

Name _____ Date _____ Period _____

DIRECTIONS: For #1-8, 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 $x = 5$.

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

3. If a varies directly as b , and $a = 42$ when $b = 35$, find a when $b = 28$.

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

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

6. 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 $a = 4$?

7. Suppose w varies jointly as x and y and inversely as z , and $w = 22$ when $x = 4$, $y = 6$, and $z = 12$. Find x when $w = 66$, $y = 10$, and $z = 15$.

8. 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 $q = 100$.

DIRECTIONS: For #9-15, answer the following word problems. Show work and use appropriate labels with your answers. Write your answers in the provided blanks.

9. 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?

10. 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?

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

- 12.** The intensity of light (measured in watts per square meter - W/m^2) from a light bulb varies inversely as the square of the distance from the bulb. If the intensity from a certain bulb is $90 W/m^2$ when the distance is 5 m, what will be the intensity at a distance of 3 m?
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- 13.** 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?
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- 14.** 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 $1/4$ 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?
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- 15.** 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 cm^3 when the temperature is 42°C and the pressure is 20 kg/cm^2 , then what is the volume of the gas when the temperature is 30°C and the pressure is 15 kg/cm^2 ?
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