7-1 Ratios & Proportions

Name_____
Date_____ Block_____

Ratio: the comparison of 2 numbers using division.

- The ratio of quantities *a* and *b* can be expressed in three ways, where b ≠ 0:

  a:b, b:c, a:c

  $\frac{5in}{10ft} = \frac{5in}{120ft} = \frac{1}{24}$

  $\frac{6}{10} = \frac{3}{5}$

- Ratios are usually expressed in simplest form and must have like units before reducing.

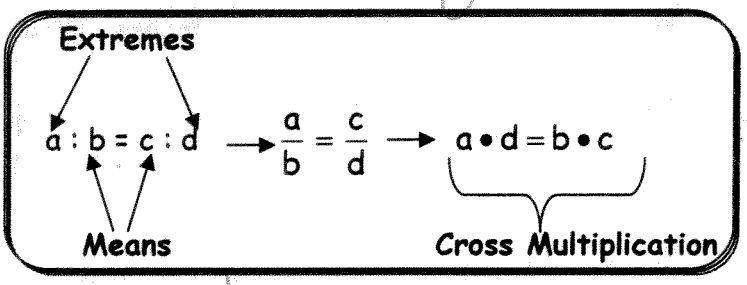
Extended ratios: can be used to compare three or more quantities.

- a : b: c means that a:b, b:c, and a:c

ex: $\frac{2}{3} = \frac{x}{5} = \frac{y}{7}$

Proportion: an equation stating that two ratios are equal.

Parts of a Proportion:



- The product of the extremes ad and the product of the means bc are called cross products.

Solve each proportion. Show your work below each problem.

1. $\frac{5}{8} = \frac{x}{12}$

$8x = 60$
$x = 7.5$

2. $\frac{x}{1.12} = \frac{1}{5}$

$5x = 1.12$
$x = 0.224$ ($\frac{28}{125}$)

3. $\frac{6x}{27} = \frac{4}{3}$

$18x = 108$
$x = 6$

4. $\frac{x+2}{3} = \frac{8}{9}$

$9x + 18 = 24$
$9x = 6$
$x = \frac{6}{9} = \frac{2}{3}$
$x = .67$

5. $\frac{3x-5}{4} = \frac{-5}{7}$

$21x - 35 = -20$
$21x = 15$
$x = \frac{15}{21} = \frac{5}{7}$
or .71

6. $\frac{x-2}{4} = \frac{x+4}{2}$

$2x - 4 = 4x + 16$
$-20 = 2x$
$x = -10$

Applications: Solve each word problem.

7. **NUTRITION:** One ounce of cheddar cheese contains 9 grams of fat. Six of the grams of fat are saturated fats. Find the ratio of saturated fats to total fat in an ounce of cheese.

$\frac{SF}{TF} = \frac{6}{9} = \frac{2}{3}$ 2 to 3

8. **FARMING:** The ratio of goats to sheep at a university research farm is 4:7. The number of sheep at the farm is 28. What is the number of goats?

$\frac{G}{S} = \frac{4}{7} = \frac{x}{28}$ $7x = 112$ $x = 16$ goats

9. **ART:** Edward Hopper's oil on canvas painting Nighthawks has a length of 60 inches and a width of 30 inches. A print of the original has a length of 2.5 inches. What is the width of the print?

$\frac{L}{W} = \frac{60}{30} = \frac{2.5}{x}$ $60x = 75$ $x = 1.25$ in

10. **BRIDGES:** The span of the Benjamin Franklin suspension bridge in Philadelphia is 1750 feet. A model of the bridge has a span of 42 inches. What is the ratio of the span of the model to the span of the actual Benjamin Franklin Bridge?

$\frac{Mod}{Act} = \frac{42 in}{1750 ft} = \frac{42 in}{1750(12 in)} = \frac{42}{21000} = \frac{1}{500}$ 1 to 500

500 x the model

Find the measures of the sides or angles of each triangle.

11. The ratio of the measures of the sides of a triangle is 3 : 4 : 6, and its perimeter is 104 feet.

$13x = 104$ $x = 8$ 24, 32, 48

12. The ratio of the measures of the sides of a triangle is 7 : 9 : 12, and its perimeter is 84 in.

$28x = 84$ $x = 3$ 21, 27, 36

13. The ratio of the measures of the angles of a triangle is 4 : 5 : 6.

$15x = 180$ $x = 12$ 48, 60, 72

14. The ratio of the measures of the angles of a triangle is 5 : 7 : 8.

$20x = 180$ $x = 9$ 45, 63, 72