Solving Systems by Graphing

Name: _____	Date: _____	Score: _____ / 26

Quick Review

A **system of equations** is two or more equations you want to be true at the same time. The **solution** is any (x, y) that satisfies *all* equations in the system. **Graphing method**: graph each line; the solution is where they intersect. Three possible outcomes: **one solution** (lines cross at one point), **no solution** (parallel lines never meet — same slope, different intercepts), or **infinitely many solutions** (the two equations describe the same line). Graphing is visual and intuitive but works best when the solution has integer coordinates. For messy answers, use substitution or elimination instead.

PRACTICE

Solve each system or describe the outcome.

1. $y = x + 1,\ y = -x + 5$ _____

2. $y = 2x,\ y = x + 3$ _____

3. $y = 3x - 2,\ y = -x + 6$ _____

4. $y = x,\ y = 4$ _____

5. $y = 2x + 1,\ y = 2x - 3$ _____

6. $y = x + 2,\ 2y = 2x + 4$ _____

7. $y = -x,\ y = x$ _____

8. $y = 3,\ x = 5$ _____

9. $y = 2x,\ y = -2x$ _____

10. $y = x + 3,\ y = x - 1$ _____

11. $y = 4,\ y = 4$ _____

12. $y = \frac{1}{2}x,\ y = -x + 3$ _____

13. $y = x - 4,\ y = 2x - 7$ _____

14. $y = 5,\ y = -x + 9$ _____

15. $y = -3x + 10,\ y = 2x$ _____

16. $x = -1,\ y = 2x + 3$ _____

17. $y = x^2,\ y = 4$ _____

18. $y = 2x - 3,\ y = 2x + 1$ _____

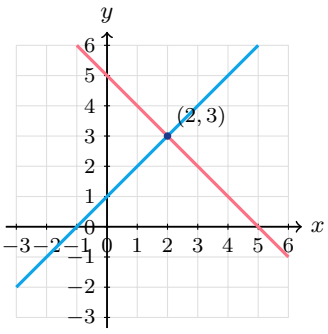
19. $y = -x + 7,\ y = x + 1$ _____

20. $y = 3x,\ y = 2x + 1$ _____

VISUAL PRACTICE

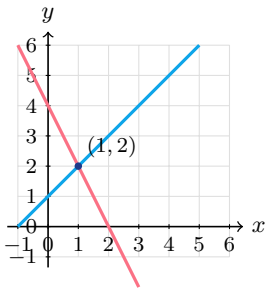
Use the graph, table, chart, or diagram to answer the question.

21. Use the graph to solve the system.



Answer: _____

22. Use the graph to solve the system.



Answer: _____

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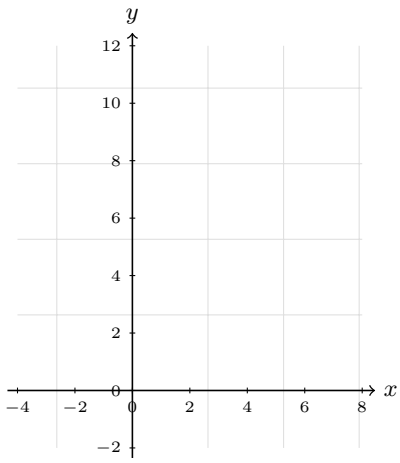
Word Problems

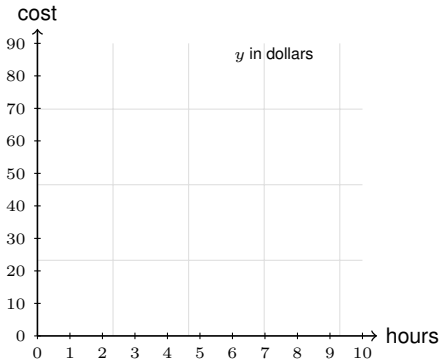
23. A line is $y = x + 2$ and another is $y = -2x + 11$. Graph both and find where they meet.



Model: _____

Answer: _____

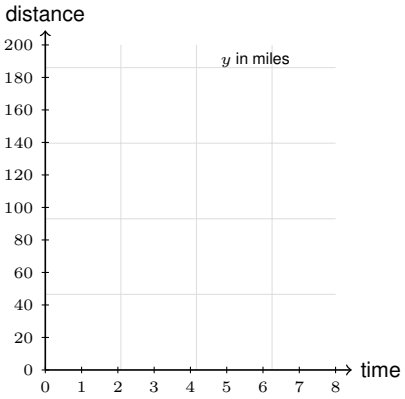
24. Two phone plans: Plan A costs \$20 plus \$5 per hour; Plan B costs \$30 plus \$3 per hour. After how many hours are the costs equal?



Model: _____

Answer: _____

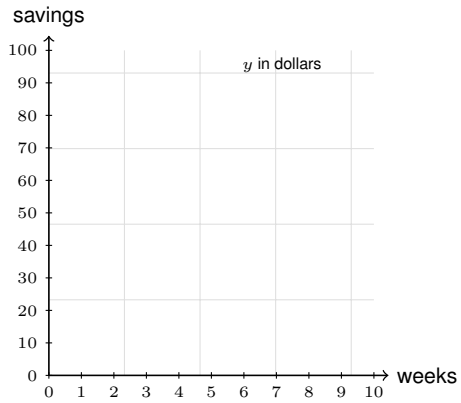
25. Two cars start from rest. Car A's distance is $30t$; Car B's is $20t + 50$. When do they meet?



Model: _____

Answer: _____

26. Two savings: A starts at \$0, adds \$10/wk. B starts at \$60, adds \$2/wk. When are they equal?



Model: _____

Answer: _____

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Answer Keys

1. $(2, 3)$
2. $(3, 6)$
3. $(2, 4)$
4. $(4, 4)$
5. no solution
6. infinitely many
7. $(0, 0)$
8. $(5, 3)$
9. $(0, 0)$
10. no solution
11. infinitely many
12. $(2, 1)$
13. $(3, -1)$
14. $(4, 5)$
15. $(2, 4)$
16. $(-1, 1)$
17. $(\pm 2, 4)$
18. no solution
19. $(3, 4)$
20. $(1, 3)$
21. $(2, 3)$
22. $(1, 2)$
23. $(3, 5)$
24. 5 hours
25. $t = 5$
26. $w = 7.5$

Step-by-Step Tutor Notes

1. Use the labels on the display first; they tell you which count or total belongs in the answer. Set equal: $x + 1 = -x + 5 \Rightarrow 2x = 4 \Rightarrow x = 2$. Then $y = 3$. This gives $(2, 3)$.
2. Use the labels on the display first; they tell you which count or total belongs in the answer. $2x = x + 3 \Rightarrow x = 3$, $y = 6$. This gives $(3, 6)$.
3. Read the table by matching the correct row and column first, then use the count or total that fits the question. $3x - 2 = -x + 6 \Rightarrow 4x = 8 \Rightarrow x = 2$, $y = 4$. This gives $(2, 4)$.
4. Take it one clear step at a time and keep the original question in mind. $y = 4$ is horizontal; intersects $y = x$ at $(4, 4)$. So the answer is $(4, 4)$.
5. Line up the two changes first; that keeps the rate from getting mixed up. Same slope, different y-intercepts. Parallel — never meet. So the requested value is no solution.
6. Second equation divides to $y = x + 2$ — same line. Every point on the line is a solution.
7. Use the labels on the display first; they tell you which count or total belongs in the answer. $-x = x \Rightarrow x = 0$, $y = 0$. This gives $(0, 0)$.
8. Use the clue in the question first, then let the arithmetic finish the job. Horizontal and vertical intersect at $(5, 3)$. So the answer is $(5, 3)$.
9. Line up the two changes first; that keeps the rate from getting mixed up. Both pass through origin with different slopes. So the requested value is $(0, 0)$.
10. Compare the change in output to the change in input, because slope is a rate of change. Parallel (same slope 1). So the requested value is no solution.
11. Start with the definition the problem is testing, then apply it directly. Same equation — every point on $y = 4$. So the answer is infinitely many.
12. Use the labels on the display first; they tell you which count or total belongs in the answer. $\frac{1}{2}x = -x + 3 \Rightarrow \frac{3}{2}x = 3 \Rightarrow x = 2$, $y = 1$. This gives $(2, 1)$.
13. Read the table by matching the correct row and column first, then use the count or total that fits the question. $x - 4 = 2x - 7 \Rightarrow -x = -3 \Rightarrow x = 3$, $y = -1$. This gives $(3, -1)$.
14. Read the table by matching the correct row and column first, then use the count or total that fits the question. $5 = -x + 9 \Rightarrow x = 4$. This gives $(4, 5)$.
15. For a table question, slow down and locate the exact row, column, or cell before calculating. $-3x + 10 = 2x \Rightarrow 10 = 5x \Rightarrow x = 2$, $y = 4$. This gives $(2, 4)$.
16. Use the clue in the question first, then let the arithmetic finish the job. At $x = -1$: $y = 2(-1) + 3 = 1$. So the answer is $(-1, 1)$.
17. Use the labels on the display first; they tell you which count or total belongs in the answer. $x^2 = 4 \Rightarrow x = \pm 2$. Two intersection points. This gives $(\pm 2, 4)$.
18. This is a good place to slow down, check the notation, and simplify cleanly. Parallel. So the answer is no solution.
19. Use the labels on the display first; they tell you which count or total belongs in the answer. $-x + 7 = x + 1 \Rightarrow 6 = 2x \Rightarrow x = 3$, $y = 4$. This gives $(3, 4)$.
20. Use the labels on the display first; they tell you which count or total belongs in the answer. $3x = 2x + 1 \Rightarrow x = 1$, $y = 3$. This gives $(1, 3)$.
21. Use the clue in the question first, then let the arithmetic finish the job. The solution is the intersection point of the two lines: $(2, 3)$. So the answer is $(2, 3)$.
22. Start with the definition the problem is testing, then apply it directly. The solution is the intersection point of the two lines, which is $(1, 2)$. So the answer is $(1, 2)$.
23. For a table question, slow down and locate the exact row, column, or cell before calculating. Set equal: $x + 2 = -2x + 11 \Rightarrow 3x = 9 \Rightarrow x = 3$, $y = 5$. This gives $(3, 5)$.
24. Use the labels on the display first; they tell you which count or total belongs in the answer. $20 + 5h = 30 + 3h \Rightarrow 2h = 10 \Rightarrow h = 5$ hours. This gives 5 hours.
25. Read the table by matching the correct row and column first, then use the count or total that fits the question. $30t = 20t + 50 \Rightarrow 10t = 50 \Rightarrow t = 5$. This gives $t = 5$.
26. For a table question, slow down and locate the exact row, column, or cell before calculating. $10w = 60 + 2w \Rightarrow 8w = 60 \Rightarrow w = 7.5$ weeks. This gives $w = 7.5$.

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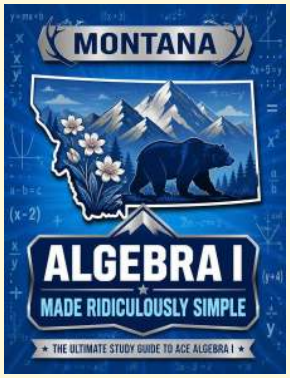

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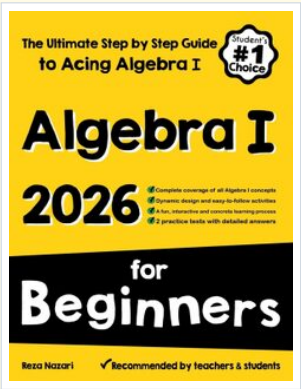

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