Name _____ Date _____ Period _____

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 $x = 5$.

_____

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

_____

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

_____

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 $z = 6$.

_____

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 $a = 4$?

_____

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 $q = 100$.

_____

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?

_____

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?

_____

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?

_____

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?

_____

11. The number of kilowattt-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?

_____

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 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?

_____

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

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

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

_____   _____

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

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

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

_____   _____