

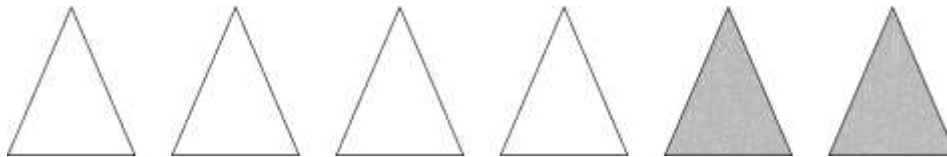
Practice A

Ratios and Rates

Use the table to write each ratio.

- angel fish to tiger barbs _____
- red-tail sharks to clown loaches _____
- catfish to angel fish _____
- clown loaches to tiger barbs _____
- catfish to red-tail sharks _____
- Write three equivalent ratios to compare the number of gray triangles in the picture with the total number of triangles.

Caroline's Pet Fish	
Tiger Barbs	5
Catfish	1
Angel fish	4
Red-tail sharks	1
Clown loaches	3



Use the table to write each ratio.

- gray male kittens to gray female kittens

- white female kittens to white male kittens

- A candy store sells 2 ounces of chocolate for \$0.80 and 3 ounces of chocolate for \$0.90. How much does the store charge per ounce for the 2 ounces of chocolate? How much does the store charge per ounce for the 3 ounces of chocolate? Which is the better deal?

Caroline's Kittens		
	White	Gray
Male	3	2
Female	5	5

LESSON
7-1

Problem Solving

Ratios and Rates

Use the table to answer each question.

Atomic Particles of Elements

Element	Protons	Neutrons	Electrons
Gold	79	118	79
Iron	26	30	26
Neon	10	10	10
Platinum	78	117	78
Silver	47	61	47
Tin	50	69	50

- | | |
|---|--|
| <p>1. What is the ratio of gold protons to silver protons?</p> <p>_____</p> | <p>2. What is the ratio of gold neutrons to platinum protons?</p> <p>_____</p> |
| <p>3. What are two equivalent ratios of neon protons to tin protons?</p> <p>_____</p> | <p>4. What are two equivalent ratios of iron protons to iron neutrons?</p> <p>_____</p> <p>_____</p> |

Circle the letter of the correct answer.

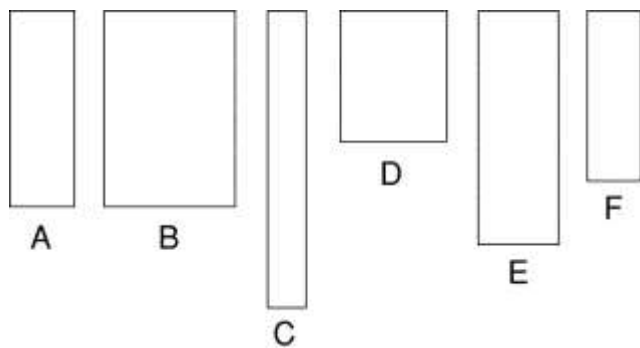
- | | |
|---|---|
| <p>5. A ratio of one element's neutrons to another element's electrons is equivalent to 3 to 5. What are those two elements?</p> <p>A iron neutrons to tin electrons</p> <p>B gold neutrons to tin electrons</p> <p>C tin neutrons to gold electrons</p> <p>D neon neutrons to iron electrons</p> | <p>6. The ratio of two elements' protons is equivalent to 3 to 1. What are those two elements?</p> <p>F gold to tin</p> <p>G neon to tin</p> <p>H platinum to iron</p> <p>J silver to gold</p> |
| <p>7. Which element in the table has a ratio of 1 to 1, no matter what parts you are comparing in the ratio?</p> <p>A iron C tin</p> <p>B neon D silver</p> | <p>8. If the ratio for any element is 1:1, which two parts is the ratio comparing?</p> <p>F protons to neutrons</p> <p>G electrons to neutrons</p> <p>H protons to electrons</p> <p>J neutrons to electrons</p> |

LESSON
7-1

Challenge

The Golden Ratio

For centuries, people all over the world have considered a certain rectangle to be one of the most beautiful shapes. Which of these rectangles do you find the most attractive?

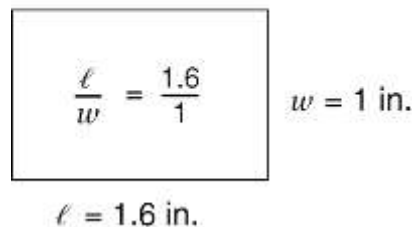


If you are like most people, you chose rectangle B. Why? It's a golden rectangle, of course! In a golden rectangle, the ratio of the length to the width is called the **golden ratio**—about 1.6 to 1.

The golden ratio pops up all over the place—in music, sculptures, the Egyptian pyramids, seashells, paintings, pinecones, and of course in rectangles.

To create your own golden rectangle, just write a ratio equivalent to the golden ratio. This will give you the length and width of another golden rectangle.

Golden Ratio



Use a ruler to draw a new golden rectangle in the space below. Then draw several non-golden rectangles around it. Now conduct a survey of your family and friends to see if they choose the golden rectangle as their favorite.

LESSON
7-2

Practice A

Using Tables to Explore Equivalent Ratios and Rates

Use each table to find three equivalent ratios.

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

1			
5			

Equivalent ratios: $\frac{1}{5}$, _____, _____, and _____

2. 3 to 8

3			
8			

Equivalent ratios: 3 to 8, _____, _____, and _____

3. 80:40

80			
40			

Equivalent ratios: 80:40, _____, _____, and _____

Use a table to find three equivalent ratios.

4. 3 to 6

5. $\frac{7}{3}$

6. 1:2

7. 2 to 1

8. Alan swims laps in a large pool. The table shows how long it takes him to swim different numbers of laps.

Number of Laps	3	6	9	12	15
Time (min)	6	12	18	24	30

How long do you predict it will take Alan to swim 10 laps?

LESSON**7-2****Problem Solving*****Using Tables to Explore Equivalent Ratios and Rates***

Use the table to answer the questions.

School Outing Student-to-Parent Ratios

Number of Students	8	16	24	32	40	48	56	64	72
Number of Parents	2	4	6	8	10	12	14	16	18

- Each time some students go on a school outing, their teachers invite students' parents to accompany them. Predict how many parents will accompany 88 students.
- Next week 112 students will go to the Science Museum. Their teachers invited some of the students' parents to go with them. How many parents do you predict will go with the students to the Science Museum?

Circle the letter of the correct answer.

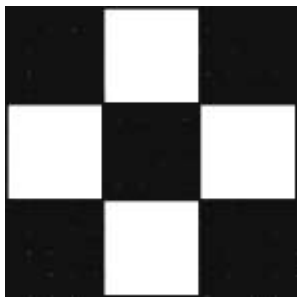
- Tanya's class of 28 students will be going to the Nature Center. How many parents do you predict Tanya's teacher will invite to accompany them?
A 5 parents
B 7 parents
C 9 parents
D 11 parents
- Some students will be going on an outing to the local police station. Their teachers invited 13 parents to accompany them. How many students do you predict will be going on the outing?
F 49 students
G 50 students
H 51 students
J 52 students
- In June, all of the students in the school will be going on their annual picnic. If there are 416 students in the school, what do you predict the number of parents accompanying them on the picnic will be?
A 52 parents
B 78 parents
C 104 parents
D 156 parents
- On Tuesday, all of the sixth-grade students will be going to the Space Museum. Their teachers invited 21 parents to accompany them. How many sixth graders do you predict will be going to the Space Museum?
F 80 sixth graders
G 82 sixth graders
H 84 sixth graders
J 86 sixth graders

LESSON
7-2

Challenge

It's All Black and White!

This grid has a black-to-white ratio of 5 to 4.



Use the black-to-white ratio to make groups of grids.
Then complete the table of equivalent ratios.

Black	5	10	15									
White	4											

LESSON

7-3

Problem Solving**Proportions**

- For most people, the ratio of the length of their head to their total height is 1:7. Use proportions to test your measurements and see if they match this ratio.

- The ratio of an object's weight on Earth to its weight on the Moon is 6:1. The first person to walk on the Moon was Neil Armstrong. He weighed 165 pounds on Earth. How much did he weigh on the Moon?

- It has been found that the distance from a person's eye to the end of the fingers of his outstretched hand is proportional to the distance between his eyes at a 10:1 ratio. If the distance between your eyes is 2.3 inches, what should the distance from your eye to your outstretched fingers be?

- Chemists write the formula of ordinary sugar as $C_{12}H_{22}O_{11}$, which means that the ratios of 1 molecule of sugar are always 12 carbon atoms to 22 hydrogen atoms to 11 oxygen atoms. If there are 4 sugar molecules, how many atoms of each element will there be?

Circle the letter of the correct answer.

- A healthy diet follows the ratio for meat to vegetables of 2.5 servings to 4 servings. If you eat 7 servings of meat a week, how many servings of vegetables should you eat?
A 28 servings C 14 servings
B 17.5 servings D 11.2 servings
- A 150-pound person will burn 100 calories while sitting still for 1 hour. Following this ratio, how many calories will a 100-pound person burn while sitting still for 1 hour?
F $66\frac{2}{3}$ calories H $6\frac{2}{3}$ calories
G $66\frac{2}{3}$ calories J 6 calories
- Recently, 1 U.S. dollar was worth 0.68 euros. If you exchanged \$25 at that rate, how many euros would you get?
A 15.82 euros
B 17.00 euros
C 23.42 euros
D 36.76 euros
- Recently, 1 U.S. dollar was worth 0.51 English pound. If you exchanged 500 English pounds, how many dollars would you get?
F 255.00 U.S. dollars
G 500.69 U.S. dollars
H 980.39 U.S. dollars
J 998.31 U.S. dollars

LESSON
9-2

Challenge

Metric Classroom Challenge

Find objects in your classroom for each unit of measure.
Estimate first. Then measure.

LENGTH, WIDTH, OR HEIGHT

Object	Estimate	Actual
	_____ millimeters	_____ millimeters
	_____ centimeters	_____ centimeters
	_____ centimeters	_____ centimeters
	_____ decimeters	_____ decimeters
	_____ decimeters	_____ decimeters
	_____ meters	_____ meters

WEIGHT

Object	Estimate	Actual
	_____ milligrams	_____ milligrams
	_____ grams	_____ grams
	_____ grams	_____ grams
	_____ kilograms	_____ kilograms

CAPACITY

Object	Estimate	Actual
	_____ milliliters	_____ milliliters
	_____ milliliters	_____ milliliters
	_____ liters	_____ liters
	_____ liters	_____ liters

LESSON**9-4****Problem Solving****Converting Metric Units****Write the correct answer.**

1. The St. Gotthard Tunnel in Switzerland is the world's longest tunnel. It is 16.3 kilometers long. What is the tunnel's length in meters?

2. Ostriches are the world's heaviest birds. On average, they weigh 156,500 grams. How many kilograms does the average ostrich weigh?

3. The huge flower of the titam arum plant of Sumatra only lives for one day. During that time it grows 75 millimeters. What is the flower's height in centimeters?

4. The average male elephant drinks about 120,000 milliliters of water each day. How many liters of water do most male elephants drink each day?

Circle the letter of the correct answer.

5. The first successful steam locomotive pulled 10,886.4 kilograms of iron. How many grams of iron did the locomotive pull?
A 10.89 grams
B 108.86 grams
C 10,886,400 grams
D 108,864,000 grams
6. The track used by the first successful steam locomotive was 15.3 kilometers long. How many meters long was the track?
F 0.153 meters
G 1.53 meters
H 153 meters
J 15,300 meters
7. About 2.03 meters of rain fall each year in a tropical rain forest. About how many centimeters of rainfall are there each year in a tropical rain forest?
A 20.3 centimeters
B 203 centimeters
C 2,030 centimeters
D 20,300 centimeters
8. The top layer of trees in a tropical forest has trees that can reach 6,096 centimeters in height. How many meters tall are these trees?
F 6.096 meters
G 60.96 meters
H 609.6 meters
J 609,600 meters