

First name: _____ Last name: _____ Student ID: _____

Ratio, Rate, Proportion**Basic problems****1. State whether the ratios are proportional. Write *yes* or *no*.**

1. $\frac{1}{2}$, $\frac{3}{4}$	2. $\frac{48}{64}$, $\frac{11}{4}$	3. $\frac{2}{8}$, $\frac{1}{16}$
4. $\frac{33}{9}$, $\frac{22}{8}$	5. $\frac{1}{5}$, $\frac{3}{15}$	6. $\frac{23}{9}$, $\frac{92}{36}$

2. Solve each proportion.

1. $\frac{15}{p} = \frac{20}{8}$	2. $\frac{s}{10} = \frac{84}{20}$	3. $\frac{3}{y} = \frac{9}{12}$
4. $\frac{4}{12} = \frac{v}{3}$	5. $\frac{12}{28} = \frac{p}{21}$	6. $\frac{20}{12} = \frac{f}{9}$

3. Create a proportion from each set of numbers. Only use 4 numbers from each set of numbers.

1. 6, 2, 9, 3	2. 4, 2, 32, 1, 8
3. 12, 24, 5, 10	4. 13, 12, 20, 4, 39

4. Find the unit rate. Round your answer to the nearest hundredth.

1. a 2.6-kg bag of carrots for \$7.05 _____ per kg	2. 322.7 miles in 7 hours _____ miles per hour
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Challenge Problems

1. A city council decided to levy a 10¢-per-cup tax on fancy coffee drinks sold there. They estimated the tax would gross about \$6 million per year. About how many fancy coffee drinks are sold per year in that city?

2. Reserved seating tickets for a ball game cost \$9 each. General admission tickets cost \$5 each. The ratio of general admission tickets sold to reserved seating tickets sold was 3:1. If the value of all the tickets sold was \$2,160, how many tickets were sold altogether?

3. Each penny contains 2.4375 grams of zinc. How many pennies could be made from a kilogram of zinc and how many milligrams zinc would be left over (to the nearest milligram)?

4. A candle is lit. Every 5 minutes the height of the candle is measured. The table shows the data gathered. Which statement below describes the rate of change of the candles height?

Time the candle has burned (minutes)	0	5	10	15
Height of the candle (centimeters)	30	28	26	24

- a. The height is decreasing at the constant rate of 2 cm per minute.
- b. The height is increasing at the constant rate of 2 cm per minute.
- c. The height is decreasing at the constant rate of 5 cm per minute.
- d. The rate of decrease of the height is constantly changing.
- e. The height is decreasing at the constant rate of 0.4 cm per minute.

5. Find the length of the diagonal of a rectangle with width of 21cm and length of 28cm.
6. A 1-inch stack of \$100 bills contains about 250 bills. In 1995, the federal debt was approximately 5 trillion dollars. If the entire debt were converted into a stack of \$100 bills, how many feet high would it be? (Round to the nearest hundredth of a foot.)
7. Lynn walks 18 inches with each step. Lynn's cousin walks 14 inches with each step. If Lynn walks one mile and her cousin takes the same number of steps as Lynn, how far behind will the cousin be when Lynn completes the mile? (5280 feet = 1 mile)
8. A box contains a total of 400 tickets that come in five colours: blue, green, red, yellow and orange. The ratio of blue to green to red tickets is 1 : 2 : 4. The ratio of green to yellow to orange tickets is 1 : 3 : 6. What is the smallest number of tickets that must be drawn to ensure that at least 50 tickets of one colour have been selected?

9. Electrical resistance in a wire is directly proportional to its length and inversely proportional to the square of its diameter. If a 10 cm long wire with diameter 2 cm has a resistance 600 ohms, a 15 cm long wire with diameter 5 cm has resistance:

- a. 144 ohms b. 2500 ohms c. 1200 ohms d. 1000 ohms e. 360 ohms

Note: When two quantities x and y are directly proportional, it means that as one quantity increases, the other quantity increases at the same rate, and if one decreases, the other also decreases proportionally. So, if y is directly proportional to x , then $y = kx$, or $y : x = k : 1$. When two quantities x and y are inversely proportional, it means that as one quantity increases, the other quantity decreases at a corresponding rate, and vice versa. So, if y is indirectly proportional to x , then $y = \frac{k}{x}$ or $yx = k$.

10. The figure below is created from four squares. Each triangle vertex is on a vertex of a square or on the **midpoint** of a side of a square. What's the ratio of shaded to unshaded area?

