

Ratios Homework

REFERENCES:

Answers:

services.nietc.org

Khan Academy:

www.khanacademy.org/math/pre-algebra/pre-algebra-ratios-rates

Math Planet:

www.mathplanet.com/education/algebra-1/how-to-solve-linear-equations/ratios-and-proportions-and-how-to-solve-them

math.com:

www.math.com/school/subject1/lessons/S1U2L1GL.html

QUESTIONS:

- 1) Of the 13 workers on a jobsite, there are 5 Apprentices. What is the ratio of Journeys to Apprentices on this job?

Answer:

a. 3:5

b. 5:3

→ c. 8:5

d. 13:8

13 total workers

5 Apprentices

13-5=8 Journeys

8 Journeys to 5 Apprentices 8:5 or 8/5

- 2) The ratio of 24 volts to 3 volts in its simplest form is 8:1.

Answer:

→ a. True

b. False

24:3 = (24÷3) : (3÷3) = 8:1

- 3) In a pot worth \$2.35, there are 6 quarters, 5 dimes, 5 pennies, and the rest of the coins are nickels. What is the ratio of nickels to dimes?

Answer:

a. 5:6

b. 6:3

→ c. 6:5

d. 6:7

\$2.35

(6 × .25) 1.50

(5 × .10) .50

(5 × .01) .05

\$0.30

\$0.30 ÷ .05 = 6

nickels to dimes = 6

to 5 = 6:5

- 4) Which of the following expresses the ratio 6 inches to 2 feet in its simplest fractional form?

Answer:

a. $\frac{1}{3}$

→ b. $\frac{1}{4}$

c. $\frac{2}{8}$

d. $\frac{6}{64}$

6" to (2 × 12) = 6" to 24"

6/24 = 1/4

- 5) The length of a pool is twice the width. The ratio of the length to the width of the pool is?

Answer:

a. 1:2

→ b. 2:1

Length:Width

Length = 2 × Width L=2W

(2 × Width):Width 2W:W

2:1

- 6) John spent 30 minutes developing an estimate for a job. The job itself took 2 hours, 45 minutes to complete. What is the ratio of the time spent on the job estimate to the total time spent on this job?

Answer:

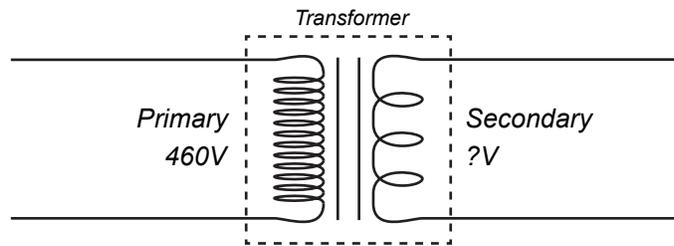
- a. 1:15
- b. 2:3
- ➔ c. 2:13
- d. 3:14

Job: 2h45m = 165m
Estimate: 30m = 30m
Total = 195m

Estimate to Total
30m to 195m
Can be reduced by dividing by 15:
(30 ÷ 15) to (195 ÷ 15)
2 to 13

- 7) If the primary to secondary voltage ratio is 4:1 for a transformer, what is the secondary voltage if the primary voltage is 460 volts?

Answer: **115**



Primary	Secondary
4 : 1	
460 : ?	
460 = 4 × 115 :	? = 1
× 115	
460 : 1	

- 8) The ratio of journeys to foremen on a certain project is 8:1. If there are 48 journeys on the project, how many foremen are there?

Answer: **6 foremen**

journeys	foremen
8 : 1	
48 : ?	
48 = 8 × 6 :	? = 1 × 6
48 : 6	

- 9) If the mix ratio for a certain chemical is 1:6 when it is mixed with water (chemical:water), how much water would be mixed with 1/2 gallon of the chemical?

Answer: **3 gallons**

Chemical	Water
1 : 6	
0.5 : ?	
0.5 = 1 × 1/2 :	? = 6 × 1/2
0.5 : 3	

- 10) The scale on a blueprint indicates that 1/2 inch equals 10 feet. The ratio for this blueprint is 1 inch:20 feet.

Answer:

- ➔ a. True
- b. False

0.5" to 10'
2 × 0.5" = 1"
2 × 10' = 20'
1" to 20'

- 11) Solve the proportion: $\frac{2}{5} = \frac{x}{15}$

Answer: **6**

$\frac{2}{5} = \frac{x}{15}$
 $15 \times \frac{2}{5} = \frac{x}{15} \times 15$
 $\frac{30}{5} = x$
 $6 = x$

12) Solve the proportion: $\frac{12}{x} = \frac{18}{6}$

Answer: **4**

$$\frac{12}{x} = \frac{18}{6}$$

$$\frac{1}{12} \times \frac{12}{x} = \frac{18}{6} \times \frac{1}{12}$$

$$\frac{1}{x} = \frac{18}{72}$$

$$\frac{x}{1} = \frac{72}{18}$$

$$x = 4$$

13) The ratios are directly proportional. Find the missing variable if: $y_1 = 4$, $x_2 = 6$, and $y_2 = 8$, what is the value of x_1 ?

Answer: **3**

	Cross Multiply	Result
$\frac{4}{8}$	$\frac{?}{6}$	$\frac{8}{24}$
		3

or

$$X_1/X_2 = Y_1/Y_2$$

$$X_1/6 = 4/8$$

$$(X_1/6) \times 6 = (4/8) \times 6$$

$$X_1 = (4/8) \times 6$$

$$X_1 = 3$$

14) The ratios are directly proportional. Find the missing variable if: $x_1 = 440$, $y_1 = 220$, and $x_2 = 360$, determine the value of y_2 .

Answer: **180**

	Cross Multiply	Result
$\frac{440}{360}$	$\frac{220}{?}$	$\frac{79200}{440}$
		180

or

$$X_1/X_2 = Y_1/Y_2$$

$$440/360 = 220/Y_2$$

$$(440/360) \times Y_2 = (220/Y_2) \times Y_2$$

$$((440/360) \times Y_2) \div (440/360) = 220 \div (440/360)$$

$$Y_2 = 220 \div (440/360)$$

15) The ratios are inversely proportional. Find the missing value if: $R_1 = 6$, $I_1 = 12$, and $R_2 = 8$

Answer: **9**

$$R_1/R_2 = I_2/I_1$$

$$6/8 = I_2/12$$

$$(6/8) \times 12 = (I_2/12) \times 12$$

$$0.75 \times 12 = I_2$$

$$9 = I_2$$

OR

$$R_1 \times I_1 = R_2 \times I_2$$

$$6 \times 12 = 8 \times I_2$$

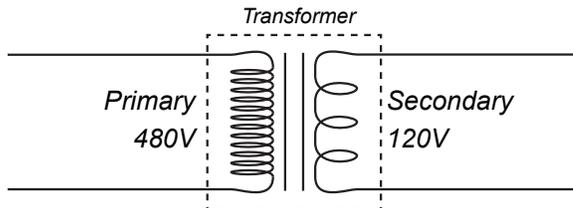
$$(6 \times 12) \div 8 = (8 \times I_2) \div 8$$

$$9 = I_2$$

16) A transformer has a primary voltage of 480 volts and a secondary voltage of 120 volts. If the primary windings have 700 turns, how many turns are in the secondary windings? (Voltage and number of turns are directly proportional).

Answer: **175**

	Cross Multiply	Result
$\frac{480V}{120V}$	$\frac{700 \text{ turns}}{? \text{ turns}}$	$\frac{84000}{480}$
		175



or $480 \div 12 = 4$ so the ration is 4:1
which means we can solve for $700 \text{ turns} \div 4 = 175$

17) One wire has a cross-sectional area of 1,250 circular mils and a resistance of 7 ohms. A second piece of wire, identical except for cross-sectional area, has a resistance of 10 ohms. Determine what the cross-sectional area of this second wire is. (Cross-sectional area and resistance are inversely proportional).

Answer: **875 cmil**

Wire #1	Wire #2
$1250 \text{cmil} \times 7\Omega =$	$? \text{cmil} \times 10\Omega$
$8750 \text{cmil}\Omega \div 10\Omega =$	$? \text{cmil} \times$
$10\Omega \div 10\Omega$	$7\Omega_{W1} / 10\Omega_{W2} = ? \text{cmil}_{W2} / 1250 \text{cmil}_{W1}$
$875 \text{cmil} = ? \text{cmil}$	$(7\Omega_{W1} / 10\Omega_{W2}) \times 1250 \text{cmil} = (? \text{cmil}_{W2} / 1250 \text{cmil}_{W1}) \times 1250 \text{cmil}$

18) If Mary drove 525 miles in 7 hours at an average speed of 75 miles per hour, how many miles per hour would her average speed need to be to make the trip in 5 hours?

Answer: **105 mph**

$$525 \text{ miles} \div 7 \text{ hours} = 75 \text{ mph}$$

$$525 \text{ miles} \div 5 \text{ hours} = 105 \text{ mph}$$

19) If the Blueprint you are using lists the scale as $1/8" = 1'$ and you measure the length of a wall on the blueprint as being $1 \frac{1}{2}"$ long. How long should the wall actually be?

Answer **12 Feet**

$$1/8" = 0.125"$$

$$1.5" \div 0.125" = 12'$$

20) If the blueprint you are using lists the scale as $1/4" = 1'$ and you measure a real window frame as being 36" wide, how wide should the window be shown on the blueprint?

Answer

$3/4"$ or $0.75"$

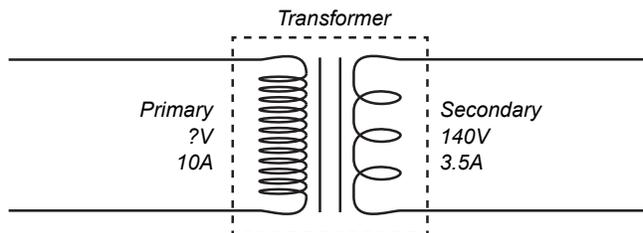
$$36" \div 12" = 3'$$

$$1/4" = 0.25"$$

$$3' \times 0.25" = 0.75"$$

21) A transformer has a secondary voltage of 140 volts and a secondary current of 3.5 amps. If the primary current is 10 amps, what is the primary voltage? (In this case, the voltages and currents are inversely proportional from the primary side to the secondary side).

Answer: **49V**



$$\begin{array}{l} \text{Secondary} \quad \text{Primary} \\ 140V \times 3.5A = ? \times \\ 10A \\ 490VA = ? \times 10A \\ 490VA \div 10A = ? \times \end{array}$$

or

$$\begin{array}{l} 3.5A_S / 10A_P = ?V_P / 140V_S \\ (3.5A_S / 10A_P) \times 140V = (?V_P / \\ 140V_S) \times 140V \end{array}$$