Algebra 6-2 Rates/6-3 Ratios

Warm-Up

Simplify numbers 1-4.

1. $\dfrac{y}{2x} \div \dfrac{x}{3}$

$\dfrac{y}{2x} \cdot \dfrac{3}{x} = \boxed{\dfrac{3y}{2x^2}}$

2. $\dfrac{\frac{10x}{5}}{3x} \div$

$\dfrac{10x}{1} \cdot \dfrac{3x}{5} = \dfrac{30x^2}{5} \overset{\div 5}{\underset{\div 5}{=}} \boxed{\dfrac{6x^2}{1}}$

3. $\dfrac{\frac{xy}{z}}{\frac{x^2}{yz}} \div$

$\dfrac{xy}{z} \cdot \dfrac{yz^2}{x^2} = \dfrac{xy^2z}{x^2} = \boxed{\dfrac{y^2}{x}}$

4. $\dfrac{-3}{z} \div \dfrac{9}{1} = \dfrac{-3}{z} \cdot \dfrac{1}{9} = \overset{\div 3}{\underset{\div 3}{\dfrac{-3}{9z}}} = \boxed{\dfrac{-1}{3z}}$

Rate	Ratios
• A comparison of 2 numbers with different units	• A comparison of 2 numbers with the same units.

Rate

Ex) $\dfrac{55 \text{ miles}}{1 \text{ hr}}$, $\dfrac{6 \text{ questions}}{1 \text{ minute}}$

Ratios

Ex) Cole to Krystaa
2,200 Songs   1,092 Songs

$\dfrac{2200}{1092}$ 2200:1092

2200 to 1092

Remember to __label__ your answer with proper __units__ .

We can write ratios and rates using the word __to__ , using a __fraction__ bar, or using a __colon__ .

Rate Examples

1. You drive 100 miles in 2 hours. How many miles per hour is this?

$$\frac{100 \text{ miles}}{2 \text{ hours}} \overset{\div 2}{\underset{\div 2}{=}} \frac{50 \text{ miles}}{1 \text{ hour}}$$

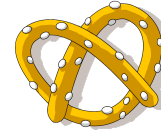__50 miles/1 hour__

2. There are 500 calories in 4 servings of pretzels. How many calories are there per serving?

$$\frac{500 \text{ calories}}{4 \text{ servings}} \overset{\div 4}{\underset{\div 4}{=}} \frac{125 \text{ calories}}{1 \text{ serving}}$$

__125 calories/serving__

3. Cereal costs $3.99 for a 12-ounce box. How much does is cost per oz?

$$\frac{\$3.99}{12 \text{ oz}} \overset{\div 12}{\underset{\div 12}{=}} \frac{\$.33}{1 \text{ oz}}$$

__$.33/oz__

4. Angie worked 7.5 hours yesterday and earned $53.33. What did she earn per hour?

$$\frac{\$53.33}{7.5 hrs} \overset{\div 7.5}{\underset{\div 7.5}{=}} \frac{\$7.11}{1 hr}$$

$\underline{\$7.11/hr}$

5. From 2000-2006, the enrollment at NHS has ~~decreased~~ by 350 students.

How fast was the enrollment changing during this period?

$\underline{-58 \text{ student}/year}$

$$\frac{-350 \text{ students}}{6 \text{ years}} = \frac{-58 \text{ students}}{1 \text{ year}}$$

6. $\dfrac{k-7}{k-10}$ What value can k <u>not</u> have?

↳ Can't divide by 0.

$\underline{k = 10}$

7. Find the rate of temperature change if the temperature ~~drops~~ 11 degrees in 5 hours.

$$\frac{-11 \text{ degrees}}{5 \text{ hours}} \overset{\div 5}{\underset{\div 5}{=}} \frac{-2.2 \text{ degrees}}{1 hr}$$

$\underline{-2.2°/1hr}$

Vocab	Definition	
Percent of Discount	Ratio of discount to original price	$\dfrac{discount}{original} = .\_\_\_ = \_\_\%$
Percent of Tax	Ratio of tax to selling price	$\dfrac{tax}{selling} = .\_\_\_ = \_\_\_\%$

Ratio Examples

8. It takes Bob 15 minutes to get to work and it takes Sue 40 minutes to get to work. What is the ratio of Bob's travel time to Sue's travel time?

$\dfrac{3}{8}, 3:8, 3\,to\,8$

$$\dfrac{Bob}{Sue} = \dfrac{15^{\div 5}}{40_{\div 5}} = \dfrac{3}{8}$$

$\dfrac{1}{8} \cdot 5280 = 660\,ft$

$\dfrac{11}{5}, 11:5, 11\,to\,5$

9. A park is an eighth of a mile long and 300 feet wide.
Find the ratio of length to width.

$$\dfrac{length}{width} = \dfrac{660\,ft}{300\,ft} = \dfrac{66^{\div 3}}{30_{\div 3}} = \dfrac{22^{\div 2}}{10_{\div 2}} = \dfrac{11}{5}$$

has Same units

10. NHS won 23 of its last 42 basketball games.

    a. What is the ratio of games won to games played?

    $\dfrac{won}{total} = \dfrac{23 \text{ games}}{42 \text{ games}}$

    23/42

    b. What % of the 42 games were won?

    $\dfrac{23}{42} = .54 = 54\%$

    54%

11. A pair of shoes that originally sold for $40 is on sale for $8 less.

    a. What is the percent of discount on the shoes?

    $\dfrac{discount}{original} = \dfrac{8}{40} = .2 = 20\%$

    20%

    b. If there is $1.92 tax on the sale price, what is the tax rate?

    $\dfrac{tax}{selling} = \dfrac{1.92}{32} = .06 = 6\%$

    6%

    $^\$40 - 8 = ^\$32$