

**ANSWERS!**

**DIRECTIONS:** For #1-6, solve for the variables as directed. Show work. Write your answers in the provided blanks.

1. If  $y$  varies directly as  $x$ , and  $y = 63$  when  $x = 9$ , find  $y$  when  $x = 5$ .

$$y = 35$$

2. If  $t$  varies directly as  $w + 2$ , and  $t = 24$  when  $w = 14$ , find  $w$  when  $t = 57$ .

$$w = 36$$

3. If  $m$  varies inversely as the cube of  $n$ , and  $m = 10$  when  $n = 4$ , find  $n$  when  $m = 80$ .

$$n = 2$$

4. If  $x$  is jointly proportional to  $y$  and  $z$ , and  $x = 140$  when  $y = 7$  and  $z = 4$ , find  $y$  when  $x = 630$  and  $z = 6$ .

$$y = 21$$

5. If  $b$  varies jointly as  $c$  and  $d$ , and inversely as  $a$ , and if  $b = 30$  when  $c = 10$ ,  $d = 2$ , and  $a = 6$ , what is the value of  $b$  when  $c = 14$ ,  $d = 6$ , and  $a = 4$ ?

$$b = 189$$

6. Suppose  $m$  varies jointly as  $n$  and  $p^2$  and inversely as the square root of  $q$ , and  $m = 324$  when  $n = 8$ ,  $p = 9$ , and  $q = 36$ . Find  $m$  when  $n = 8$ ,  $p = 5$ , and  $q = 100$ .

$$m = 60$$

**DIRECTIONS:** For #7-12, answer the following word problems. Show work and use appropriate labels with your answers. Write your answers in the provided blanks.

7. A spring extends or compresses in direct proportion to the mass being supported. If a spring extends 30 cm when supporting 75 grams, how far will it extend when supporting 48 grams?

$$19.2 \text{ cm}$$

8. The monthly cost for Bryce to maintain 5 taxis has been \$714.80. Assuming the same rate, what will be the monthly cost if Bryce adds 4 more taxis to his company?

$$\$1286.64 \text{ (he now has 9 taxis)}$$

9. A survey showed that 99 out of 176 people questioned preferred waffles to pancakes. In a city with a population of 1696, how many people are likely to prefer waffles?

$$954 \text{ people prefer waffles}$$

10. The stopping distance of a car after the brakes are applied varies directly as the square of the speed of the car at the moment the brakes are applied. If a car traveling 60 mph can stop in 200 feet, how many feet will it take the same car to stop when it is traveling 90 mph?

**450 feet**

11. The number of kilowatt-hours (kWh) per year that an appliance uses varies jointly as the number of watts the appliance consumes and the number of hours per day it is used. A hair dryer that consumes 1200 watts and is used  $\frac{1}{4}$  hour each day uses 109.5 kWh per year. How many kilowatt-hours (kWh) does a 100-watt light bulb use each year if it is turned on for 2 hours each day?

**73 kWh**

12. The volume a given mass of gas varies directly as the temperature and inversely as the pressure (Boyle's law). If the volume of a certain gas is  $231 \text{ cm}^3$  when the temperature is  $42^\circ\text{C}$  and the pressure is  $20 \text{ kg/cm}^2$ , then what is the volume of the gas when the temperature is  $30^\circ\text{C}$  and the pressure is  $15 \text{ kg/cm}^2$ ?

**$220 \text{ cm}^3$**

DIRECTIONS: For #13-14, divide. Show all work. Write your answers in the provided blanks.

13.  $\frac{12x^3+2x^2-14x+4}{2x+1}$

14.  $\frac{2x^5-x^4+2x^3-x}{x^2-3}$

$$6x^2 - 2x - 6 + \frac{10}{2x+1}$$

$$2x^3 - x^2 + 8x - 3 + \frac{23x-9}{x^2-3}$$

DIRECTIONS: For #15-16, use SYNTHETIC DIVISION to divide. Show all work. Write your answers in the provided blanks.

15.  $\frac{3x^3+2x^2-11x-6}{x+4}$

16.  $\frac{3x^3-6x-9}{x-3}$

$$3x^2 - 10x + 29 - \frac{122}{x+4}$$

$$3x^2 + 9x + 21 + \frac{54}{x-3}$$