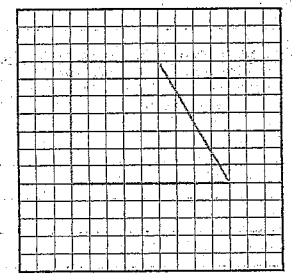
Ⓐ 
Ⓑ 
Ⓒ 
Ⓓ 

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4. Part A

Use the grid to draw a quadrilateral that has one pair of parallel sides and also has perpendicular sides.

Sample answer:



WORK SPACE

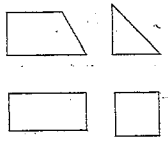
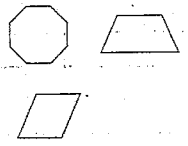
Part B

What is the name of the shape you drew?

Ⓐ trapezoid
Ⓑ pentagon
Ⓒ rectangle
Ⓓ hexagon

5. Lee sorted shapes into two different groups.

Describe how the shapes in Group A are different from the shapes in Group B.

Group A	Group B
	

Sample answer: The shapes in Group A have right angles. The shapes in Group B do not have right angles.

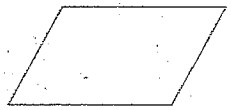
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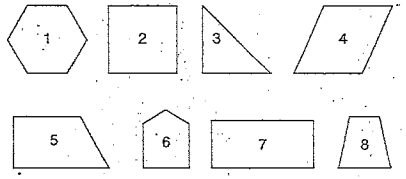
WORK SPACE

6. George said, "A parallelogram is always a rectangle." Do you agree with his statement? Explain your answer with words and pictures.

Sample answer: No. A parallelogram is a quadrilateral with two sets of parallel sides, but it does not need to have four right angles, which a rectangle must have. The shape below is a parallelogram, but it is not a rectangle.



7. Write the number of the shape in the appropriate box. Some shapes can be in more than one box.

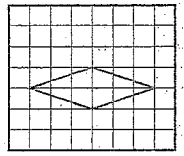


has an obtuse angle	has perpendicular sides	has parallel sides
1, 4, 5, 6, 8	2, 3, 5, 6, 7	1, 2, 4, 5, 6, 7, 8

8. Part A

Use the grid to draw a parallelogram with four equal sides that is not a square.

Sample answer:



Part B

What is the name of the shape you drew?

Sample answer: I drew a rhombus.

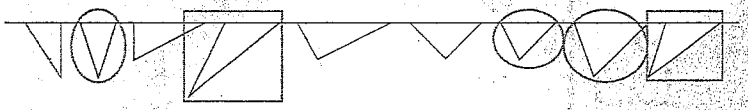
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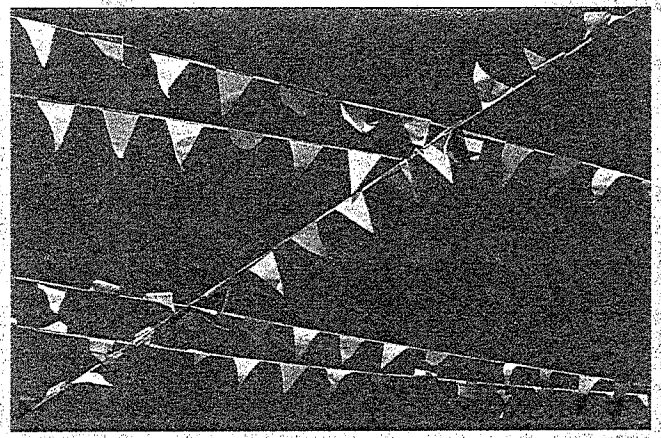
EXIT TICKET

4.G.2

Now that you have mastered classifying figures, let's solve the problem in the Real-World Connection.

Cleo and her friends are getting ready for the school carnival. They need to hang flags around the two tents. Cleo opens the box of flags. The flags are all mixed up! She needs to sort the flags into three groups: acute triangles, right triangles, and obtuse triangles. Sort the flags for Cleo. Circle the flags that are acute triangles. Draw a box around the flags that are obtuse triangles. The right triangles should not have a circle or a box around them.



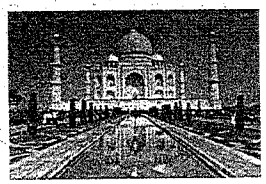


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GUIDED INSTRUCTION

Symmetry is used by architects in building design to show a sense of balance, as well as power. The Taj Mahal is a well-known example.





1. How many lines of symmetry does this figure have? Draw the line(s) of symmetry.



Step One Check for a vertical line of symmetry.

The figure has a vertical line of symmetry.



Step Two Check for a horizontal line of symmetry.

The figure has a horizontal line of symmetry.

THINK ABOUT IT

Think about folding the shape in half to find symmetry. For example, try it with a sheet of paper, folding it vertically, horizontally, or diagonally.

Step Three Check for other lines of symmetry.

There are no others, because the halves would not match when folded any other way.

Step Four Count the lines of symmetry.

The figure has 2 lines of symmetry.

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2. Look at the letters in the art teacher's name to the right.

MR. CAHILL

Which of the letters are symmetrical? Which of the letters are not symmetrical?

Which letters have one line of symmetry?

- M and A have a vertical line of symmetry.
- C has a horizontal line of symmetry.

Which letters have two lines of symmetry?

- H and I have a vertical and horizontal line of symmetry.

Which letters are not symmetrical?

- R and L have no lines of symmetry.

3. Select TWO drawings that have exactly one line of symmetry.

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

Ⓔ 

HINT, HINT

Read carefully. This question is asking which drawings have exactly one line of symmetry. Some may have more than one or even none.

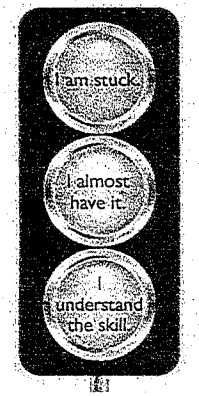
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[194] masteryeducation.com | Mathematics | Level D
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TURN AND TALK

Find a partner. List five shapes in your classroom. Does each shape have one or more lines of symmetry? Explain.

Color in the traffic signal that shows how you are doing with the skill.



How Am I Doing?

What questions do you have?

What is an example of line symmetry?

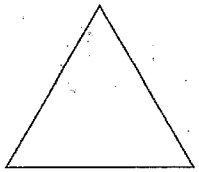
How could you use your knowledge of line symmetry to create a symmetrical design?

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INDEPENDENT PRACTICE

Answer the questions.

1. Look at the equilateral triangle.



How many lines of symmetry does an equilateral triangle have?

(A) 0
(B) 1
(C) 2
(D) 3

HINT, HINT

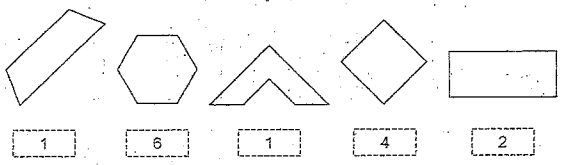
Regular polygons have lines of symmetry that go from a vertex through a side.

WORK SPACE

2. Use the numbers in the box to label each shape with the number of lines of symmetry it has.

Numbers can be used more than once. Write each number in the appropriate box.

0	1	2	3	4	5	6



1	6	1	4	2

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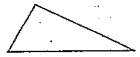
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WORK SPACE

3. Which drawing does NOT have a line of symmetry?

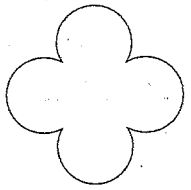
Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

4. How many lines of symmetry does this shape have?



Write your answer in the box.

4

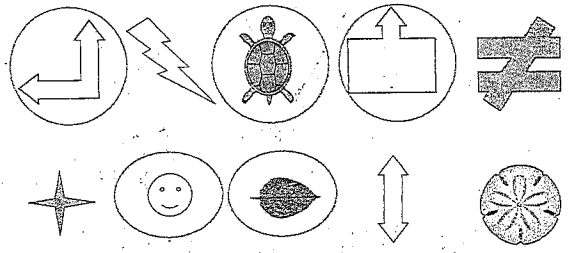
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5. Write the letters in the appropriate group.

B C D E F G H
K L M N P R S
T U V W X Y Z

0 lines of symmetry	1 line of symmetry	2 or more lines of symmetry
F G K L N P R S Z	B C D E M T U V W Y	H X

6. Select FIVE shapes that have exactly one line of symmetry.



SKETCH IT

Try drawing a horizontal and a vertical line and seeing if the two sides are mirror images.

WORK SPACE

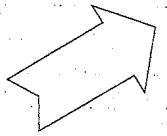
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WORK SPACE

7. How many lines of symmetry does this shape have?

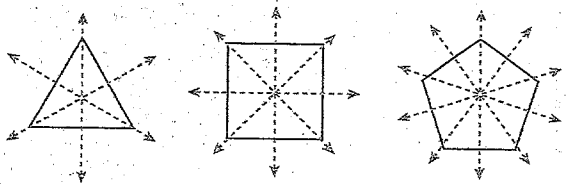


Write your answer in the box.

1

8. Part A

Draw all of the lines of symmetry for each regular polygon.



Part B

What do you notice about the number of lines of symmetry in each regular polygon? How many lines of symmetry do you think a regular octagon would have?

Sample answer: The number of lines of symmetry for each regular polygon is equal to the number of sides of the polygon. I think an octagon would have eight lines of symmetry because it has eight sides.

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9. Which statement is true? Explain how you know your answer is correct.

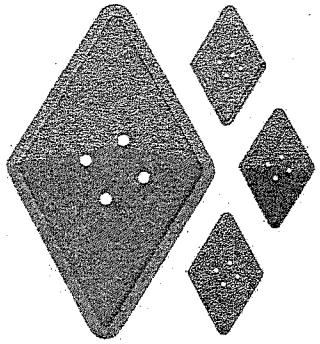
Ⓐ All parallelograms have line symmetry.

Ⓑ Some parallelograms have line symmetry.

Ⓒ No parallelograms have line symmetry.

Sample answer: Some parallelograms have line symmetry. All rectangles are parallelograms and are symmetrical because the opposite sides are the same length, and all the angles are right angles. A parallelogram that does not have right angles will not be symmetrical because the angles will not match when the parallelogram is folded.

WORK SPACE



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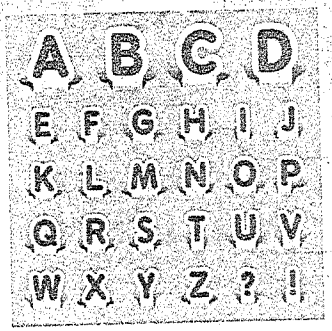
EXIT TICKET

4.G.3

Now that you have mastered lines of symmetry, let's solve the problem in the Real-World Connection.

The school art show is this Friday! Violet is decorating a bulletin board for the event. She cuts out a heart by folding a sheet of paper in half, drawing and cutting out half the heart, then unfolding the paper. She can use this method for some of the letters. But which ones?

Identify the letters of the alphabet that have line symmetry.



A, B, C, D, E, H, I, M, O, T, U, V, W, X, Y

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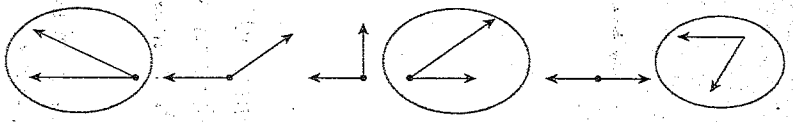
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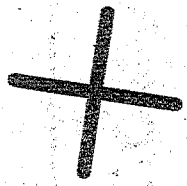
PRACTICE TEST

Answer the questions.

1. Circle THREE angles that are acute angles.



2. Jarrold made a helicopter model out of wooden sticks. Here is a picture of the helicopter blades.



All four angles are the same measure. What is the measure of each angle?

Write your answer in the box.

90 °

3. A rotating fan makes a $\frac{1}{5}$ turn. What is the measure of the angle of rotation in degrees?

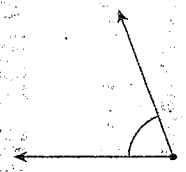
Ⓐ 45°

Ⓑ 50°

Ⓒ 60°

Ⓓ 72°

4. What is the measure of the angle?



Write your answer in the box.

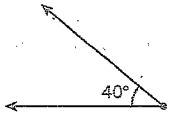
70 °

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5. Use a protractor to draw an example of an acute angle. Label its measure.

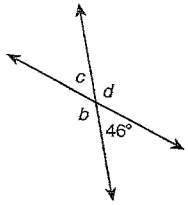
Sample answer:



Accept all angles with measures between 0° and 90°. Check students' measures.

6. Two lines intersect to form four angles.

Select THREE statements that are correct.



Ⓐ $b = 44°$

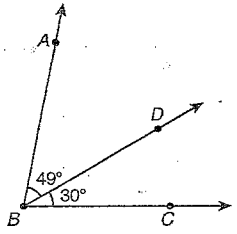
Ⓑ $c = 46°$

Ⓒ $d = 134°$

Ⓓ $b + d = 180°$

Ⓔ $c + d = 180°$

7. Find the measure of angle *ABC*.



Write your answer in the box.

79 °

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8. Which statement is always true?

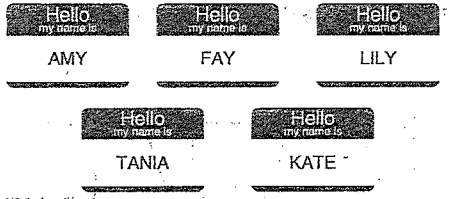
Ⓐ A right angle is greater than an acute angle.

Ⓑ An obtuse angle is less than a right angle.

Ⓒ An obtuse angle is equal to a straight angle.

Ⓓ An acute angle is greater than an obtuse angle.

9. There are five nametags on a desk.

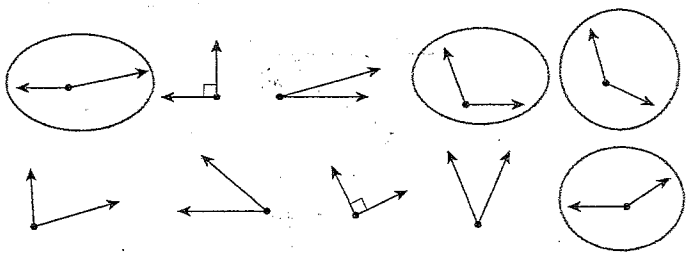


A 4th grader says, "My name has parallel line segments, perpendicular line segments, and six right angles." Which nametag belongs to this 4th grader? Explain your answer.

Sample answer: The nametag that belongs to this 4th grader is "KATE." The T and the E have perpendicular lines. The E has parallel lines. There are 4 right angles in the E and two right angles in the T for a total of 6 right angles.

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10. Circle FOUR angles that are obtuse.



11. Which statement is NOT true?

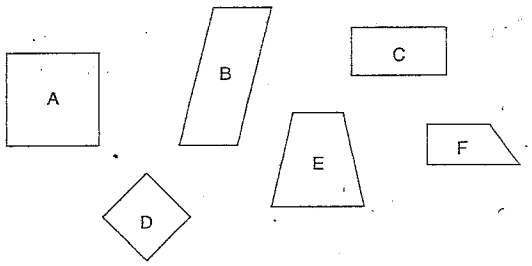
Ⓐ All squares have four right angles.

Ⓑ A trapezoid can have two right angles.

Ⓒ Some triangles have two right angles.

Ⓓ All triangles have at least two acute angles.

12. Look at the quadrilaterals below.

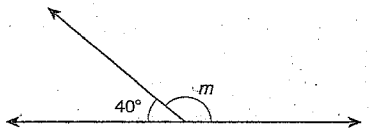


How can you sort them into two groups so that none of them are in both groups? Explain your answer.

Sample answer: I can classify them into a group with right angles and a group without right angles. Figures A, C, D, and F would be in the group with right angles. Figures B and E would be in the group without right angles.

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13. What is the measure of angle *m*?



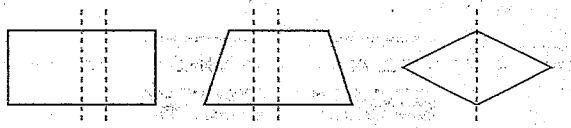
Write your answer in the box.

140 °

14. Part A

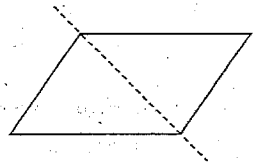
Tom and Bill are exploring quadrilaterals and looking for lines of symmetry. Did they draw the lines of symmetry in these quadrilaterals correctly? If not, redraw the line(s).

Sample answer:



Part B

Tom says that this parallelogram is symmetrical because the line divides it into two equal halves. Is Tom correct? Why or why not?



Sample answer: The two halves are the same, but they will not match when they are laid on top of each other, so he is not correct.

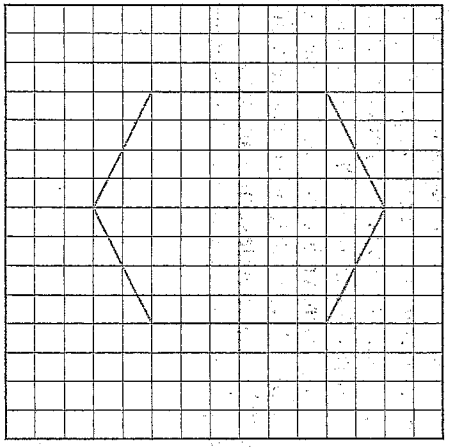
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15. Part A

Use the grid to draw a figure with six sides that has exactly two lines of symmetry. Include the lines of symmetry.

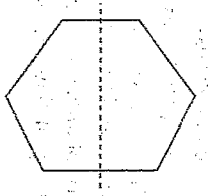
Sample answer:



Part B

How could you change the figure you drew so that it would have exactly one line of symmetry? Explain your answer.

Sample answer: I could change two sides so that they still match each other if the hexagon is folded on one line of symmetry, but would not match if it was folded on the other line of symmetry.



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