

Slope-Intercept Form

Name: _____ Date: _____ Score: _____ / 30

Q 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.

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



◆ 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

- | | |
|---|---|
| <ol style="list-style-type: none"> 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. $-\frac{1}{2}$ | <ol style="list-style-type: none"> 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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