

Graphing Ratios

Name: _____ Date: _____ Score: _____ / 24

Q Quick Review

Equivalent ratios can be **graphed as points** on a coordinate grid. If the ratio of x to y is $1 : 3$, then the pairs $(1, 3)$, $(2, 6)$, and $(3, 9)$ all belong to it. When you plot these points, they always line up in a **straight line that passes through the origin** $(0, 0)$. The point $(1, k)$ on that line shows the **unit rate** — the y -value when $x = 1$. Reading a graph backward works too: a point $(4, 12)$ tells you the ratio $4 : 12$, which simplifies to $1 : 3$.

◊ **Example:** The ratio of bags to marbles is $1 : 4$. List three coordinate pairs (bags, marbles) that belong on its graph.
 ⇒ For each pair, the marbles value is 4 times the bags value. Start with 1 bag: $1 \times 4 = 4$ marbles, giving the point $(1, 4)$. Next, 2 bags: $2 \times 4 = 8$ marbles, giving $(2, 8)$. Then 3 bags: $3 \times 4 = 12$ marbles, giving $(3, 12)$. If you plotted these, they would form a straight line through the origin, and the point $(1, 4)$ shows the unit rate of 4 marbles per bag.

Answer: $(1, 4)$, $(2, 8)$, $(3, 12)$

PRACTICE

Use the given ratio or points to answer each question.

- | | |
|---|--|
| 1. Ratio $1 : 2$: find y when $x = 5$ _____ | 11. Point $(3, 21)$: write the unit rate as $1 : \square$ _____ |
| 2. Ratio $1 : 3$: find y when $x = 4$ _____ | 12. Ratio $1 : 5$: find y when $x = 6$ _____ |
| 3. Ratio $2 : 5$: find y when $x = 6$ _____ | 13. Ratio $4 : 5$: find y when $x = 12$ _____ |
| 4. Ratio $1 : 4$: find y when $x = 7$ _____ | 14. Point $(6, 18)$: write the unit rate as $1 : \square$ _____ |
| 5. Ratio $3 : 4$: find y when $x = 9$ _____ | 15. Ratio $3 : 7$: find y when $x = 6$ _____ |
| 6. Point $(2, 6)$: write the unit rate as $1 : \square$ _____ | 16. Ratio $1 : 8$: find y when $x = 4$ _____ |
| 7. Point $(4, 8)$: write the unit rate as $1 : \square$ _____ | 17. Point $(8, 24)$: write the unit rate as $1 : \square$ _____ |
| 8. Point $(5, 20)$: write the unit rate as $1 : \square$ _____ | 18. Ratio $5 : 2$: find y when $x = 15$ _____ |
| 9. Ratio $1 : 6$: find y when $x = 3$ _____ | 19. Point $(2, 14)$: write the unit rate as $1 : \square$ _____ |
| 10. Ratio $2 : 3$: find y when $x = 8$ _____ | 20. Ratio $1 : 1$: find y when $x = 9$ _____ |

◆ Word Problems

21. A bakery makes 3 muffins for every 1 minute. List the coordinate pairs (minutes, muffins) for 1, 2, and 3 minutes. _____
22. On a graph of cups of lemonade sold, the point $(5, 15)$ is plotted. What is the unit rate in dollars per cup if the y -axis shows dollars? _____
23. A car uses gas at the ratio 1 gallon to 30 miles. What coordinate pair shows the distance for 4 gallons? _____
24. A graph of a walking trip passes through $(2, 8)$, where x is hours and y is miles. How many miles are walked in 5 hours? _____



Answer Keys

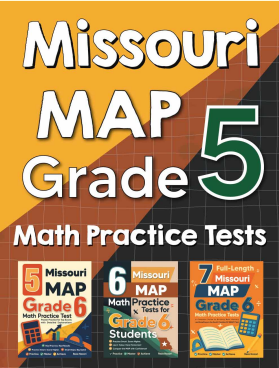
- | | |
|-------------------------------------|---|
| 1. <input type="text" value="10"/> | 13. <input type="text" value="15"/> |
| 2. <input type="text" value="12"/> | 14. <input type="text" value="3"/> |
| 3. <input type="text" value="15"/> | 15. <input type="text" value="14"/> |
| 4. <input type="text" value="28"/> | 16. <input type="text" value="32"/> |
| 5. <input type="text" value="12"/> | 17. <input type="text" value="3"/> |
| 6. <input type="text" value="3"/> | 18. <input type="text" value="6"/> |
| 7. <input type="text" value="2"/> | 19. <input type="text" value="7"/> |
| 8. <input type="text" value="4"/> | 20. <input type="text" value="9"/> |
| 9. <input type="text" value="18"/> | 21. <input type="text" value="(1, 3), (2, 6), (3, 9)"/> |
| 10. <input type="text" value="12"/> | 22. <input type="text" value="\$3 per cup"/> |
| 11. <input type="text" value="7"/> | 23. <input type="text" value="(4, 120)"/> |
| 12. <input type="text" value="30"/> | 24. <input type="text" value="20 miles"/> |

Step-by-Step Explanations

- | | |
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| <p>1. Multiply: $5 \times 2 = 10$, so the point is $(5, 10)$.</p> <p>2. Multiply: $4 \times 3 = 12$, so the point is $(4, 12)$.</p> <p>3. 6 is 3 times 2, so $y = 3 \times 5 = 15$.</p> <p>4. Multiply: $7 \times 4 = 28$, so the point is $(7, 28)$.</p> <p>5. 9 is 3 times 3, so $y = 3 \times 4 = 12$.</p> <p>6. The ratio $2 : 6$ simplifies to $1 : 3$ by dividing both by 2.</p> <p>7. The ratio $4 : 8$ simplifies to $1 : 2$ by dividing both by 4.</p> <p>8. The ratio $5 : 20$ simplifies to $1 : 4$ by dividing both by 5.</p> <p>9. Multiply: $3 \times 6 = 18$, so the point is $(3, 18)$.</p> <p>10. 8 is 4 times 2, so $y = 4 \times 3 = 12$.</p> <p>11. The ratio $3 : 21$ simplifies to $1 : 7$ by dividing both by 3.</p> <p>12. Multiply: $6 \times 5 = 30$, so the point is $(6, 30)$.</p> <p>13. 12 is 3 times 4, so $y = 3 \times 5 = 15$.</p> | <p>14. The ratio $6 : 18$ simplifies to $1 : 3$ by dividing both by 6.</p> <p>15. 6 is 2 times 3, so $y = 2 \times 7 = 14$.</p> <p>16. Multiply: $4 \times 8 = 32$, so the point is $(4, 32)$.</p> <p>17. The ratio $8 : 24$ simplifies to $1 : 3$ by dividing both by 8.</p> <p>18. 15 is 3 times 5, so $y = 3 \times 2 = 6$.</p> <p>19. The ratio $2 : 14$ simplifies to $1 : 7$ by dividing both by 2.</p> <p>20. With ratio $1 : 1$, y always equals x, so $y = 9$.</p> <p>21. Muffins are 3 times the minutes: $1 \rightarrow 3, 2 \rightarrow 6, 3 \rightarrow 9$. These points line up through the origin.</p> <p>22. The point $(5, 15)$ means 5 cups earn \$15. The unit rate is $15 \div 5 = \\$3$ per cup.</p> <p>23. Multiply the gallons by 30: $4 \times 30 = 120$ miles, so the point is $(4, 120)$.</p> <p>24. From $(2, 8)$, the unit rate is $8 \div 2 = 4$ miles per hour. In 5 hours: $5 \times 4 = 20$ miles.</p> |
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