

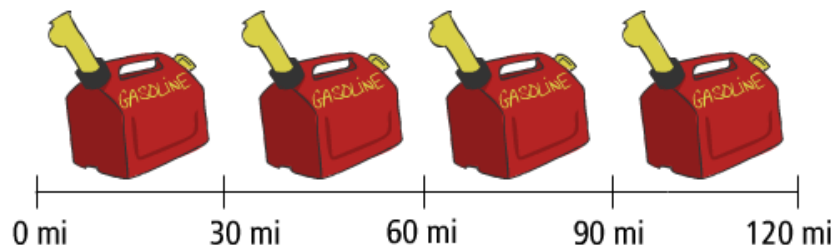
Lesson 7.2

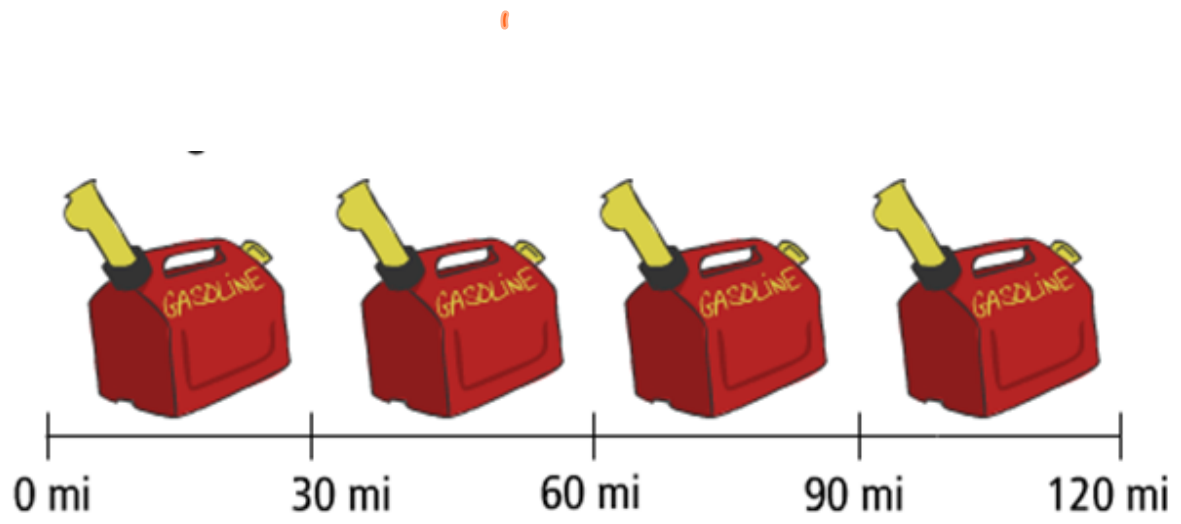
Unit Rates

A **rate** is a ratio that compares quantities measured in different units. A **unit rate** is the rate for one unit of a given quantity. When a unit rate is written as a fraction, the denominator is 1 unit. The 1 in a unit rate is read as "per."

If a car travels 120 mi on 4 gal of gasoline, then the rate is $\frac{120 \text{ mi}}{4 \text{ gal}}$.

The unit rate is $\frac{30 \text{ mi}}{1 \text{ gal}}$, or 30 miles per gallon.



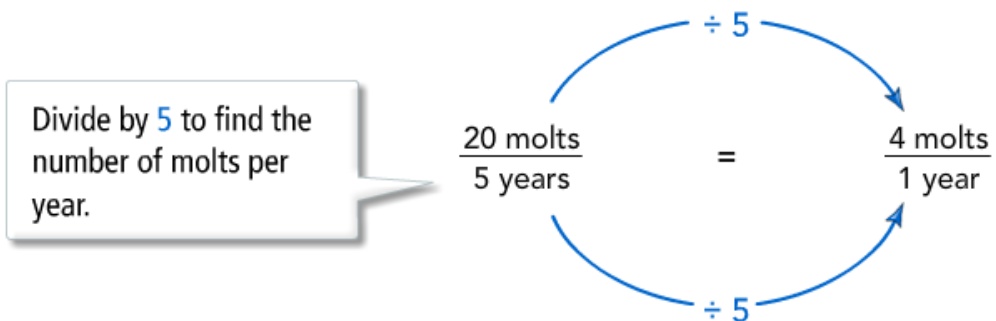


Example #1

- › A lobster molts, or sheds its shell, 20 times over a period of 5 years.
How many times per year does the lobster molt?




The ratio of the number of molts to the number of years is $\frac{20 \text{ molts}}{5 \text{ years}}$.



The unit rate is $\frac{4 \text{ molts}}{1 \text{ year}}$, or 4 molts per year.

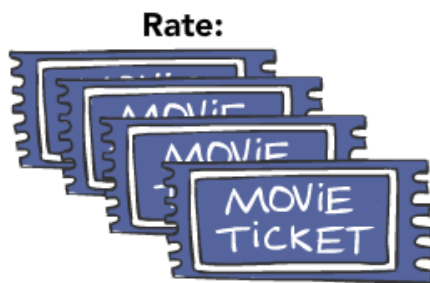
The lobster molts 4 times per year.

Got It? #1

 Find the unit rate for 219 heartbeats in 3 minutes.

- A. 3.65 heartbeats per minute
- B. 73 heartbeats per minute
- C. 216 heartbeats per minute
- D. 657 heartbeats per minute

A **unit price** is a unit rate that gives the price of one item, or the price per item.



\$25 for 4 tickets

$$\frac{\$25}{4 \text{ tickets}}$$



\$6.25 for 1 ticket

$$\frac{\$6.25}{1 \text{ ticket}}, \text{ or } \$6.25 \text{ per ticket}$$

Example#2

-) Your class is tie-dying T-shirts to sell for a fundraiser. You are in charge of buying the plain T-shirts. Which package is the best buy? Which package is the worst buy?



it price is \$3.40 per T-shirt.

The unit price is \$3.25 per T-shirt.

2.99

The unit price is \$3.15 per T-shirt.



Best Buy

Worst Buy

10 for 29.90

Got It? #2

You also need to buy dye for the tie-dying activity. You can buy the dye in various sizes. Which is the best buy?

A • 2 fl oz for \$3.96 1.98

B • 4 fl oz for \$8.36 2.09

C • 8 fl oz for \$14.24 1.78

D • 16 fl oz for \$28.96 1.81

$$\begin{array}{r} 2.09 \\ 4 \overline{) 8.36} \\ \underline{8} \\ 3 \\ \underline{-0} \\ 36 \\ \underline{36} \\ 0 \end{array}$$

Example #3

Astronauts have different nutritional needs in space than on Earth. An astronaut's diet contains 18 mg of iron for 2 days. How many milligrams of iron should the astronaut's diet contain for 9 days?

First, find the unit rate in milligrams per day.

$$\frac{18 \text{ mg}}{2 \text{ days}} = \frac{9 \text{ mg}}{1 \text{ day}}$$

Diagram showing the conversion of 18 mg / 2 days to 9 mg / 1 day. A blue arrow above the equals sign points from left to right with $\div 2$ written above it. A blue arrow below the equals sign points from right to left with $\div 2$ written below it.

Then use the unit rate to find the number of milligrams of iron the astronaut's diet should contain for 9 days.

$$\frac{9 \text{ mg}}{1 \text{ day}} = \frac{81 \text{ mg}}{9 \text{ days}}$$

Diagram showing the conversion of 9 mg / 1 day to 81 mg / 9 days. A blue arrow above the equals sign points from left to right with $\times 9$ written above it. A blue arrow below the equals sign points from right to left with $\times 9$ written below it.

The astronaut's diet should contain 81 mg of iron for 9 days.


$$\frac{18 \text{ mg}}{2 \text{ days}} = \frac{9 \text{ mg}}{1 \text{ day}}$$

9 days?

$$9 \times 9 = 81 \text{ mg}$$

* multiply

Got It? #3

 A satellite travels about 2,272 mi in 8 min. About how many miles does the satellite travel in 3 min?

A. 6,059 mi

B. 852 mi

C. 757 mi

D. 284 mi

PRACTICE

► Do you know **HOW?**

1. The Earth rotates 1.25 degrees in 5 minutes. How many degrees does it rotate in 1 minute?

degrees

2. A driver fills his tank with 15 gallons of gas for \$45.60 at a gas station. The next time he stops he fills up with 12 gallons for \$39.00. Find the unit price for gas at each station and circle which has the better deal.

1st Station:

2nd Station:

3. There are approximately 195 babies born each hour in the Philippines. Find the approximate number of babies born in the Philippines every 20 minutes.

babies

4. **Writing** A company earns a profit of \$50 for every 10 items sold. Explain how the company can find the amount of profit for 50 items sold.

5. **Error Analysis** A classmate writes a rate for Exercise 1 to express the degrees rotated in 2 minutes. Explain her error and give the correct rate.

$$\frac{1.25 \div 2}{5 \div 2} = \frac{0.625}{2.5}$$

