

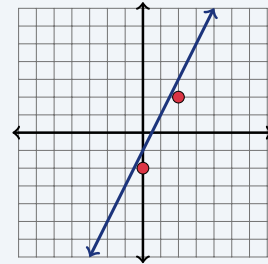
# Graphing Lines Using Slope-Intercept Form

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 18

## Quick Review and Helpful Hints

The *slope-intercept form* is  $y = mx + b$ , where  $m$  is the *slope* (rise over run) and  $b$  is the *y-intercept* (where the line crosses the  $y$ -axis). To graph: plot  $(0, b)$  first, then use the slope to step to a second point. To rewrite an equation in this form, solve for  $y$ .

▷ **Example:** Find the slope and  $y$ -intercept of  $y = 2x - 1$ , then describe its graph. **Work:** Compare to  $y = mx + b$ :  $m = 2$  and  $b = -1$ . Plot  $(0, -1)$ , then go up 2 and right 1 to  $(1, 1)$ . ★ **Answer:**  $m = 2$ ,  $b = -1$

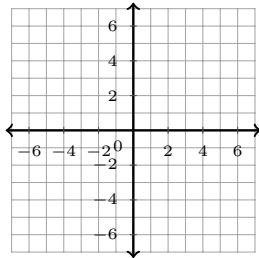


$y = 2x - 1$ : start at  $b = -1$ , slope 2.

### ◆ Practice Problems

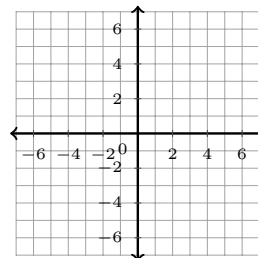
Sketch each line on the coordinate plane. Then state  $m$  and  $b$ , rewrite in  $y = mx + b$  form, or write the equation, as directed.

1. Graph  $y = 3x + 2$ . Then state  $m$  and  $b$ .



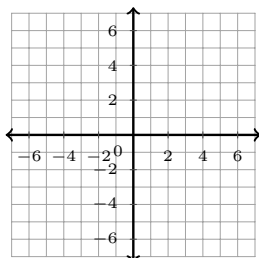
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3. Graph  $y = \frac{1}{2}x - 4$ . Then state  $m$  and  $b$ .



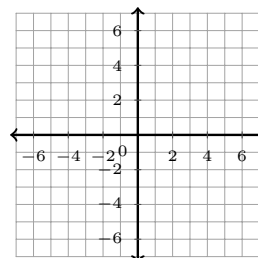
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2. Graph  $y = -x + 5$ . Then state  $m$  and  $b$ .



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4. Graph  $y = -2x$ . Then state  $m$  and  $b$ .



5. Graph  $y = 6$ . Then state  $m$  and  $b$ .



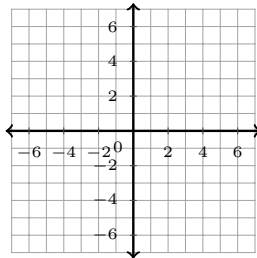
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9. Rewrite  $-3x + y = 2$  in slope-intercept form, then graph it.



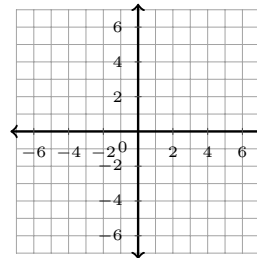
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6. Rewrite  $2x + y = 9$  in slope-intercept form, then graph it.



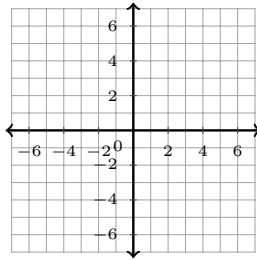
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10. Rewrite  $6x + 2y = 10$  in slope-intercept form, then graph it.



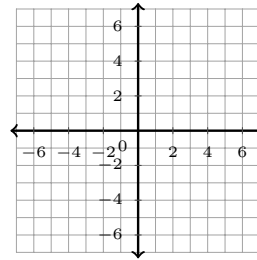
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7. Rewrite  $4x - y = 3$  in slope-intercept form, then graph it.



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11. Write and graph the line with  $m = 2$ ,  $b = -5$ .



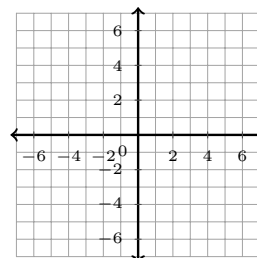
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8. Rewrite  $x + 2y = 8$  in slope-intercept form, then graph it.



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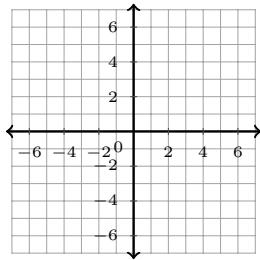
12. Write and graph the line with  $m = -3$ ,  $b = 1$ .



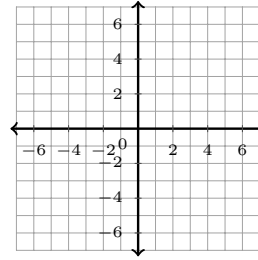
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13. Write and graph the line with  $m = \frac{1}{4}$ ,  $b = 0$ .



14. Write and graph the line with  $m = 1$ ,  $b = 7$ .



◆ Word Problems

15. A line has slope 2 and passes through  $(0, 3)$ . Write its equation.

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17. A line crosses the  $y$ -axis at  $(0, -4)$  and has slope 1. Write its equation.

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16. A taxi costs \$3 plus \$2 per mile. Write the cost  $y$  in terms of miles  $x$ .

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18. State the slope and  $y$ -intercept of  $y = -\frac{2}{3}x + 5$ .

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**Answer Keys**

1.  $m = 3, b = 2$

2.  $m = -1, b = 5$

3.  $m = \frac{1}{2}, b = -4$

4.  $m = -2, b = 0$

5.  $m = 0, b = 6$

6.  $y = -2x + 9$

7.  $y = 4x - 3$

8.  $y = -\frac{1}{2}x + 4$

9.  $y = 3x + 2$

10.  $y = -3x + 5$

11.  $y = 2x - 5$

12.  $y = -3x + 1$

13.  $y = \frac{1}{4}x$

14.  $y = x + 7$

15.  $y = 2x + 3$

16.  $y = 2x + 3$

17.  $y = x - 4$

18.  $m = -\frac{2}{3}, b = 5$



### Graph Answer Sketches

These are the required line sketches for the graphing items. Each line has arrows on both ends.

1.  $y = 3x + 2$ ;  $m = 3$ ,  $b = 2$



7.  $y = 4x - 3$



2.  $y = -x + 5$ ;  $m = -1$ ,  $b = 5$



8.  $y = -\frac{1}{2}x + 4$



3.  $y = \frac{1}{2}x - 4$ ;  $m = \frac{1}{2}$ ,  $b = -4$



9.  $y = 3x + 2$



4.  $y = -2x$ ;  $m = -2$ ,  $b = 0$



10.  $y = -3x + 5$



5.  $y = 6$ ;  $m = 0$ ,  $b = 6$



11.  $y = 2x - 5$



6.  $y = -2x + 9$



12.  $y = -3x + 1$



13.  $y = \frac{1}{4}x$



14.  $y = x + 7$



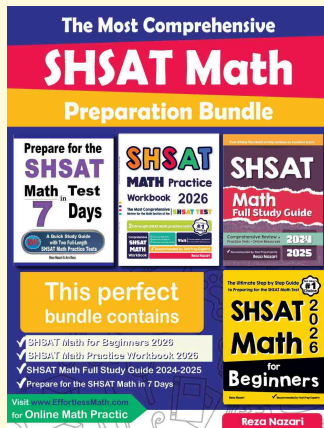
## Step-by-Step Explanations

- Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is It is already in  $y = mx + b$  form: the number with  $x$  is  $m = 3$ , and the constant is  $b = 2$ . So the final answer is  $m = 3$ ,  $b = 2$ .
- A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Here  $-x$  means  $m = -1$ , and the constant is  $b = 5$ . So the final answer is  $m = -1$ ,  $b = 5$ .
- Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The coefficient of  $x$  is  $m = \frac{1}{2}$ , and  $b = -4$ . So the final answer is  $m = \frac{1}{2}$ ,  $b = -4$ .
- Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is With no constant,  $b = 0$ ; the slope is  $m = -2$ . So the final answer is  $m = -2$ ,  $b = 0$ .
- Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is A flat line  $y = 6$  has slope  $m = 0$  and crosses the  $y$ -axis at  $b = 6$ . So the final answer is  $m = 0$ ,  $b = 6$ .
- A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract  $2x$  from both sides:  $y = -2x + 9$ . So the final answer is  $y = -2x + 9$ .
- Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract  $4x$ :  $-y = -4x + 3$ . Multiply by  $-1$ :  $y = 4x - 3$ . So the final answer is  $y = 4x - 3$ .
- Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract  $x$ :  $2y = -x + 8$ . Divide by  $2$ :  $y = -\frac{1}{2}x + 4$ . So the final answer is  $y = -\frac{1}{2}x + 4$ .
- Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Add  $3x$  to both sides:  $y = 3x + 2$ . So the final answer is  $y = 3x + 2$ .
- A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract  $6x$ :  $2y = -6x + 10$ . Divide by  $2$ :  $y = -3x + 5$ . So the final answer is  $y = -3x + 5$ .
- Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Put  $m$  with  $x$  and  $b$  as the constant:  $y = 2x - 5$ . So the final answer is  $y = 2x - 5$ .
- Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is  $y = -3x + 1$ . So the final answer is  $y = -3x + 1$ .
- Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is With  $b = 0$  there is no constant:  $y = \frac{1}{4}x$ . So the final answer is  $y = \frac{1}{4}x$ .
- A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is  $y = x + 7$ . So the final answer is  $y = x + 7$ .
- Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Use  $m = 2$  and the intercept  $b = 3$  (from  $(0, 3)$ ):  $y = 2x + 3$ . So the final answer is  $y = 2x + 3$ .
- Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The fixed \$3 is  $b$  and the \$2 per mile is the slope:  $y = 2x + 3$ . So the final answer is  $y = 2x + 3$ .
- Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The point  $(0, -4)$  gives  $b = -4$  and the slope is  $1$ :  $y = x - 4$ . So the final answer is  $y = x - 4$ .
- A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is In  $y = mx + b$  form,  $m = -\frac{2}{3}$  and  $b = 5$ . So the final answer is  $m = -\frac{2}{3}$ ,  $b = 5$ .



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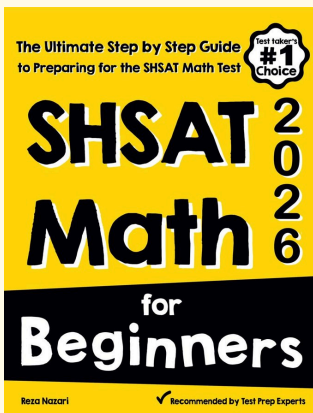
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