Graphing Ratios

Name: _____	Date: _____	Score: _____ / 24

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 $(\text{bags}, \text{marbles})$ that belong on its graph.
⇒ For each pair, the marbles value is 4 times the bags value. Start with 1 bag: $1\times4=4$ marbles, giving the point $(1,4)$. Next, 2 bags: $2\times4=8$ marbles, giving $(2,8)$. Then 3 bags: $3\times4=12$ 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 $x=5$ _____
2. Ratio $1:3$: find y when $x=4$ _____
3. Ratio $2:5$: find y when $x=6$ _____
4. Ratio $1:4$: find y when $x=7$ _____
5. Ratio $3:4$: find y when $x=9$ _____
6. Point $(2,6)$: write the unit rate as $1:\square$ _____
7. Point $(4,8)$: write the unit rate as $1:\square$ _____
8. Point $(5,20)$: write the unit rate as $1:\square$ _____
9. Ratio $1:6$: find y when $x=3$ _____
10. Ratio $2:3$: find y when $x=8$ _____
11. Point $(3,21)$: write the unit rate as $1:\square$ _____
12. Ratio $1:5$: find y when $x=6$ _____
13. Ratio $4:5$: find y when $x=12$ _____
14. Point $(6,18)$: write the unit rate as $1:\square$ _____
15. Ratio $3:7$: find y when $x=6$ _____
16. Ratio $1:8$: find y when $x=4$ _____
17. Point $(8,24)$: write the unit rate as $1:\square$ _____
18. Ratio $5:2$: find y when $x=15$ _____
19. Point $(2,14)$: write the unit rate as $1:\square$ _____
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 $(\text{minutes}, \text{muffins})$ 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? _____

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Answer Keys

1. $\boxed{10}$
2. $\boxed{12}$
3. $\boxed{15}$
4. $\boxed{28}$
5. $\boxed{12}$
6. $\boxed{3}$
7. $\boxed{2}$
8. $\boxed{4}$
9. $\boxed{18}$
10. $\boxed{12}$
11. $\boxed{7}$
12. $\boxed{30}$
13. $\boxed{15}$
14. $\boxed{3}$
15. $\boxed{14}$
16. $\boxed{32}$
17. $\boxed{3}$
18. $\boxed{6}$
19. $\boxed{7}$
20. $\boxed{9}$
21. $\boxed{(1,3),\ (2,6),\ (3,9)}$
22. $\boxed{\$3 \text{ per cup}}$
23. $\boxed{(4, 120)}$
24. $\boxed{20 \text{ miles}}$

Step-by-Step Explanations

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

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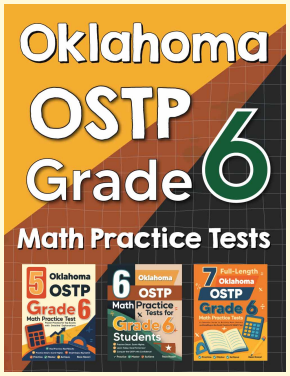

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