

## NAQ.b

Date \_\_\_\_\_ Period \_\_\_\_\_

## NAQ.b.1

**Determine if a pair of ratios forms a proportion. <sup>\*\*</sup>Clearly show work and explain your decision.**

Circle your answer.

1)  $\frac{12}{6}$  and  $\frac{4}{2}$

$$\frac{12}{6} = \frac{4}{2}$$

$$12(2) = 6(4)$$

$$24 = 24 \checkmark$$

PROPORTION

2)  $\frac{4}{3}$  and  $\frac{12}{6}$

$$\frac{4}{3} = \frac{12}{6}$$

$$4(6) = 3(12)$$

$$24 \neq 36$$

NOT A PROPORTION

To determine if ratios are proportions

- ① Set ratios EQUAL TO EACH OTHER
- ② Cross Multiply

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

$$a \cdot d = b \cdot c$$

- ③ IF THE PRODUCTS ARE EQUAL THEN THE RATIOS FORM A PROPORTION

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## NAQ.b.2

Solve AND CHECK a proportion with a single variable. Clearly show work. Circle your answer.

1)  $\frac{3}{9} = \frac{8}{x}$

$$3 \cdot x = 9 \cdot 8$$

$$\frac{3x}{3} = \frac{72}{3}$$

$$x = 24$$

2)  $\frac{9}{6} = \frac{x}{8}$

$$9 \cdot 8 = 6 \cdot x$$

$$\frac{72}{6} = \frac{6x}{6}$$

$$x = 12$$

C:  $\frac{3}{9} = \frac{8}{24}$

$$\frac{1}{3} = \frac{1}{3} \checkmark$$

C:  $\frac{9}{6} = \frac{12}{8}$

$$\frac{3}{2} = \frac{3}{2} \checkmark$$

Label Check!!

To solve proportion equations:

- ① CROSS MULTIPLY
- ② DIVIDE TO SOLVE FOR VARIABLE
- ③ DON'T FORGET TO CHECK IN THE ORIGINAL EQUATION.

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**\*\* CLEARLY SHOW ALL STEPS!!** Date \_\_\_\_\_ Period \_\_\_\_\_

## NAQ.b.3

Set up and solve a proportion, including units, given a simple word problem.

(1) Set up the proportion; (2) Clearly show work to solve the proportion and remember to check; and (3) Circle your answer using the appropriate units.

1) 15% of what is 18 minutes?

$$\frac{15}{100} = \frac{18}{X}$$

$$X = 18 \cdot 100 \div 15$$

$$X = 120 \text{ minutes}$$

$$C: \frac{15}{100} = \frac{18}{100}$$

$$.15 = .15 \checkmark$$

$$EQ: \frac{.15 \cdot X}{.15} = \frac{18}{.15}$$

$$X = 120 \text{ minutes}$$

3) What percent of 20 miles is 9 miles?

$$\frac{P}{100} = \frac{9}{20}$$

$$P = 100 \cdot 9 \div 20$$

$$P = 900 \div 20$$

$$P = 45\% \leftarrow \text{Don't Forget \%!!}$$

$$C: \frac{45}{100} = \frac{9}{20}$$

$$.45 = .45 \checkmark$$

$$EQ: \frac{P \cdot 20}{20} = \frac{9}{20}$$

$$P = .45 \rightarrow 45\%$$

$$\frac{X}{10} = \frac{200}{100}$$

$$X = 10 \cdot 200 \div 100$$

$$X = 2000 \div 100$$

$$X = 20 \text{ ft}$$

$$C: \frac{20}{10} = \frac{200}{100}$$

$$2 = 2 \checkmark$$

$$EQ: X = 2.00 \cdot 10$$

$$X = 20 \text{ ft}$$

There are 2 methods to solve proportions:

$$\text{Method 1: } \frac{IS}{OF} = \frac{\%}{100}$$

- USE ANY VARIABLE (X, N, etc) FOR "IS" or "OF"
- USE "P" FOR %'S
- Solve by cross multiply and divide.

Method 2: write an EQUATION; and solve  
IS means "EQUAL"  
OF means "MULT"  
Change %  $\rightarrow$  decimal

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CLEARLY SHOW ALL WORK !!! Date \_\_\_\_\_ Period \_\_\_\_\_

NAQ.b.4

Set up and solve a proportion, including units, given a real world example.

1) 12 bunches of grapes cost \$18. How many bunches can you buy for \$6?

Key Info:  $12 \text{ Grapes} = \$18$   
 $? \text{ Grapes} = \$6$

Define Variable w/units:  $X = \text{number of bunches of grapes}$

Set Up Proportion:  $\frac{12}{18} = \frac{X}{6}$

✓ Solve (clearly show work, round to units):

\* Solve by  
 Cross multiply  
 and divide

$$12 \cdot 6 = 18X \quad \text{or} \quad X = 12 \cdot 6 \div 18$$

$$\frac{72}{18} = \frac{18X}{18}$$

$$X = 4$$

Answer (in words) You could buy 4 bunches of grapes.

2) If you can buy seven pineapples for \$28, then how many can you buy with \$48?

Key Info:  $7 \text{ pine apples} = \$28$   
 $? \text{ pine apples} = \$48$

Define Variable w/units:  $X = \text{Number of pine apples}$

Set Up Proportion:  $\frac{7}{28} = \frac{X}{48}$

Solve (clearly show work, round to units):

$$28X = 7 \cdot 48 \quad \text{or} \quad X = 7 \cdot 48 \div 28$$

$$\frac{28X}{28} = \frac{336}{28}$$

$$X = 12$$

Answer (in words) You can buy 12 pine apples