BE-1A | Monday 5-19-08

① $-6-6-6=?$

② $\frac{1}{2} \cdot -3 = ?$

③ $3x+4y-5x-y=?$

④ $\dfrac{\frac{1}{2}}{3} = ?$

⑤ $-12(4x)=?$

Semester Exam: Ch 3-6 Ratios & Proportions
Ch 4 Graphing Relations & Functions
Ch 5 Analyzing Linear Equations
Ch 6 Solving Linear Inequalities

Sign Rules: Adding ⇒ Add, keep same sign
Subtracting ⇒ Subtract, "biggest" sign wins
$\cdot, \div$ ⇒ SPDN

Fraction Rules: $+, -$ ⇒ Common Denominator
$\cdot$ ⇒ tops • tops, bottoms • bottoms
$\div$ ⇒ flip (bottom), change to $\cdot$

RATIO A COMPARISON OF 2 NUMBERS by division
(FANCY NAME for A FRACTION!)

PROPORTION AN EQUATION THAT STATES 2 RATIOS ARE =
(NEED AN = SIGN)

Ex) $\frac{1}{4} = \frac{2}{8}$ Ex) $\frac{x}{5} = \frac{5}{9}$

IN ANY proportion, the CROSS-PRODUCTS ARE EQUAL.

Ex) ~~$\frac{1}{4} = \frac{2}{8}$~~ Ex) $\frac{x}{5} = \frac{5}{9}$

$1 \cdot 8 = 2 \cdot 4$ ✓ $9x = 25$

Ex

Use the "CROSS-PRODUCTS ARE =" PROPERTY TO SOLVE PROPORTIONS

$\therefore \frac{9x}{9} = \frac{25}{9}$

$\boxed{x = \frac{25}{9}}$

RATE A RATIO WHERE THE "top" AND "bottom" HAVE different UNITS Ex) $\frac{4 \text{ miles}}{1 \text{ hour}}$ Ex) $\frac{5 \text{ mm}}{C^\circ}$

Ch. 3-6 Ratios and Proportions (Pg 155)

Note: $3 = \frac{x}{4}$ could be written as a proportion... how?

$$\frac{3}{1} = \frac{x}{4} \quad \therefore \boxed{1x = 12}$$

(Ex) $\frac{3}{4} = \frac{6}{x} \quad \therefore \quad 3x = 24$

$\boxed{x = 8}$ Ck $\frac{3}{4} = \frac{6}{(8)}$ ✓

(Ex) $\frac{x}{45} = \frac{5}{15} \quad \therefore \quad 15x = 5 \cdot 45$

$$\frac{15x}{15} = \frac{5 \cdot 45}{15}$$

$$x = \frac{5 \cdot \cancel{45}^{\cancel{9}^{3}}}{\cancel{15}_{\cancel{3}_{1}}} = 15$$

$\boxed{x = 15}$

Ex 3 Pg 156 $\frac{N}{15} = \frac{24}{16} \quad \therefore \quad \frac{16N}{16} = \frac{15 \cdot \cancel{24}^{3}}{\cancel{16}_{2}}$

$$\boxed{N = \frac{45}{2}}$$

What kind of practical problems involve proportions?

- Rates
- Scales, such as maps, models, blueprints, ...

Ex 4 Pg 157 Trent rides 30 mi in 4 hrs. At this rate, how far in 6 hrs?

Let d = distance

$$\frac{30 \text{ mi}}{4 \text{ hr}} = \frac{d \text{ mi}}{6 \text{ hr}} \quad \therefore 4d = 180$$

$$\boxed{d = 45 \text{ mi}}$$

Ex - models I am interested in N scale model railroad. N-scale is 1:160

Which means 1 unit of model (the smaller number) = 160 units of real

Ex) $\frac{1 \text{ in model}}{160 \text{ in real}}$ or $\frac{160 \text{ ft of real}}{1 \text{ ft of model}}$

If a SP gondola car is $3\frac{1}{2}$ in., how big is the real?

Let g be length of gondola (inches)

$$\frac{g}{\frac{7}{2}} = \frac{160}{1} \quad \therefore g = \frac{7}{2} \cdot 160$$

$$g = 7 \cdot 80$$

$$\boxed{g = 560 \text{ in}}$$

$$\boxed{g = 46.\overline{6} \text{ ft}}$$

Some other popular railroad scales:

1:48 O "oh" scale, large

* 1:86 HO "half oh" scale (now 1:87.1 metric change)

1:160 N scale

1:220 Z scale – very small!

* most popular

Ex 5 Pg 157 Map: 2 inches = 9 miles, how far is $1\frac{3}{4}$ in. on map?
(map) (real)

Let d = distance (real) in miles

$$\frac{2\text{ in}}{9\text{ mi}} = \frac{\frac{7}{4}\text{ in}}{d} \quad \therefore 2d = \frac{7}{4} \cdot \frac{9}{1}$$

$$\frac{2d}{2} = \frac{\frac{63}{4}}{2}$$

$$d = \frac{63}{4} \cdot \frac{1}{2}$$

$$\boxed{d = \frac{63}{8} = 7\frac{7}{8}\text{ mi}}$$

Homework: · Pg 158, 159 } # 22 to 24, 31 to 34, 46 to 49