

* BE-1A MONDAY 12-11-06 *

①

* COPY THIS PAGE FOR NOTES *

AN EQUATION THAT HAS TWO
fractions EQUAL TO EACH OTHER

$$\text{EX) } \frac{1}{4} = \frac{2}{8}$$

IS CALLED A PROPORTION.

It CAN BE READ AS:

ONE IS TO FOUR AS
TWO IS TO EIGHT

ONE KEY FACT ABOUT
proportions (EQUATIONS WITH TWO
fraction) IS they CAN be
SOLVED WITHOUT USING fractions!

(2)

Suppose
YOU HAD
THIS
PROPORTION.

$$\frac{a}{b} = \frac{c}{d}$$

$$\cancel{b} \cdot \frac{a}{\cancel{b}} = \frac{c}{d} \cdot b$$

MULTIPLY
BOTH SIDES
BY b

$$a = \frac{cb}{d}$$

$$d \cdot a = \frac{cb}{\cancel{d}} \cdot \cancel{d}$$

MULTIPLY
BOTH SIDES
BY d

$$\boxed{ad = bc}$$

$$\frac{a}{b} = \frac{c}{d}$$

**CROSS PRODUCTS
ARE EQUAL**

MULTIPLY

EX) $\frac{1}{4} = \frac{2}{8}$

$$1 \cdot 8 = 4 \cdot 2 \quad \checkmark$$

EX) $\frac{x}{4} = \frac{3}{12}$

$$12x = 12 \quad \text{SOLVE!}$$

$$\boxed{x = 1}$$

w/o
FRACTIONS

Ch. 3-6 Ratios and Proportions

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⚡
FRACTIONS

⚡
AN EQUATION THAT
HAS TWO FRACTIONS
EQUAL TO EACH
OTHER.

⚡
THE CROSS-PRODUCTS OF A PROPORTION
ARE EQUAL (TO EACH OTHER)

EX 3 Pg. 156 Solve

$$\frac{N}{15} = \frac{24}{16}$$

💡 SIMPLIFY FRACTIONS
BEFORE / AFTER

$$\frac{24}{16} = \frac{3}{2}$$

$$\frac{N}{15} = \frac{3}{2}$$

$$2N = 3 \cdot 15$$

$$N = \frac{3 \cdot 15}{2}$$

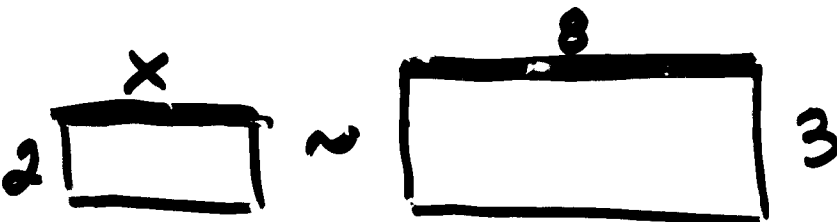
$$\therefore \boxed{N = \frac{45}{2}} \text{ or } 22.5$$

PREFERRED

Similar
Shapes

~

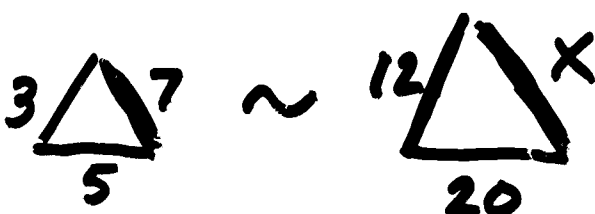
SAME SHAPE,
different sizes. THE
SIZE OR MEASURES OF
EACH SIDE ARE
IN PROPORTION.

Ex) 

$$\frac{x}{8} = \frac{2}{3} \quad \text{or} \quad \frac{2}{3} = \frac{x}{8}$$

$$3x = 16$$

$$x = \frac{16}{3} \quad \text{or} \quad 5\frac{1}{3}$$

Ex) 

$$\frac{3}{12} = \frac{7}{x} \quad \text{or} \quad \frac{5}{20} = \frac{7}{x}$$

$$3x = 7 \cdot 12$$

$$x = \frac{7 \cdot 12}{3} = \boxed{28}$$

$$5x = 7 \cdot 20$$

$$x = \frac{7 \cdot 20}{5} = \boxed{28}$$

RATE $\Rightarrow$ RATIOS WITH
DIFFERENT UNITS

$$\frac{\text{MILES}}{\text{Hour}}, \frac{\text{Degrees}}{\text{MINUTES}}, \frac{\text{cats}}{\text{House}}$$

Proportions CAN BE USED TO SOLVE
MANY RATE problems

EX 4 Pg 157

Trent rides 30 miles every Saturday.
in 4 hours. At this rate, How far
can he ride in 6 hours?

30 mi. is to 4 hours as
x mi is to 6 hours

$$\frac{30}{4} = \frac{x}{6}$$

$$4x = 30 \cdot 6$$

$$x = \frac{30 \cdot 6}{4}$$

MUST HAVE
UNITS!

$$x = 45 \text{ mi}$$

⑥
Scales, such as maps, models, are perfect for solving with proportions.

Ex 5 Pg 157

MAP SCALE IS 2 INCHES = 9 miles. Distance between 2 points on map is $1\frac{3}{4}$ in., WHAT is real distance between them?

2 in. is to 9 mi. as

$\left(1\frac{3}{4}\right)$ in. is to X mi.
 $\frac{7}{4}$

$$\frac{2}{9} = \frac{\frac{7}{4}}{x}$$

$$2x = 9 \cdot \frac{7}{4} = \frac{63}{4}$$

$$x = \frac{\frac{63}{4}}{\frac{2}{1}} = \frac{63}{4} \cdot \frac{1}{2} = \boxed{\frac{63}{8} \text{ mi}} \text{ or } 7\frac{7}{8} \text{ mi.}$$

Page 158 Practice $\Rightarrow$ Check
for Understanding

Homework:

- Read Ch. 3-6
- Pg 158-159
11, 12, 19 to 22, 31 to 32,