

Content and Language Objective:

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

Warm - Up

1. Write 5 irrational numbers.

π , 1.3695..., $\sqrt{7}$, $\sqrt{2}$, $\sqrt{3}$

2. Write 5 rational numbers.

1, 2, 3, 4, 5, $\sqrt{4}$, $\frac{1}{2}$, 0
.75, -3

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Keywords:

- Ratios
- Proportions
- Terminates
- Repeating Decimal
- Variable

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Comparing 2 numbers is called a ratio.

Example: Scoring 19 out of 20 points on a test.

Ways to write a ratio:

$$\frac{19}{20}$$

$$19:20$$

$$0.95$$

$$95\%$$

When you divide 19 by 20, the decimal ends or terminates.

$$\frac{19}{20} = 0.95$$

But sometimes you get a repeating decimal.

$$\frac{210}{330} = 0.6\overline{3}63....$$

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A proportion is an equation showing 2 ratios are equal to each other

- **Similar to reducing fractions**

Example:

$$\frac{2}{2} \cdot \frac{2}{3} = \frac{4 \div 2}{6 \div 2} \quad \frac{1}{2} = \frac{3}{6} = \frac{2}{4} = \frac{1}{2} \quad \frac{12}{24} \cdot \frac{2}{2} = \frac{x}{48} \quad \frac{24}{24}$$

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How do we solve a situation like the following? There are a couple ways that we can look at solving this problem

$$\frac{12}{24} = \frac{x}{48}$$

cross-multiplication

~~$$\frac{12}{24} = \frac{x}{48}$$~~

$$24 \cdot x = 12 \cdot 48$$

$$\frac{24x}{24} = \frac{576}{24}$$

$$\boxed{x = 24}$$

~~∞~~
Fish method

~~$$\frac{12}{24} = \frac{x}{48}$$~~

$$\frac{48 \cdot 12}{24} = x$$

$$\frac{576}{24} = x = 24$$

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$$\frac{9}{14} = \frac{5}{x}$$

Cross-multiplication

$$\begin{array}{r} \cancel{9} \times \cancel{5} \\ \cancel{14} \times \cancel{x} \\ 9x = 70 \\ \frac{9x}{9} = \frac{70}{9} \\ \boxed{x = 7.7} \end{array}$$

Fish method

$$\begin{array}{r} \cancel{9} \times \cancel{5} \\ \cancel{14} \times \cancel{x} \\ 5 \times 14 \\ \frac{5 \times 14}{9} = x \end{array} \quad \frac{70}{9} = x \quad \boxed{7.7 = x}$$

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$$10r = 114 \quad 10r - 90$$

$$-90r = 24$$

$$r - 90 = 24$$

Cross-multiply

$$\frac{10}{4} \times \frac{6}{r-9}$$

$$10(r-9) = 6 \cdot 4$$

$$10r - 90 = 24$$

$$+90 \quad +90$$

$$10r = 114$$

$$\boxed{r = 11.4}$$

$$\frac{10}{4} = \frac{6}{r-9}$$

fish method

$$\frac{10}{4} \times \frac{6}{r-9}$$

$$\frac{6 \cdot 4}{10} = r - 9$$

$$\frac{24}{10} = r - 9$$

$$2.4 = r - 9$$

$$\begin{array}{r} +9 \quad +9 \\ \hline 11.4 = r \end{array}$$

