Unit 12.3 Variations

1. Find the constant of variation (k) for each problem, if no variation put N/a

   a. $6x = \frac{12}{y}$

   b. $18x + 6y = 0$

   c. $-5x + 4y = 9$

2. Find the <u>direct</u> variation constant (k) for the tables

   a.

x	y
5	2
15	6
20	8

   y = (_____) x

   b.

x	y
2	7
4	14
10	35

   y = (_____) x

3. Find the <u>inverse</u> variation constant (k) for the tables

a.

x	y
2	-4
4	-2
8	-1

$$y = \frac{(\quad)}{x}$$

x	y
28	0.25
21	0.33
14	0.5

$$y = \frac{(\quad)}{x}$$

4. Rewrite each equation to solve for the requested variable, then determine if the relationship of the requested variable

   a. $4x = 5y$; solve for y

   is y directly, inversely or not proportional to x?

   b. $2x = y - 1$; solve for x

   is x directly, inversely or not proportional to y?

c. $\frac{V_1}{n_1} = \frac{V_2}{n_2}$; solve for V_2

is V_2 directly, inversely or not proportional to n_2?

d. $P_1V_1 = P_2V_2$; solve for V_1

is V_1 directly, inversely or not proportional to P_1?

e. $\frac{N_P}{N_S} = \frac{I_S}{I_P}$; solve for I_s

is I_S directly, inversely or not proportional to I_P?

5. If y varies directly as x, and $y = 3$ when $x = 9$, find y if $x = 7$.

6. If y varies inversely as x, and $y = 5$ when $x = 8$, find y if $x = 20$.

7. If y varies inversely as x^2, and $y = -8$ when $x = 2$, find y if $x = 3$.

8. z varies jointly as x and y, and $z = 60$ when $x = 2$ and $y = 3$. Find z if $x = 3$ and $y = 4$

9. z varies jointly as x and y^2, and $z = 63$ when $x = 5$ and $y = 3$. Find z if $x = \frac{10}{3}$ and $y = 2$.

10. z varies directly as x and inversely as y^2. If $z = 5$ when $x = 1$ and $y = 2$, find z if $x = 2$ and $y = 1$

11. The extension of a spring is proportional to the load (force) applied to it. If the spring stretches 5 inches with a weight of 10 lbs at the end, how far will the spring stretch if the weight is increased to 12 lbs?

12. The resistance of a wire is directly proportional to the length of wire and inversely proportional to the square of the diameter. The resistance of a wire that is 500 ft long with a diameter of 0.01 inches is 20 Ω. If the wire is replaced with a wire that is 1500 ft long and has a diameter of 0.02 in instead, what is the new resistance?

13. Ideal Gas Law: The temperature of a gas (T) is directly proportional to the pressure (P) times the volume (V) and inversely proportional to the number of moles (n) times the universal gas constant (R). If $P = 1.95$ atm, $V = 12.30$ L, $n = 0.654$ mol and $R = 0.08206$ L atm/mol K find the temperature of the gas in Kelvins

14. Your car stereo uses a 5 ft audio wire with a diameter of 0.025 in and a resistance of 1.6 ohms. What is the resistance of a piece of the same audio wire if it is 8 ft long instead?