**RATE**

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| **Problem 1:** Which carton of eggs (same brand and size) would you advise your family to buy? Which is the better buy economically? | |
| **STORE A**: $2.64 per carton of eggs | **STORE B**: $4.50 per carton of eggs |
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**Conclusion:**

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| **DEFINITION: Rate** is a comparison of two related numbers (quantities) having **different units**. A rate is usually written as a ‘unit rate’, in which the second term is always one like in the example above: 22 cents per one egg. |

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| **Example 1: Wage**  John earns $60 for working 4 hours. What is his **rate of pay**? | **Example 2: Speed**  If it takes 2 hours to travel 180 km distance, what is the rate of change (speed)? | **Example 3: Unit Price**  A 200g bag of mixed nuts costs $3.40. Calculate the **unit price**. |

**PROPORTION**

**Proportion** is an equation, which states that two fractions are equal.

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| **Example 1** | **Example 2** | **Example 3 \* *cross multiplication*** |

**Problem 2:** John’s family consumes 4 eggs a day. At this rate, how many eggs would they consume in one year?

(Set up a proportion that shows the daily rate = yearly rate)

**Problem 3:** How much would John’s family save in a year if they chose the 12-carton egg? (Set up a proportion that shows amount saved per one egg = amount saved per total eggs in one year)

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| **Example 1: Recipe**  The recipe calls for 1 cup of rye flour to 2 cups of all-purpose flour. How many cups of rye flour would you need to use if you added 6 cups of all-purpose flour? | **Example 2: Weight**  A rope’s length and weight are in proportion. When 20m of rope weighs 1 kg, then 200 m of rope weighs: |
| **Example 3: Speed**  A pendulum completes 7 swings every three seconds. How many swings does it complete in a minute? | **Example 4: Price (cost)**  Apples are $2.00 per dozen (12), how many apples can you get for $5.50? |
| **RATIO**  **Ratio** is a comparison of two quantities **with the same units.**    1 yellow square to 2 blue squares  We express ratios in three different ways:   * use “:” to separate the values 🡪 1 : 2 * use the word “to” 🡪 1 to 2 * write like a fraction 🡪 ½  |  | | --- | | Bilal uses the following ingredients for his favorite bread:   * 1 cup of rye flour * 2 cups of all-purpose flour * 1 cup of milk   What is the ratio of rye flour to all-purpose flour? \_\_\_ : \_\_\_  What is the ratio of rye flour to total flour? \_\_\_ : \_\_\_  What is the ratio of all-purpose flour to total flour? \_\_\_ : \_\_\_  What is the ratio of total flour to milk? \_\_\_ : \_\_\_ |   Write each ratio in simplest form. Find GCF, and then divide each quantity by the GCF.   |  |  |  | | --- | --- | --- | | **a**. | **b**. 4 : 12 : 16 | **c**. 6 to 10 | | |

**Practice: Ratios, Rates, and Proportions**

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| Write the following as ratios in lowest terms | | | | | |
| a. 73 days to 1 year | b. 35cents to $1.05 | | c. 750 mL to 1.5 L | | d. 3 min to 45 sec |
| Find the unit rate of the following: | | | | | |
| e. Mike earns $42 in 6 hours. | | f. $350 for 8 people to attend a party | | g. 24 pop for $6.96 | |
| **Answer** the following rate problems: | | | | | |
| h. Jack earned $50 in 10 hours, while John earned $105 in 20 hours. Which person had the better rate of pay? | | | i. A bus travels 10 km in 25 minutes. At this rate, how far will the bus travel in one hour? | | |
| j. Oranges are $2.00 per dozen. At this rate, how many oranges could you get for $3.50 | | | k. Katherine cycled 30 km in 2 hours. If she continues at the same rate, what distance will she travel in 7 hours? | | |
| l. Which is the better value? $350 for a bus of 35 people, or $440 for a bus of 40 people? | | | m. Which is the better value? 28 g of mixed nuts for $0.84, or 35g of mixed nuts for $1.40? | | |
| Find the missing value in the following proportions \*round to 2d.p. where necessary | | | | | |
| n. | o. | | p. | | q. |
| ANSWERS: a. 1:5, b. 1:3, c. 5:6, d. 4:1, e. $7/h, f. $43.75/p, g. $0.29/pop, h. John, i. 24km/h, j. 21oran., k. 105 km, l. $350/35, m. 28g/$0.84, n. m=1.88, o. k=0.82, p. p=7, q. y=1.6 | | | | | |