Slope-Intercept Form

Name: _____	Date: _____	Score: _____ / 30

Quick Review

Slope-intercept form: $y = mx + b$, where m is the slope and b is the y-intercept (where the line crosses the y-axis). The two numbers tell you everything you need to graph the line: start at $(0, b)$, then use the slope to step to the next point. The line $y = 2x + 3$ starts at $(0, 3)$ with slope 2 — go up 2, right 1, plot a point, and connect. To write a line in this form, you need either the slope and y-intercept, or enough info to compute them. Lines parallel to the x-axis are $y = b$ (slope 0); lines parallel to the y-axis are $x = a$ (undefined slope, not slope-intercept form).

PRACTICE

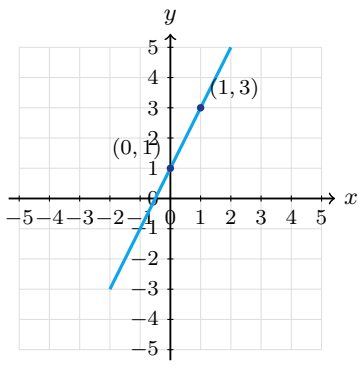
Write or identify in slope-intercept form.

1. A line has slope 2 and y-intercept 5. Write its equation. _____
2. A line has slope -1 and passes through the origin. Write its equation. _____
3. A line has slope $\frac{1}{2}$ and y-intercept -3. Write its equation. _____
4. Identify m, b in $y = 4x - 9$ _____
5. Identify m, b in $y = -\frac{2}{3}x + 1$ _____
6. Slope of $y = 7$ _____
7. For the line $y = -x + 4$, what is the y-intercept? _____
8. Line through $(0, 2)$ with slope 3 _____
9. A horizontal line crosses the y-axis at -5. Write its equation. _____
10. Rewrite $2x + y = 8$ in slope-intercept form. _____
11. Rewrite $4y = 12x - 8$ in slope-intercept form. _____
12. Convert $3x - y = 6$ _____
13. Line through $(2, 5)$ with $m = 3$ _____
14. A line passes through $(0, -4)$ and has slope -1. Write its equation. _____
15. For $y = -\frac{1}{2}x + 9$, identify the slope. _____
16. Convert $y - 3 = 2(x + 1)$ _____
17. A line has slope -3 and y-intercept $\frac{1}{2}$. Write its equation. _____
18. Slope of $x = 4$ _____
19. Convert $5x + 10y = 20$ _____
20. A line goes through the origin and has slope $\frac{2}{3}$. Write its equation. _____

VISUAL PRACTICE

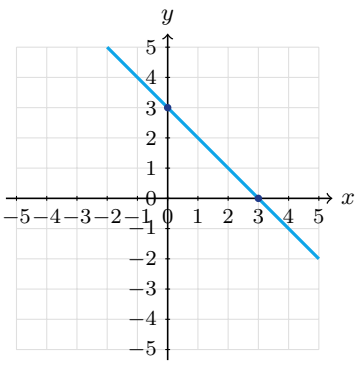
Use the graph, table, chart, or diagram to answer the question.

21. Identify the slope and y-intercept of the graphed line.



Answer: _____

22. Identify the slope and y-intercept of the graphed line.



Answer: _____

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Word Problems

23. A taxi charges \$3 to start plus \$2 per mile. Write the cost as a function of miles.

Model: _____ **Answer:** _____

24. A phone plan starts at \$25 per month plus \$0.10 per text. Write the cost function.

Model: _____ **Answer:** _____

25. A water tank holds 500 gallons and drains at 25 gallons per hour. Write volume after t hours.

Model: _____ **Answer:** _____

26. A line passes through $(0, 10)$ and $(4, 2)$. Write its equation in slope-intercept form and identify the starting value.

Model: _____ **Answer:** _____

27. A gym charges an \$18 sign-up fee and \$22 each month. Write the total cost after m months.

Model: _____ **Answer:** _____

28. A candle is 12 inches tall and burns down 0.5 inch each hour. Write its height after t hours.

Model: _____ **Answer:** _____

29. A line crosses the y-axis at -6 and passes through $(3, 0)$. Write its equation.

Model: _____ **Answer:** _____

30. Jada starts with \$75 saved and adds \$15 each week. Write a function for her savings after w weeks.

Model: _____ **Answer:** _____

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Answer Keys

1. $y = 2x + 5$
2. $y = -x$
3. $y = \frac{1}{2}x - 3$
4. $m = 4, b = -9$
5. $m = -\frac{2}{3}, b = 1$
6. 0
7. 4
8. $y = 3x + 2$
9. $y = -5$
10. $y = -2x + 8$
11. $y = 3x - 2$
12. $y = 3x - 6$
13. $y = 3x - 1$
14. $y = -x - 4$
15. $-\frac{1}{2}$
16. $y = 2x + 5$
17. $y = -3x + \frac{1}{2}$
18. undefined
19. $y = -\frac{1}{2}x + 2$
20. $y = \frac{2}{3}x$
21. $m = 2,\ b = 1$
22. $m = -1,\ b = 3$
23. $C = 2m + 3$
24. $C = 0.10t + 25$
25. $V = 500 - 25t$
26. $y = -2x + 10$
27. $C = 22m + 18$
28. $h = -0.5t + 12$
29. $y = 2x - 6$
30. $S = 15w + 75$

Step-by-Step Tutor Notes

1. Slope-intercept form is $y = mx + b$. With $m = 2$ and $b = 5$, the equation is $y = 2x + 5$.
2. Passing through the origin means the y-intercept is 0. In $y = mx + b$, use $m = -1$ and $b = 0$, so $y = -x$.
3. Use $m = \frac{1}{2}$ and $b = -3$ in $y = mx + b$. Fractional slopes work the same way as whole-number slopes.
4. Compare the change in output to the change in input, because slope is a rate of change. Coefficient of x is the slope; constant is the y-intercept. So the requested value is $m = 4, b = -9$.
5. Think of slope as the amount the output changes for each 1-unit change in the input. Negative fractional slope; y-intercept at 1. So the requested value is $m = -\frac{2}{3}, b = 1$.
6. Think of slope as the amount the output changes for each 1-unit change in the input. $y = 7$ is a horizontal line. Slope is 0. So the requested value is 0.
7. In slope-intercept form, the constant term is the y-intercept. Here that constant is 4.
8. Use the clue in the question first, then let the arithmetic finish the job. $(0, 2)$ *is* the y-intercept, so $b = 2$. So the answer is $y = 3x + 2$.
9. A horizontal line keeps the same y-value everywhere. Since it crosses at -5, the equation is $y = -5$.
10. Work one inverse operation at a time and keep both sides balanced. Move the $2x$ term to the other side by subtracting $2x$: $y = -2x + 8$. After simplifying, the answer is $y = -2x + 8$.
11. Divide every term by 4. That gives $y = 3x - 2$, with slope 3 and intercept -2.
12. Work one inverse operation at a time and keep both sides balanced. Subtract $3x$: $-y = -3x + 6$. Multiply by -1: $y = 3x - 6$. After simplifying, the answer is $y = 3x - 6$.
13. Use the labels on the display first; they tell you which count or total belongs in the answer. $y - 5 = 3(x - 2) \Rightarrow y = 3x - 6 + 5 = 3x - 1$. This gives $y = 3x - 1$.
14. The point $(0, -4)$ is the y-intercept, so $b = -4$. With slope -1, the equation is $y = -x - 4$.
15. The slope is the coefficient of x in slope-intercept form, so the slope is $-\frac{1}{2}$.
16. Focus on the main idea of the problem, then simplify carefully. Distribute: $y - 3 = 2x + 2$, so $y = 2x + 5$. So the answer is $y = 2x + 5$.
17. Use $y = mx + b$ with $m = -3$ and $b = \frac{1}{2}$. That gives $y = -3x + \frac{1}{2}$.
18. Think of slope as the amount the output changes for each 1-unit change in the input. Vertical line — not a function, slope is undefined. So the requested value is undefined.
19. Keep the order of operations in view, then simplify without skipping the sign check. Subtract $5x$: $10y = -5x + 20$. Divide by 10: $y = -\frac{1}{2}x + 2$. After simplifying, the answer is $y = -\frac{1}{2}x + 2$.
20. The origin gives $b = 0$. With slope $\frac{2}{3}$, the equation is $y = \frac{2}{3}x$.
21. The line crosses the y-axis at 1 and rises 2 for each 1 step right.
22. The line crosses the y-axis at 3 and drops 1 for each step right, so $m = -1$ and $b = 3$.
23. $3 is the starting cost (the y-intercept); $2 per mile is the rate (slope). $C = 2m + 3$.
24. Think of slope as the amount the output changes for each 1-unit change in the input. $b = 25$ (flat fee), $m = 0.10$ (per-text rate). $C = 0.10t + 25$. So the requested value is $C = 0.10t + 25$.
25. Compare the change in output to the change in input, because slope is a rate of change. Starts at 500 (intercept); drops by 25 per hour (slope -25). $V = -25t + 500$. So the requested value is $V = 500 - 25t$.
26. Think of slope as the amount the output changes for each 1-unit change in the input. $(0, 10)$ gives $b = 10$. Slope: $\frac{2-10}{4-0} = -2$. So $y = -2x + 10$. So the requested value is $y = -2x + 10$.
27. The monthly charge is the slope, 22. The one-time sign-up fee is the y-intercept, 18. So $C = 22m + 18$.
28. The starting height is 12, and the height drops by 0.5 each hour. That gives $h = -0.5t + 12$.
29. The y-intercept is -6. Slope from $(0, -6)$ to $(3, 0)$ is $\frac{0-(-6)}{3-0} = 2$, so $y = 2x - 6$.
30. The starting amount is 75, and the weekly rate is 15. In slope-intercept form, $S = 15w + 75$.

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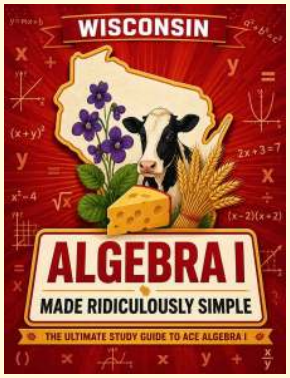

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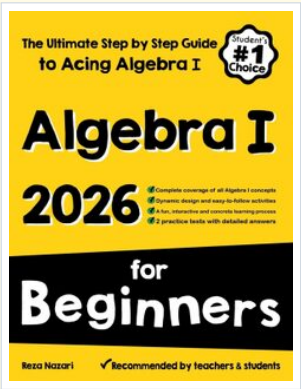

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