

11.4 Indirect Variation

1) The data entries in Figure 1 suggest indirect variation because as the weight increases, the distance decreases, and vice versa.

3)

- a) Variation Constant = 120
- b) Independent Variable = Weight
- c) Dependent Variable = Distance

$$5) \quad \text{RESISTANCE} = \frac{\text{CONSTANT}}{\text{AMPERAGE}}$$

$$R = \frac{V}{I}; \quad R = \text{resistance, } I = \text{amperage, } V = \text{variation constant}$$

$$7) \quad R = \frac{400}{I}$$

$$R(20) = \frac{400}{(20)} = 20 \text{ ohms}$$

$$9) \quad (0.5 \text{ N}) = \frac{a}{(100 \text{ m})^2}$$

$$a = (0.5 \text{ N})(100 \text{ m})^2 = (0.5 \text{ N})(10,000 \text{ m}^2) = 5000 \text{ N m}^2$$

$$11) \quad D = \frac{a}{V}$$

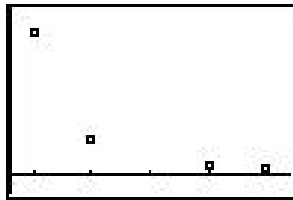
$$a = DV = (20)(10) = 200 \quad D = \frac{200}{V}$$

$$13) \quad y = \frac{a}{x^3}$$

$$a = yx^3 = (3)(4)^3 = (3)(64) = 192 \quad y = \frac{192}{x^3}$$

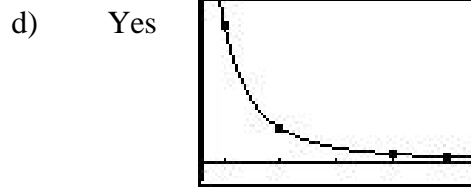
15)

a)



b) Yes, the graph is a downward sloping curve in the first quadrant and the x and y -axes appear to be asymptotes.

c) $y = 53.2x^{-2} = \frac{53.2}{x^2}$



e) The greater the distance one moves away from the lamp, the less amount of light is seen.

Skill and Review

17)
$$\frac{2}{x-1} + \frac{4}{x+1} = 2$$

$$\frac{2(x+1)}{(x-1)(x+1)} + \frac{4(x-1)}{(x+1)(x-1)} = 2$$

$$\frac{2(x+1) + 4(x-1)}{(x-1)(x+1)} = 2$$

$$\frac{2x+2+4x-4}{(x-1)(x+1)} = 2$$

$$\frac{6x-2}{x^2-1} = 2$$

$$6x - 2 = 2(x^2 - 1)$$

$$6x - 2 = 2x^2 - 2$$

$$2x^2 - 6x = 0$$

$$2x(x - 3) = 0$$

$$2x = 0 \text{ or } x - 3 = 0$$

$$x = 0 \text{ or } x = 3$$

←Zero factor property

19)

a)
$$\begin{aligned} & \sqrt{15} \sqrt{3} \\ & = 15^{1/2} 3^{1/2} \\ & = (15 \cdot 3)^{1/2} \\ & = 45^{1/2} \\ & = (9 \cdot 5)^{1/2} \\ & = 9^{1/2} 5^{1/2} \end{aligned}$$

$$\begin{aligned} &= (3^2)^{1/2} 5^{1/2} \\ &= 3 5^{1/2} \\ &= 3\sqrt{5} \end{aligned}$$

b) $\sqrt{12} + \sqrt{75}$

$$\begin{aligned} &= 12^{1/2} + 75^{1/2} \\ &= (4 \cdot 3)^{1/2} + (25 \cdot 3)^{1/2} \\ &= 4^{1/2} 3^{1/2} + 25^{1/2} 3^{1/2} \\ &= (2^2)^{1/2} 3^{1/2} + (5^2)^{1/2} 3^{1/2} \\ &= 2 3^{1/2} + 5 3^{1/2} \\ &= 2\sqrt{3} + 5\sqrt{3} \\ &= 7\sqrt{3} \end{aligned}$$