

5-1B: Rates and Unit Rates

11-9-15

5-1C: Proportional and NonProportional Relationships

Ratio: a comparison of two quantities by division $\frac{2}{4}$ $2:4$ 2 to 4 *must reduce

Rate: a ratio of two quantities with different units $\frac{4 \text{ miles}}{2 \text{ hours}} = \frac{2 \text{ miles}}{1 \text{ hour}}$ 2 miles per hour
 *per means divide

Unit Rate: a rate that has been reduced to a denominator of one

Proportion: an equation stating two ratios or rates are equivalent $\frac{2}{4} = \frac{1}{2}$
 * Solve using cross products or heart method

Proportional: when two or more rates or ratios are equal

NonProportional: when two or more rates or ratios are not equal

Ex. 1: Find each unit rate. Round to the nearest hundredth.

A) 400 miles on 14 gallons of gas
 $\frac{400 \text{ mi}}{14 \text{ gal}} \div 14 = \frac{28.57 \text{ mi}}{1 \text{ gal}}$

B) 125 students in 5 classes
 $\frac{125 \text{ students}}{5 \text{ classes}} \div 5 = \frac{25 \text{ students}}{1 \text{ class}}$

28.57 miles per gallon

25 students per class

Ex. 2: A farmers market sells 8 ears of corn for \$3.50. At this same rate, how much will it cost to buy 28 ears of corn?

* Find unit rate first
 \$ always goes on top
 $\frac{3.50}{8 \text{ ears}} \div 8 = \0.4375 1 ear
 $28 \text{ ears} = 28 \cdot 0.4375 = \$12.25 \text{ for } 28 \text{ ears of corn}$

Ex. 3: Determine whether each set of numbers is proportional. *Find unit rates to compare.

A)

| | | | | |
|--------------|----|----|----|----|
| Time (s) | 1 | 2 | 3 | 4 |
| Distance (m) | 24 | 48 | 72 | 96 |

 meters per second

$\frac{24}{1} = \frac{48}{2} = \frac{72}{3} = \frac{96}{4} = \frac{24}{1}$

Yes, all rates are equal to 24 meters per second.

B)

| | | | | |
|---------------|---|---|---|---|
| Baseballs (#) | 1 | 2 | 3 | 4 |
| Cost (\$) | 2 | 3 | 4 | 5 |

 cost per baseball

$\frac{2}{1} = \frac{3}{2} = \frac{1.5}{1}$ $\frac{4}{3} = \frac{1.\bar{3}}{1}$ $\frac{5}{4} = \frac{1.25}{1}$

No, the rates are not equal.

HW: 5-1B, 5-1C Skills Practice WS