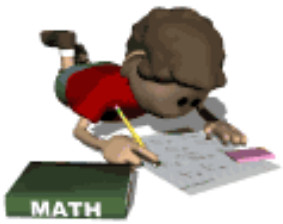
Algebra 2 – Lesson 10A Worksheet
Direct, Inverse, and Joint Variation



Solve each of the following problems using the direct, inverse and joint variation equations. Make sure to show all work on a separate sheet of paper.

1. y varies directly as x. x = 3 when y = 12. Find y when x = 12.

2. a varies directly as b. b = 1 when a = 5. Find b when a = 2.

3. y varies inversely as x. x = 4 when y = 3. Find y when x = 7.

4. m varies inversely as n. n = 6 when m = 2. Find m when n = 3.

5. Y varies inversely as x. x = 3 when y = -2. Find y when x = 10.

6. z varies jointly as x and y. x = 3 and y = 2 when z = 12. Find z when x = 4 and y = 5.

In exercises 7 – 9, the variables x and y vary inversely. Use the given pair of values to find an equation that relates the variables.

7. x = 3, y = -2

8. x = 4, y = 6

9. x = 5, y = 1

In exercises 10 – 12, the variable z varies jointly with the product of x and y. Use the given values to find an equation that relates the variables.

10. x = 3, y = 8, z = 2

11. x = -5, y = 2, z = $\frac{3}{4}$

12. x = 1, y = $\frac{1}{2}$, z = 4

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13. To balance a seesaw, the distance, d (in feet), a person is from the fulcrum is inversely proportional to his or her weight, w (in pounds). Roger, who weighs 120 pounds, is sitting 6 feet away from the fulcrum. Ellen weighs 108 pounds. How far from the fulcrum must she sit to balance the seesaw?

14. The temperature, T (in degrees Kelvin), of an enclosed gas varies jointly with the product of the volume, V (in cubic centimeters), and the pressure, P (in kilograms per square centimeter). The temperature of a gas is 294°K when the volume is 8000 cubic centimeters and the pressure is 0.75 kilogram per square centimeter. What is the temperature when the volume is 7000 cubic centimeters and the pressure is 0.87 kilogram per square centimeter?

Use the following information for questions 15 and 16.
The work, W (in joules), done when lifting an object is jointly proportional to the product of the mass, m (in kilograms), of the object and the height, h (in meters), that the object is lifted. The work done when a 120-kilogram object is lifted 1.8 meters above the ground is 2116.8 joules.

15. Write an equation that relates W, m, and h.

16. How much work is done when lifting a 100 – kilogram object 1.5 meters above the ground?

17. Solve: $x^3 = x^2 + 12x$

18. Solve: $x^4 - 5x^2 - 36 = 0$

19. Solve: $x^{\frac{1}{2}} = \frac{4}{5}$

20. Solve the system of equations: $\begin{cases} y = 3x - 4 \\ 4x - y = -5 \end{cases}$