

CLO:

Students will solve for variables using proportions and be able to explain, verbally, in their own words the process for solving proportions.

Warm Up:

1. In the space provided, please write down everything you know about proportions.

2. Solve for x: $5 \cdot \frac{2x+4}{5} = 4 \cdot 5$

$$\begin{array}{r} 2x+4=20 \\ -4 \quad -4 \\ \hline 2x=16 \\ \frac{2x}{2}=\frac{16}{2} \quad \boxed{x=8} \end{array}$$

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Comparing 2 numbers is called a ratio.

Example: scoring a 19 out of 20 on a test.

Ways to write a ratio: $\frac{19}{20}$ ^x19:20 0.95 95%

When you divide 19 by 20, the decimal ends, or terminates. $\frac{19}{20} = 0.95$

Sometimes you get a repeating decimal.

$$\frac{210}{330} = 0.63\overline{63}....$$

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A proportion is an equation showing two ratios are equal to each other.

■ Similar to reducing fractions

Examples: $\frac{2}{3} = \frac{4}{6}$ $\frac{1}{2} = \frac{3}{6}$ $\frac{2}{4} = \frac{1}{2}$ $\frac{12}{24} = \frac{x}{48}$

(Handwritten annotations in purple show the reduction process: for 2/3 to 4/6, multiply by 2; for 1/2 to 3/6, multiply by 3; for 2/4 to 1/2, divide by 2; for 12/24 to x/48, multiply by 4.)

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Solving for a variable using proportions:

cross multiply

$$\frac{2}{5} = \frac{x}{45}$$

$$5 \cdot x = 2 \cdot 45$$

$$5x = 90$$

$$x = 18$$

~~$\frac{2}{5} = \frac{x}{45}$~~

$$\frac{45 \cdot 2}{5} = x$$

$$\frac{90}{5} = 18 = x$$

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$$\frac{b}{15} = \frac{3}{5}$$

$$3 \cdot 15 = 5 \cdot b$$

$$\frac{45}{5} = \frac{5b}{5}$$

$$\boxed{9 = b}$$

$$\frac{-6}{x} = \frac{-24}{12}$$

$$-6 \cdot 12 = -72$$

$$-24x$$

$$\frac{-24x}{-24} = \frac{-72}{-24}$$

$$\boxed{x = 3}$$

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$$\begin{array}{l} \frac{5}{10} = \frac{10}{x-1} \\ 5(x-1) = 10 \cdot 10 \\ 5x - 5 = 100 \\ \begin{array}{r} +5 \quad +5 \\ \hline 5x = 105 \\ \hline 5 \quad 5 \end{array} \\ x = 21 \end{array}$$

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$$\frac{3}{4} = \frac{6}{b-5}$$

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$$\frac{6}{p+7} = \frac{5}{10}$$

