Section 12-1 (1-21, 24-26 & 30-38)

Practice by Example
Suppose y varies inversely with x. Write an equation for the inverse variation.

Example 1
(page 637)
1. \(y = 6\) when \(x = 3\)  
2. \(y = 1\) when \(x = 2\)  
3. \(y = 7\) when \(x = 8\)  
4. \(y = 3\) when \(x = 0.5\)  
5. \(y = 10\) when \(x = 2.4\)  
6. \(y = 3.5\) when \(x = 2.2\)  
7. \(y = 6\) when \(x = \frac{1}{3}\)  
8. \(y = \frac{1}{10}\) when \(x = 8\)  
9. \(y = \frac{1}{10}\) when \(x = \frac{3}{5}\)

Example 2
(page 637)
Each pair of points is on the graph of an inverse variation. Find the missing value.
10. \((6, 12)\) and \((9, y)\)  
11. \((3, 5)\) and \((1, n)\)  
12. \((x, 11)\) and \((1, 66)\)  
13. \((x, 55)\) and \((5, 77)\)  
14. \((9.4, b)\) and \((6, 4.7)\)  
15. \((50, 13)\) and \((t, 5)\)  
16. \((4, 3.5)\) and \((1.2, g)\)  
17. \((24, 1.6)\) and \((c, 0.4)\)  
18. \((500, 25)\) and \((4, n)\)  
19. \((\frac{1}{2}, 24)\) and \((5, y)\)  
20. \((x, \frac{1}{2})\) and \((\frac{3}{5}, \frac{1}{4})\)  
21. \((\frac{1}{2}, 5)\) and \((b, \frac{1}{8})\)

Example 4
(page 639)
Do the data in each table represent a direct variation or an inverse variation? Write an equation to model the data in each table.

24. | \(x\) | \(y\) |
---|---|
| 2 | 1 |
| 5 | 2.5 |
| 8 | 4 |

25. | \(x\) | \(y\) |
---|---|
| 4 | 15 |
| 6 | 10 |
| 10 | 6 |

26. | \(x\) | \(y\) |
---|---|
| 3 | 24 |
| 9 | 8 |
| 12 | 6 |

Apply Your Skills
Find the constant of variation \(k\) for each inverse variation. Then write an equation for the inverse variation.
30. \(y = 8\) when \(x = 4\)  
31. \(r = 3.3\) when \(t = \frac{1}{3}\)  
32. \(x = \frac{1}{2}\) when \(y = 5\)  
33. \(a = 25\) when \(b = 0.04\)  
34. \(p = 10.4\) when \(q = 1.5\)  
35. \(x = 5\) when \(y = 75\)

Geometry
Does each formula represent a direct or an inverse variation? Explain.
36. the perimeter of an equilateral triangle: \(P = 3s\)
37. the time \(t\) to travel 150 mi at \(r\) mi/h: \(t = \frac{150}{r}\)
38. the circumference of a circle with radius \(r\): \(C = 2\pi r\)
### Answers for Lesson 12-1, pp. 640–642

#### Exercises

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<table>
<thead>
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<tr>
<td>1</td>
<td>(xy = 18)</td>
<td>2</td>
<td>(xy = 2)</td>
<td>3</td>
<td>(xy = 56)</td>
<td>4</td>
<td>(xy = 1.5)</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>(xy = 2)</td>
<td>8</td>
<td>(xy = 0.5)</td>
<td>9</td>
<td>(xy = 0.06)</td>
<td>10</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>13</td>
<td>7</td>
<td>14</td>
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<td>12</td>
<td>17</td>
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<tr>
<td>19</td>
<td>2</td>
<td>20</td>
<td>(\frac{1}{6})</td>
<td>21</td>
<td>20</td>
<td>22</td>
<td>3 (\text{h})</td>
<td>23</td>
</tr>
</tbody>
</table>

24. Direct variation; \(y = 0.5x\)

25. Inverse variation; \(xy = 60\)

26. Inverse variation; \(xy = 72\)

27. Direct variation; the ratio \(\frac{\text{cost}}{\text{pound}}\) is constant at \$1.79.

28. Inverse variation; the total number of slices is constant at 8.

29. Inverse variation; the product of the length and width remains constant with an area of 24 square units.

30. 32; \(xy = 32\)

31. 1.1; \(rt = 1.1\)

32. 2.5; \(xy = 2.5\)

33. 1; \(ab = 1\)

34. 15.6; \(pq = 15.6\)

35. 375; \(xy = 375\)

36. Direct variation; the ratio of the perimeter to the side length is constant at 3.

37. Inverse variation; the product of the rate and the time is always 150.

38. Direct variation; the ratio of the circumference to the radius is constant at \(2\pi\).

39. 121 ft

40. 2.4 days