Rates

How is a rate different from a from a ratio?

Rates are written in fraction form and must be in the right order. Since the units are different, they remain in the answer, but there should be no common factors in the numbers.

EXAMPLES:

a. 6 leaders for every 48 Cub Scouts is shown

$$\frac{6 \text{ leaders}}{48 \text{ Cub Scouts}} = \frac{1 \text{leader}}{8 \text{Cub Scouts}}$$

b. 27 cement blocks for every 6 feet

$$\frac{27 \text{blocks}}{2 \text{ feet}} = \frac{9 \text{ blocks}}{6 \text{feet}}$$

1 & 2. Write the simplified rates:

1. 60 oz. for 8 servings
2. $56 earned in 8 hours NOTICE when you

simplified

$\frac{\$56}{8\text{hrs}}$ in #2, you got a denominator of 1 hour.

$\frac{\$7}{1\text{hr}}$ is a unit rate

It means that $7 was earned in every 1 hour block of time. We say the rate of earnings was $7 per hour.

You are accustomed to using unit rates.

Speed: 45mph is $\frac{45\text{miles}}{1\text{hour}}$

Gasoline mileage: 24 mpg is $\frac{24 \text{ miles}}{1 \text{ gallon}}$

cost: Cost is \$3.25 per ticket or $\frac{\$3.25 \text{ Unit}}{1 \text{ ticket}}$

It is easy to find the unit rate when the denominator is a factor of the numerator.

\$18 for 6 lbs. $\frac{\$18}{6\ lb} = \frac{\$6 \times 3}{6 \times 1 lb} = \frac{\$3}{1\ lb}$

or \$3 per *l*b

NOTICE the same result would be obtained by dividing

$$6\overline{)18} \quad \$3 \text{ per pound}$$

When the "fraction" will not simplify leaving "1" in the denominator, you can divide to find the unit rate.

EXAMPLE: \$18 for 5lbs.

\$ 3.60 per pound

$\frac{\$18}{5lb}$ is $5\overline{)18.0000}$

$-$

15

30

-30

(Since it's money, we should give answer at least to the hundredths place.)

With a calculator, use 18 ÷ 5 = 3.6. You show \$3.60.

TIME FOR A "MONEY" LESSON!

\$.37 really says 37 hundredths of a dollar.
We usually read it as 37 cents.
37¢ really does say 37 cents.

If I buy 2 bars of soap for 75¢, find the unit cost. (This means the cost for 1 bar.)

$\frac{75¢}{2 \text{bars}} = 2\overline{)75.0¢}$ 37.5

37.5 ¢ per bar

-6

This price is given to the nearest tenth of a cent.

15
−14
10 –
10

A common error is to use .37¢ for $ .37
$.37 is less than 1 dollar.
What does .37¢ mean?
Less than 1 cent!

Written with a dollar sign 37¢ is $.37; therefore, 37.5¢ is $.375. A thousandth of a dollar is a tenth of a cent.

Be sure you understand this section about money! Ask for help if you're not sure about this!

You will often be asked to find answers to the nearest tenth of a cent. It will be one place after the decimal point if you are working in cents (¢); but it will be the third place if you are working in dollars ($).

3-6. Find the unit rates.

3. 800 miles in 25 hours 4. 426 miles on 18.2 gallons
(answer to the nearest mpg)

Answer 5, and 6 to the nearest tenth of a cent.

5. a. 75¢ for 8 oz. 6. $3.56 for 18 oz.
b. $0.75 for 8 oz.

7. A family bought 5 lb. of heads on shrimp for $22.50. After popping the heads, they had 3 lb. of shrimp. Find the cost per pound of the headless shrimp.

8. A butcher paid $216 for 240 lbs. of beef. He discarded 60 lbs. of fat. Find the resulting cost per pound of the remaining beef.

Now you are ready for some comparison shopping. A better buy is the item with the lower unit cost.

Which is the better buy?

6.5 oz. of tuna for $.89 or 9.75 oz of the same kind of tuna for $1.45?

Find the unit cost of each:

$\frac{\$.89}{\quad} = \frac{\$0.14}{\quad}$ $\frac{\$1.45}{\quad} = \frac{\$0.15}{\quad}$

6.5oz oz 9.75oz oz.

Now compare the unit costs.

The 6.5 oz. can is the better buy because its unit cost is the lower of the two unit costs.

You will do more comparison shopping in later chapters of your text.

ANSWERS

1. $\frac{15\text{oz.}}{2\text{servings}}$ 4. 23 mpg 7. $7.50 per lb.

2. $\frac{\$7}{1\text{hr.}}$ 5. a. ≈ 9.4¢ per oz. 8. $1.20 per lb.

b. ≈ $0.094 per oz. If you missed 5b, read the “money lesson” again!.

3. 32 mph 6. ≈ $.198 per oz.
or 19.8¢ per oz.