

Today

Two Lessons

5.1 and 5.2

**Ratios, Rates
and Proportions**

Lesson 5.1 Ratios and Rates

Learning Targets:

- Express ratios in 3 different ways
- Find unit rates ~~★~~
- Find ratios and rates from a table
- Find ratios and rates from a graph ✓

Ratios

A ratio is a comparison of quantities

$\frac{3}{1}$ $\frac{f}{s}$ Flour to Sugar in a recipe

Girls to Boys in a class

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

Cats to Dogs in a neighborhood

G : B

12 : 5

8 to 4

$\frac{7}{5}$ Girls
Boys

Ratios

A ratio is a comparison of quantities

There are **4** girls for every **3** boys
in the Math Pentathlon Club.

Order is Important

- Express ratios in 3 different ways

There are 4 girls for every 3 boys
in the Math Pentathlon Club.

1. Using Words: 4 to 3

2. Using a Colon: 4:3

3. As a Fraction: $\frac{4}{3}$

(order is important!)

Complex Ratios

$$\frac{\frac{3}{5}}{\frac{5}{6}}$$

$$\frac{\frac{4}{7}}{\frac{20}{21}}$$

• Rates

A Rate is a ratio of two different quantities with different units.

$$\frac{60 \text{ miles}}{2 \text{ hours}}$$

$$\frac{400 \text{ calories}}{30 \text{ minutes}}$$

$$\frac{80 \text{ dollars}}{3 \text{ feet}}$$

$$\frac{120 \text{ words}}{4 \text{ minutes}}$$

$$\frac{\$7}{3 \text{ lbs}}$$

$$\frac{24 \text{ miles}}{5 \text{ gallons}}$$

Find unit rates

**Rule: Make the Denominator = 1
by DIVIDING**

$$\frac{60 \text{ miles}}{2 \text{ hours}} = \frac{30 \text{ mi}}{1 \text{ hr}}$$

$$\frac{\$7}{3 \text{ lbs}} = \frac{\$2.33}{1 \text{ lb}}$$

$$\frac{24 \text{ miles}}{5 \text{ gallons}} = \frac{4.8 \text{ mi}}{1 \text{ gal}}$$

$$\frac{120 \text{ words}}{4 \text{ minutes}} = \frac{30 \text{ words}}{1 \text{ min}}$$

$$\begin{array}{r} 2.33333 \\ 3 \overline{)7} \\ \underline{6} \\ 10 \\ \underline{9} \\ 10 \\ \underline{9} \\ 10 \\ \underline{9} \\ 10 \\ \underline{9} \\ 10 \end{array}$$

~~\$~~ 2. $\overline{3}$

• Find Ratios and Rates

There are 45 males and 60 females in a subway car. The subway car travels 2.5 miles in 5 minutes. Express as a Fraction.

a. Find the ratio of males to females.

$$\frac{m}{f} = \frac{45}{60} = \frac{3}{4}$$

b. Find the speed of the subway car.

$$\frac{\text{miles}}{\text{min}} = \frac{2.5}{5} = \frac{0.5 \text{ miles}}{1 \text{ minute}}$$

• Find ratios and rates from a table

The ratio table shows the costs for different amounts of artificial turf.
Find the unit rate in dollars per square foot.



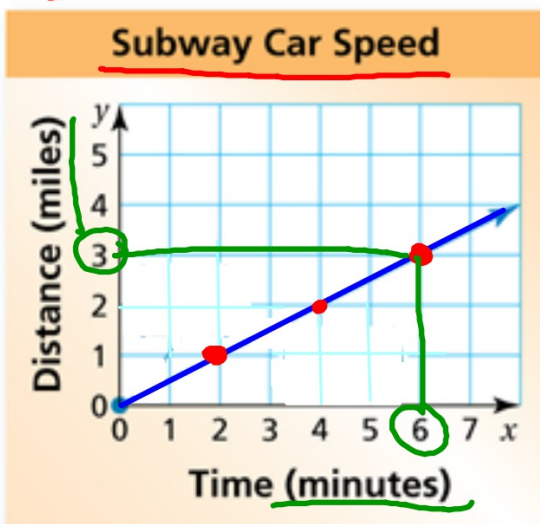
Amount (square feet)	25	100	400	1600
Cost (dollars)	100	400	1600	6400

Use a ratio from the table to find the unit rate.

$$\frac{\$}{\text{sq. ft.}} \quad \frac{400}{100} = \frac{\$4}{1 \text{ sq. ft.}}$$

○ Find ratios and rates from a graph

The graph shows the speed of a subway car. Find the speed in miles per minute.



step 1: choose a point

$$\frac{3}{6}$$

miles ← (circled 3)
← (circled 6) minutes

step 2: Simplify

$$\frac{0.5 \text{ mile}}{1 \text{ minute}}$$

Homework

Pg. 167

#11-15, 17-20

24-28 even

29 and 31

