# Know your Rate: Objectives



## Students will be able to:

Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

**Why the calculator is helpful:**

In this activity the use of the calculator ratio application can be used to verify the ratios that are being evaluated. Students should be encouraged to calculate the ratios the traditional way, but keep in mind the ratio application is a very powerful tool.

## ENGAGE

Access students’ knowledge by asking the following questions:

* + What do you know about ratios?
  + Name some specific examples where you have seen a ratio used in an article, advertisement, etc…
  + What have you previously studied that might apply to our study of ratios?

## EXPLORE

Explore students’ understanding and/or inquiry by asking:

* + Name the three different ways to write a ratio.
  + Why would someone use one form of writing a ratio more than another?
  + How do ratios help us understand information?

## EXPLAIN

Have students explain their thoughts/ideas to the following questions:

* + Explain how two ratios are in proportion with each other.
  + Explain how to create equivalent ratios.
  + What patterns do you notice when creating equivalent ratios?

## EXTEND

Extend student understanding by asking the following questions:

* + How could you prove two ratios are in proportion other than by using cross products?
  + Why are ratios and proportions important in engineering?
  + What other professions require people to use ratio and proportions?
  + What other questions do you still have regarding ratios and proportions?



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# Know your Rate: Getting Started

## Getting Started:

A local restaurant is collecting data for how many hamburgers they sell each hour. They want to make certain they always have enough hamburgers in stock to sell to their customers. Also, this will help them determine how many hamburger buns they must order. The following data table shows the number of hamburgers sold at specific times during a day. Examine the table and answer the following questions.

|  |  |
| --- | --- |
| Time (Hours) | Hamburgers Sold |
| 2 | 60 |
| 3 |  |
| 5 | 150 |
|  | 210 |

1. Complete the data table.
2. What is the unit rate for hamburgers sold each hour?
3. If the restaurant is open 12 hours each day, how many hamburgers should they expect to sell?
4. If the restaurant is open seven days a week, how many hamburgers should they expect to sell each week?
5. If you were the manager of the restaurant, what factors would contribute to you ordering more or less hamburgers in a given week? Explain your reasoning and include any calculations necessary to justify your reasoning.

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# Know your Rate: Problems

1. Kevin can mow two lawns in his neighborhood in forty-five minutes. How long will it take him to mow 7 lawns?
2. There are 150 calories per serving of corn chips. How many calories are there in four servings of corn chips?
3. Janine is standing next to a 10-meter tall tree that casts a shadow that is 24 meter long. If Janine’s shadow measures 4 meter, how tall is Janine?
4. Complete each table and determine who makes more money per hour?

Perry’s Earnings

|  |  |
| --- | --- |
| Hours Worked | Salary |
| 5 | $32.00 |
| 8 |  |
| 10 | $64.00 |
| 15 | $96.00 |

Wanda’s Earnings

|  |  |
| --- | --- |
| Hours Worked | Salary |
| 3 |  |
| 6 | $34.50 |
| 10 |  |
| 12 | $69.00 |

1. Four friends go to dinner and they all order the same meal. Their total bill is

$28.00. If they return to the same restaurant the following week and order the same meal but bring three more friends with them, what is the total cost of their bill?

1. A major rainstorm drops 1.25 cm of rain every 20 minutes. If the rainstorm continues at the same rate, how much rain will there be in one hour and fifteen minutes?
2. Which is greater 24% of 50 or 50% of 24? Explain your reasoning.
3. Vickie and Cath go for a bike ride. Vickie travels 6 km in 45 minutes but Cath travels 3 km in 20 minutes. If they each maintain the same rate of speed, who travels the furthest in one hour? Explain your reasoning.