Rates and Unit Rates

A **rate** is a **ratio** that is used to compare **unlike** or different kinds of quantities.

Rates **include the units** because the quantities involved have different units.

A unit rate describes how many units of the first type of quantity correspond to one unit of the second type of quantity.

To express a rate as a **unit rate**, **divide** the **value** of the first term by the value of the second term, and then **divide** the **unit** of the first term by the unit of the second term.

Some common unit rates are:

kilometers per hour   cost per item   earnings per week   songs per minute

In each case the first quantity is related to 1 unit of the second quantity.

In English, 4 classes per day is a rate telling us that you have 4 classes each day or every day.

In Math, 4 classes/day   Symbol " / " means "per"

**Rates, like ratios and fractions, also mean division. (You always divide to find rates!)

Note: However, for comparing any two unlike quantities, **there are always two possible rates.**

Practice 1:
For each statement, record both possible rates, find the unit rates, then write a short sentence explaining each unit rate.

1. The store is selling 8 oranges at $4.00.

   Rate 1:   Rate 2:

   Unit rate 1:   Unit rate 2:

   Interpretation: Interpretation:

2. You finish 10 questions in 5 minutes.

   Rate 1:   Rate 2:

   Unit rate 1:   Unit rate 2:

   Interpretation: Interpretation:

3. Ms. Chor runs 10 laps in 25 minutes.

   Rate 1:   Rate 2:

   Unit rate 1:   Unit rate 2:

   Interpretation: Interpretation:

Which rate should we use???
It depends on what information is useful for you to make a decision or solve a problem.

For example: $10 for 600g of Smarties $5 for 500g of Jelly Beans

Situation 1: You want to know which deal is a better buy. _____

Situation 2: You want to treat yourself but you only have $2. _____

Practice 2: Write a unit rate for each situation.

1. Driving 180 km in 3 hours

2. 54 hot dogs for 18 people

3. 160 words typed in 4 minutes

4. $27.40 for 4 hours of work

5. $12.66 for 8 packages of juice boxes

6. $284 for a 4 day car rental

7. A convenience store has 15 customers in 20 minutes

8. Temperature changes by -16ºC in 4 hours

Answer Keys: **1.** 60km/h, **2.** 3 hot dogs/person, **3.** 40 words/minute, **4.** $6.85/h, **5.** $1.58/package,
              6. $71/day, **7.** 0.75 customer/minute, **8.** Drops by 4 ºC/h since its $-4°C/h$