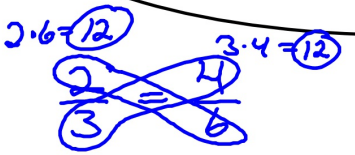
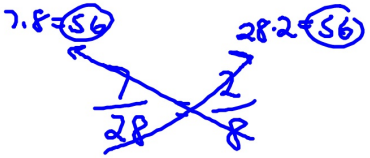
Accelerated MathNotes
Section 5-7
Solving Proportions

A **proportion** is an equation stating that two ratios or rates are equivalent. $\frac{\square}{\square}=\frac{\square}{\square}$

$$\frac{2}{3}=\frac{4}{6} \qquad \frac{2}{5}=\frac{n}{40}$$

In a proportion the cross products are equal.





$\frac{2}{4}=\frac{x}{y}$

If crossproduct = 8
$x=?$ $x=2$
$y=?$ $y=4$

Methods to Solve a Proportion

1) Use cross products and solve algebraically.

$\frac{4.2}{n}=\frac{8}{5}$

$4.2(5)=8\cdot n$

$21=8n$

$\frac{21}{8}=\frac{8}{8}n$

$2.625=1n$

$2.625=n$

Solve using algebraic steps:

$\frac{3}{17}=\frac{7}{n}$

$3\cdot n=17\cdot 7$

$3n=119$

$\frac{3n}{3}=\frac{119}{3}$

$1n=39.\overline{6}$

or $n=39\frac{2}{3}$

Round to nearest tenth

$\frac{n}{19}=\frac{1.8}{7}$

$n\cdot 7=19(1.8)$

$7n=34.2$

$\frac{7n}{7}=\frac{34.2}{7}$

$1n=4.8857\ldots$

$n\approx 4.9$

Methods to Solve a Proportion

2) Use concept of equivalent ratios.

$\frac{4}{5} \overset{\times 2}{=} \frac{8}{n}$ $\quad n = 10$

$\frac{28}{49} \overset{\div 7}{=} \frac{4}{n}$ $\quad n = 7$

Methods to Solve a Proportion

3) Sometimes you can put one of the ratios in simplest form first.

$\frac{9}{15} = \frac{6}{n}$

$\frac{3}{5} \overset{\times 2}{=} \frac{6}{n}$ $\quad n = 10$

$\frac{22}{30} = \frac{55}{n}$

$\frac{11}{15} \overset{\times 5}{=} \frac{55}{n}$ $\quad n = 75$

Methods to Solve a Proportion

* Use equivalent ratios
* Simplify one of ratios first
* Use cross products

What's the best method to use ?

$\frac{21}{25} = \frac{8}{n}$

$21 \cdot n = 25 \cdot 8$

$21n = 200$

$\frac{21n}{21} = \frac{200}{21}$

$1n = 9.523\ldots$

$n \approx 9.5$

Methods to Solve a Proportion

* Use equivalent ratios
* Simplify one of ratios first
* Use cross products

What's the best method to use ?

$\frac{12}{18} = \frac{28}{n}$

$\frac{2}{3} \overset{\times 14}{=} \frac{28}{n}$

$42 = n$

Methods to Solve a Proportion

* Use equivalent ratios
* Simplify one of ratios first
* Use cross products

$\frac{11}{7} \overset{\times 3}{\underset{\times 3}{}} = \frac{n}{21}$

$n = 33$

What's the best method to use ?

Carla earns $74.25 for working 8 hours last week. How much will she earn for working 20 hours?

$\frac{\$}{hour}$ $\quad \frac{74.25}{8} = \frac{n}{20}$

$74.25(20) = 8n$

$1485 = 8n$

$\frac{1485}{8} = \frac{8n}{8}$

$185.625 = n$

$185.63

The ratio of salt to water in a certain solution is 2 to 17. If the solution contains 34 ounces of salt, how many ounces of water does it contain?

$\frac{salt}{water}$ $\quad \frac{2}{17} \overset{\times 17}{\underset{\times n}{}} = \frac{34}{n}$

$n = 289$ oz water

Ted can run 150 meters in 24 seconds. At this rate, how many meters will he run in 38 seconds?

$\frac{meters}{sec}$ $\quad \frac{150}{24} = \frac{n}{38}$

$\frac{25}{4} = \frac{n}{38}$

$25(38) = 4n$

$950 = 4n$

$\frac{950}{4} = \frac{4n}{4}$

$237.5 = n$

237.5 m