

Games An arcade sells game tokens individually or in packages. They are having a sale on token packages, as shown below.

Number of Packages	Price (\$)
1	5
2	10
3	15



HOW do you use equivalent rates in the real world?

CCSS Common Core State Standards

Content Standards
6.RP.3, 6.RP.3b

MP Mathematical Practices
1, 3, 4, 5, 7

1. How many token packages can you buy with \$20? \$25?
Explain.

Each package costs \$5, so divide the total by \$5.

2. What is the unit price?

\$5 per package

3. How much would it cost to buy 6 token packages?

\$30

4. The arcade sells individual



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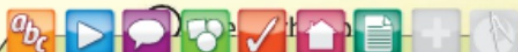
\$30

4. The arcade sells individual tokens for \$0.25 each. If a token package contains 25 tokens, how much would you save by buying a package of 25 tokens instead of 25 individual tokens? Explain.

\$1.25; A package of 25 tokens costs \$5 and 25 individual tokens cost \$6.25. $\$6.25 - \$5.00 = \$1.25$

Which **MP** Mathematical Practices did you use?
Shade the circle(s) that applies.

1 Persevere with Problems



Guided Practice



1. Out of 30 students surveyed, 17 have a dog. Based on these results, predict how many of the 300 students in the school have a dog? (Example 1)

Show your work

170 students

part
whole = $\frac{17}{30}$

$\frac{17}{30} = \frac{170}{300}$
 $\times 10$

2. If one out of 12 students at a school share a locker, how many share a locker in a school of 456 students? (Example 2)

38 students

$\frac{1}{12} = \frac{x}{456}$
 $\times 38$

3. Sybrina jogged 2 miles in 30 minutes. At this rate, how far would she jog in 90 minutes? At what rate did she jog each hour? (Examples 3 and 4)

6 mi; 4 miles per hour

$\frac{2}{30} = \frac{x}{90}$
 $\times 4$

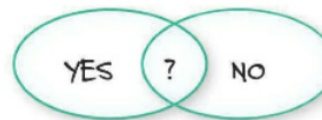
$\frac{2}{30} = \frac{6}{90}$
 $\times 3$

4. **Building on the Essential Question** How can you use diagrams and equations to solve ratio and rate problems?

Sample answer: You can divide a bar diagram into the correct number of sections to find the unit rate. Use the unit rate to solve the rate or ratio problem.

Rate Yourself!

Are you ready to move on?
Shade the section that applies.



For more help, go online to access a Personal Tutor.



FOLDABLES Time to update your Foldable!

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- 5** **MP Make a Prediction** The table shows which school subjects are favored by a group of students. Predict the number of students out of 400 that would pick science as their favorite subject.

60 students

Favorite Subject	
Subject	Number of Responses
Math	6
Science	3
English	4
History	7

- 6.** Liliana takes 4 breaths per 10 seconds during yoga. At this rate, about how many breaths would Liliana take in 2 minutes of yoga?

48 breaths

- 7.** **MP Use Math Tools** Find a report in a newspaper or magazine, or on the Internet that uses results from a survey. Evaluate how the survey uses ratios to reach conclusions. **See students' work.**

Name _____

My Homework _____

Independent Practice

Go online for Step-by-Step Solutions

eHelp



1. If 45 cookies will serve 15 students, how many cookies are needed for 30 students? (Examples 1 and 2)

Show your work

90 cookies

$$\begin{array}{r} 45 \text{ cookies} \\ \times 2 \\ \hline 90 \end{array}$$

$$\begin{array}{r} 15 \text{ students} \\ \times 2 \\ \hline 30 \end{array}$$

2. Four students spent \$12 on school lunch. At this rate, find the amount 10 students would spend on the same school lunch. (Example 3)

\$30

$$\begin{array}{r} 12 \\ \div 4 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 3 \times 10 \\ \hline 30 \end{array}$$

- 3 A Clydesdale drinks about 120 gallons of water every 4 days. At this rate, about how many gallons of water does a Clydesdale drink in 28 days? (Example 3)

840 gal

4. **STEM** In 10 minutes, a heart can beat 700 times. At this rate, in how many minutes will a heart beat 140 times? At what rate can a heart beat? (Example 4)

2 min; 70 times per minute

$$\begin{array}{r} 10 \text{ minutes} \\ \div 700 \\ \hline \frac{1}{70} \end{array}$$

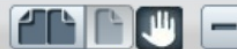
$$\begin{array}{r} \frac{1}{70} \times 140 \\ \hline 2 \end{array}$$



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Write Subject

Number of



can a heart beat? (Example 4)

2 min; 70 times per minute

$$\frac{2 \text{ minutes}}{700} = \frac{1}{70} = \frac{2}{140}$$

minutes

times

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6. Liliana takes 4 breaths per 10 seconds during yoga. At this rate, about how many breaths would Liliana take in 2 minutes of yoga?

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H.O.T. Problems Higher Order Thinking

8. **MP Identify Structure** One rate of an equivalent ratio is $\frac{9}{n}$. Select two other rates, one that can be solved using equivalent fractions and the other that can be solved with unit rates. **Sample answer: Equivalent**

fractions: $\frac{18}{20} = \frac{9}{n}$; $n = 10$. Unit rates: $\frac{18}{6} = \frac{3}{1} = \frac{9}{n}$; $n = 3$.

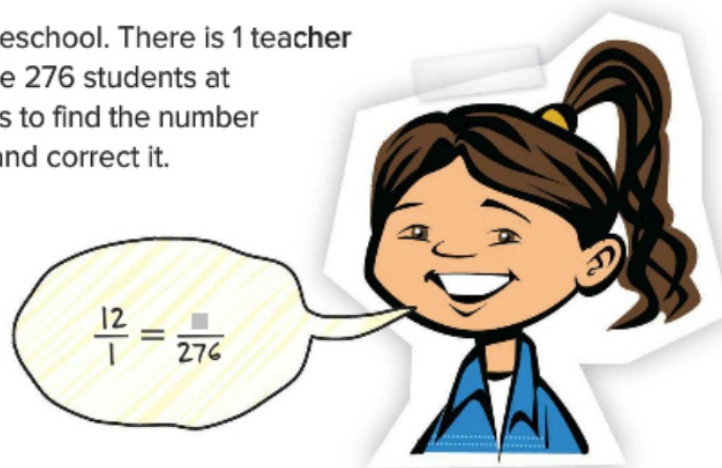
9. **MP Find the Error** Elisa's mom teaches at a preschool. There is 1 teacher for every 12 students at the preschool. There are 276 students at the preschool. Elisa is setting up equivalent ratios to find the number of teachers at the preschool. Find her mistake and correct it.

Elisa did not set up the equivalent ratios

in the correct order. She should have set it

up as $\frac{1}{12} = \frac{\square}{276}$. There are 23 teachers

at the preschool.



10. **MP Reason Inductively** Tell whether the following statement is *always*, *sometimes*, or *never* true for numbers greater than zero. Explain.

In equivalent ratios, if the numerator of the first ratio is greater than the denominator of the first ratio, then the numerator of the second ratio is greater than the denominator of the second ratio.

Always; in order for the ratios to fo





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Always; in order for the ratios to form equivalent ratios, they must be equivalent fractions, therefore reducing to the same fraction.

11. **MP Persevere with Problems** Suppose 25 out of 175 people said they like to play disc golf and 5 out of every 12 of the players have a personalized flying disc. At the same rates, in a group of 252 people, predict how many you would expect to have a personalized flying disc. Explain.

15 people; The unit rate for the people that said they like to play disc golf is $\frac{1}{7}$. In a group of 252 people, $252 \div 7$ or 36 people would like to play disc golf. Using equivalent ratios, $\frac{5}{12} = \frac{\square}{36}$. So, 15 people would have a personalized flying disc.

12. **MP Persevere with Problems** A car traveling at a certain speed will travel 76 feet per second. How many miles will the car travel in 3.1 hours if it maintains the same speed? Round to the nearest tenth. (*Hint: There are 5,280 feet in one mile.*) **160.6 mi**

