

Unit 3: Ratio Representations

Dear Parents/Guardians,

A major works of grade 6 starts in Unit 3 with an introduction to ratios and proportional reasoning. In Lesson 1, students explore ratios in different contexts and represent ratios with tables and tape diagrams. Lesson 2 continues the exploration of ratios using tables and looking at equivalent ratios. In Lesson 3, students construct double number lines and use them to solve ratio problems. In Lesson 4, we use ratio reasoning and the different representations to convert between units of measurement.

Ratios and Tape Diagrams

A **ratio** is a pair of nonnegative numbers in a specific order. We use a colon to represent ratio language such as "to," "for every," or "per."

Example: The ratio of cats to dogs at the pet show was 3 to 5.

The ratio of cats to dogs is 3 : 5. The ratio of cats to total animals is 3 : 8. The ratio of dogs to cats is 5 : 3. The ratio of dogs to total animals is 5 : 8.

Tape diagrams are one way to represent ratios. Tape diagrams are always made of connected rectangles in which the parts represent the same amount.

Example: The ratio of cats to dogs at the pet show was 3 : 5. If there are 24 cats in the pet show, how many dogs were there?

The ratio of cats to dogs can be represented as:

c	c	c	d	d	d	d	d
$3(8) = 24$				$5(8) = 40$			

3 rectangles represent 24 cats. Since $24 \div 3 = 8$, each rectangle represents 8 pets.

5 rectangles represent the number of dogs. Since $5 \times 8 = 40$, there are 40 dogs in the pet show.

Equivalent Ratios

Two ratios are equivalent if each number in the ratio is obtained by multiplying by the same positive number.

Example: Are 3 : 5 and 15 : 25 equivalent ratios?

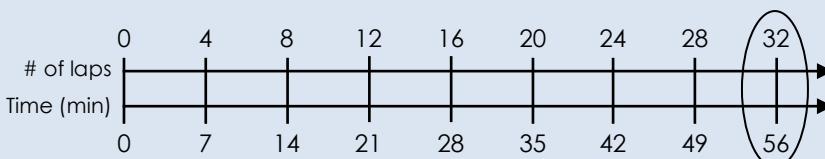
$$\begin{array}{ccc} 3:5 & & \\ \times 5 & \curvearrowright & \times 5 \\ 15:25 & & \end{array}$$

Since each number in the ratio is multiplied by 5, 15 : 25 is an equivalent ratio to 3 : 5.

Double Number Lines

A double number line is two parallel number lines depicting corresponding values of a ratio for easy comparison.

Example: Lilia can swim 4 laps in 7 minutes. At this rate, how many minutes will it take her to swim 32 laps?



Notice that each ratio on the double number line is an equivalent ratio to the original 4 : 7. At this rate, Lilia can swim 32 laps in 56 minutes.



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GRADE 6

By the end of the unit, your student should know...

- What a ratio is and use ratio language and notation [Lesson 3.1]
- How to represent and solve problems involving ratios using tables, tape diagrams, and double number lines [Lessons 3.1, 3.2, 3.3]
- How to use ratio reasoning to convert measurement units to solve problems in context [Lesson 3.4]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of the unit.
- For an introduction to ratios and ratio notation: <https://bit.ly/37BzF3U>
- For using tape diagrams to solve problems: <https://youtu.be/c6Pa34wRVEk>
- Solving rate problems with double number lines: <https://bit.ly/2Y4Y1Qo>
- For measurement conversions: <https://bit.ly/2MZKJ17>