

Classroom Exercises

Find the constant of variation for each inverse variation.

1. $xy = 30$ 2. $lw = 16$ 3. $rt = 400$ 4. $y = \frac{-48}{x}$

For Exercises 5–8, y varies inversely as x .

5. y is 3 when x is 8. Find y when x is 2.
6. y is 12 when x is 9. Find y when x is 36.
7. y is 8 when x is 6. When y is 24, what is x ?
8. y is 32 when x is 3. When y is 16, what is x ?

For Exercises 9 and 10, let $y = \frac{36}{x}$.

9. If x increases, what happens to y ? 10. If x decreases, what happens to y ?

Written Exercises

In each of the following, y varies inversely as x .

1. y is 13 when x is 4. Find y when x is 26.
2. y is 18 when x is 6. Find y when x is 9.
3. y is 3 when x is 8. Find y when x is 6.
4. y is 4 when x is -16 . Find y when x is -8 .
5. y is 20 when x is 4. When y is 80, what is x ?
6. y is -60 when x is $\frac{3}{5}$. When y is 2, what is x ?
7. y is 3 when x is -8 . When y is -6 , what is x ?
8. y is 12 when x is $\frac{3}{4}$. When y is 27, what is x ?

Determine whether y varies inversely as x . If so, find the constant of variation.

9.	<table border="1"><thead><tr><th>x</th><th>y</th></tr></thead><tbody><tr><td>3</td><td>4</td></tr><tr><td>2</td><td>6</td></tr><tr><td>-4</td><td>-3</td></tr><tr><td>12</td><td>2</td></tr></tbody></table>	x	y	3	4	2	6	-4	-3	12	2	10.	<table border="1"><thead><tr><th>x</th><th>y</th></tr></thead><tbody><tr><td>6</td><td>4</td></tr><tr><td>-8</td><td>-3</td></tr><tr><td>-12</td><td>2</td></tr><tr><td>3</td><td>-8</td></tr></tbody></table>	x	y	6	4	-8	-3	-12	2	3	-8	11.	<table border="1"><thead><tr><th>x</th><th>y</th></tr></thead><tbody><tr><td>3.2</td><td>20</td></tr><tr><td>6.4</td><td>10</td></tr><tr><td>12.8</td><td>5</td></tr><tr><td>21.9</td><td>3</td></tr></tbody></table>	x	y	3.2	20	6.4	10	12.8	5	21.9	3	12.	<table border="1"><thead><tr><th>x</th><th>y</th></tr></thead><tbody><tr><td>3.2</td><td>15.0</td></tr><tr><td>6.4</td><td>7.5</td></tr><tr><td>10.0</td><td>4.8</td></tr><tr><td>19.2</td><td>2.5</td></tr></tbody></table>	x	y	3.2	15.0	6.4	7.5	10.0	4.8	19.2	2.5
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Solve each problem.

13. The current in an electric circuit varies inversely as the resistance. When the current is 40 amps, the resistance is 25 ohms. Find the current when the resistance is 15 ohms.
14. The time to travel a fixed distance varies inversely as the rate of travel. When the time traveled is 6 h, the rate of travel is 90 km/h. Find the time when the rate of travel is 80 km/h.

15. The number of vibrations a string makes under constant tension is inversely proportional to its length. If a 32-cm string vibrates 420 times per second, what length string vibrates 640 times per second?
17. The length of a rectangle with a constant area varies inversely as the width. When the length is 24 in., the width is 8 in. Find the length when the width is 12 in.
19. The base of a triangle with constant area varies inversely as the height. When the base is 22 cm, the height is 6 cm. Find the length of the base when the height is 12 cm.
21. The height of a cylinder of constant volume varies inversely as the square of the radius of the base. The height of a cylinder is 12 m and the radius of the base is 5 m. Find the height of the cylinder of the same volume with a base radius of 6 m.
23. The weight of a body at, or above, the earth's surface varies inversely as the square of the body's distance from the earth's center. An object has a weight of 350 lb when it is at the earth's surface. What is its weight when it is 250 mi above the earth's surface? (Use 4,000 mi as the earth's radius.)
24. How far above the earth's surface would the object in Exercise 23 have to be for its weight to be 290 lb?
16. When two meshed gears revolve, their speeds are inversely proportional to the number of teeth they have. If a gear with 60 teeth revolves at a speed of 2,500 rev/min, at what speed should a gear with 90 teeth revolve?
18. The volume of gas varies inversely as the pressure. If the volume is 60 m^3 under 6 atmospheres of pressure, find the volume under 4 atmospheres of pressure.
20. The frequency of a radio wave is inversely proportional to its wave-length. If a 300-m wave has a frequency of 2,000 kilocycles, what length wave has a frequency of 1,000 kilocycles?
22. The brightness of the illumination of an object varies inversely as the square of the distance of the object from the source of illumination. If a light meter reads 45 luxes at a distance of 3 m from a light source, find the reading at 5 m from the source.

Mixed Review

Simplify. 6.1, 6.3

1. $-3y(-2y^3)$

2. $-a^2 \cdot (-a)^2$

3. $-ab(-2ab)$

4. $\frac{25ab}{5a^3b}$

5. $\frac{36a^3bc^4}{-6ab^4c^5}$

6. $\frac{(3a^3b^2)^3}{9ab^7}$

Solve. 7.7

7. $x^2 - 8x + 15 = 0$

8. $x^2 - 3x - 4 = 0$

9. $y^2 + 5y = 0$

10. $y^2 - 16 = 0$

11. $2y^2 = 2 - 3y$

12. $-y = 6y^2 - 1$

13. Five is what percent of 8? 4.7

14. Eighty is 125% of what number? 4.7