

Similarity – Properties of Proportions

Notes Section 7.1

Name _____

Ratio: a comparison of two quantities.

$$3:2 \quad 3 \text{ to } 2 \quad \frac{3}{2}$$

What is the ratio of female students to male students in this class?

What is the ratio to Twinkie riders to car riders in this class?

Proportion: an equation stating that two ratios are equal.

Example: $\frac{4}{8} = \frac{1}{2}$

Solve each proportion.

#1) $\frac{x}{12} = \frac{84}{2015}$

$$\cancel{12} \cdot \frac{x}{\cancel{12}} = \frac{4}{15} \cdot 4$$

$$x = \frac{16}{5}$$

#2) $\cancel{9} \cdot (x+2) \frac{10}{9} = \frac{30}{x+2} \cdot \cancel{(x+2)} \cdot 9$

$$10(x+2) = 30 \cdot 9$$

$$10x+20 = 270$$

$$10x = 250$$

$$x = 25$$

#3) $(3) \cdot \cancel{10} \cdot \frac{x+6}{10} = \frac{2x-5}{3} \cdot \cancel{(3)} \cdot (10)$

$$3(x+6) = 10(2x-5)$$

$$3x+18 = 20x-50$$

$$3x+68 = 20x$$

$$68 = 17x$$

$$4 = x$$

#4) $\frac{7-x}{9} = \frac{21}{63}$

$$\cancel{9} \cdot \frac{7-x}{\cancel{9}} = \frac{1}{3} \cdot \cancel{9} \cdot 3$$

$$7-x = 3$$

$$-x = -4$$

$$x = 4$$

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#5) On a bike, the ratio of the number of rear sprocket teeth to the number of front sprocket teeth is equivalent to the number of rear sprocket wheel revolutions to the number of pedal revolutions. If there are 8 rear sprocket teeth and 18 front sprocket teeth, how many revolutions of the rear sprocket wheel will occur for 5 revolutions of the pedal?

$$\frac{\# \text{ r.s.t.}}{\# \text{ f.s.t.}} = \frac{\# \text{ r.s.w.r.}}{\# \text{ p.r.}}$$

$$\frac{4 \cdot 8}{9 \cdot 18} = \frac{x}{5}$$

$$5 \cdot \frac{4}{9} = \frac{x}{5} \cdot 9$$

$$\frac{20}{9} = x$$

#6) One way to determine the strength of a bank is to calculate its capital-to-assets ratio as a percent. A weak bank has a ratio of less than 4%. The Gnadon National Bank has a capital of \$177,000 and assets of \$4,450,000. Is it a weak bank? Explain.

$$\text{Strength} = \frac{\text{CAP}}{\text{Assets}}$$

$$\text{Strength} = \frac{177,000}{4,450,000}$$

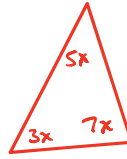
$$\text{Strength} = 0.03978$$

$$\text{Strength} = 3.978\%$$

Gnadon is a weak bank because its

Strength is less than 4%

#7) The ratio of the measures of the angles of a triangle is 3:5:7. What is the measure of each angle in the triangle?



$$3x + 5x + 7x = 180$$

$$15x = 180$$

$$x = 12$$

$$3x = 3(12) = 36$$

$$5x = 5(12) = 60$$

$$7x = 7(12) = 84$$

#8) On a map of Ohio, three fourths of an inch represents 15 miles. If it is approximately 10 inches from Sandusky to Cambridge on the map, what is the actual distance in miles?

$$8 \cdot x \cdot \frac{3}{4} \text{ in} = \frac{10 \text{ in}}{x \text{ mi}} \cdot 15 \cdot x$$

$$\frac{3}{4} x = 10 \cdot 15$$

$$3x = 150$$

$$3x = 150$$

$$x = 150 \text{ mi}$$

It is 150 miles from Sandusky to Cambridge