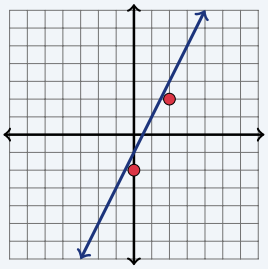
Graphing Lines Using Slope-Intercept Form

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:** $m = 2,\ b = -1$

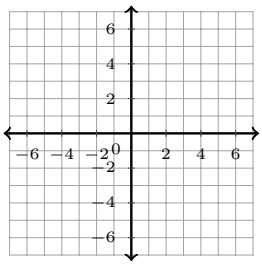


$y = 2x - 1$: start at $b = -1$, slope 2.

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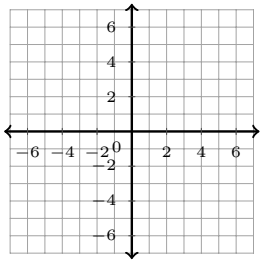
3. Graph $y = \frac{1}{2}x - 4$. Then state m and b.



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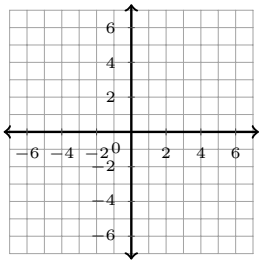
2. Graph $y = -x + 5$. Then state m and b.



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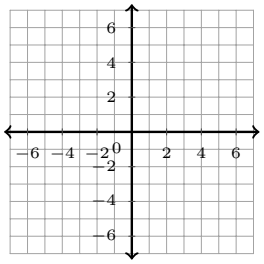
4. Graph $y = -2x$. Then state m and b.



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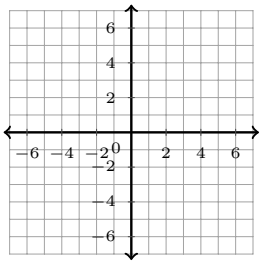
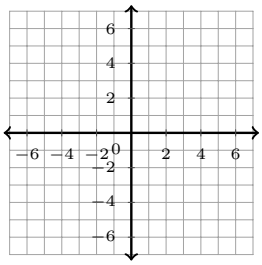
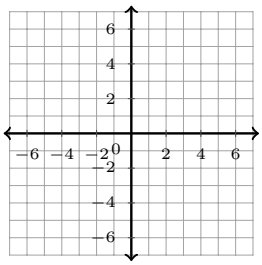
5. Graph $y = 6$. Then state m and b.



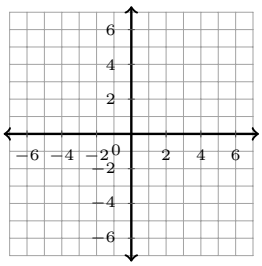
6. Rewrite $2x + y = 9$ in slope-intercept form, then graph it.



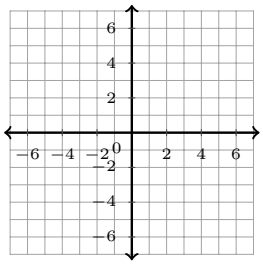
7. Rewrite $4x - y = 3$ in slope-intercept form, then graph it.



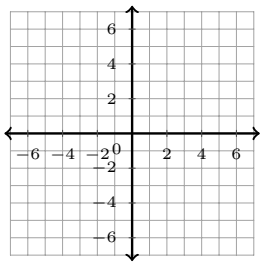
8. Rewrite $x + 2y = 8$ in slope-intercept form, then graph it.



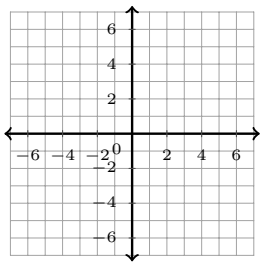
9. Rewrite $-3x + y = 2$ in slope-intercept form, then graph it.



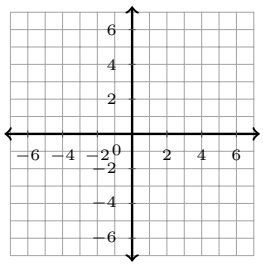
10. Rewrite $6x + 2y = 10$ in slope-intercept form, then graph it.



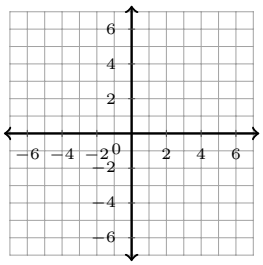
11. Write and graph the line with $m = 2,\ b = -5$.



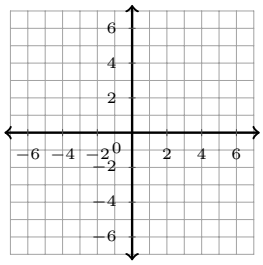
12. Write and graph the line with $m = -3,\ b = 1$.



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.

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

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

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

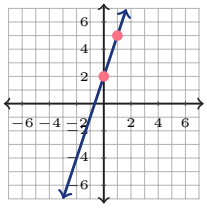
Answer Keys

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

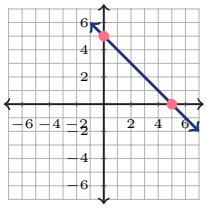
Graph Answer Sketches

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

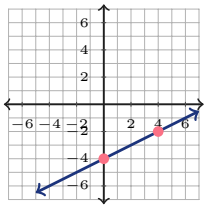
1. $y = 3x + 2;\ m = 3,\ b = 2$



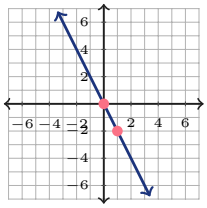
2. $y = -x + 5;\ m = -1,\ b = 5$



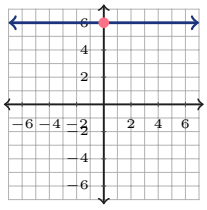
3. $y = \frac{1}{2}x - 4;\ m = \frac{1}{2},\ b = -4$



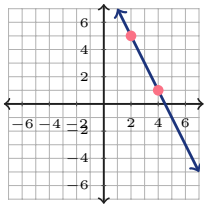
4. $y = -2x;\ m = -2,\ b = 0$



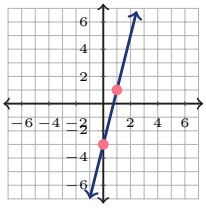
5. $y = 6;\ m = 0,\ b = 6$



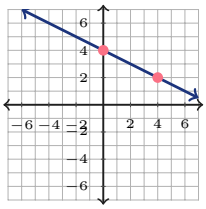
6. $y = -2x + 9$



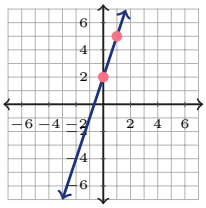
7. $y = 4x - 3$



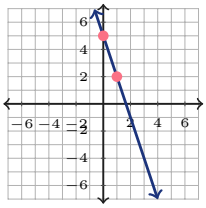
8. $y = -\frac{1}{2}x + 4$



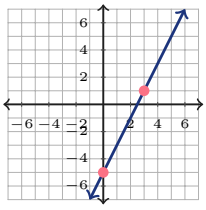
9. $y = 3x + 2$



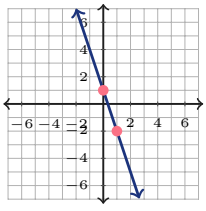
10. $y = -3x + 5$



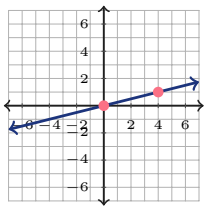
11. $y = 2x - 5$



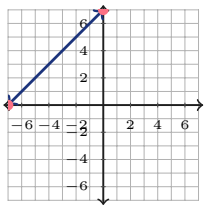
12. $y = -3x + 1$



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



14. $y = x + 7$



Step-by-Step Explanations

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 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 $m = 3,\ b = 2$.

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

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

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

5. 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 $m = 0,\ b = 6$.

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 $y = -2x + 9$.

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 Subtract $4x$: $-y = -4x + 3$. Multiply by -1: $y = 4x - 3$. So the final answer is $y = 4x - 3$.

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

9. 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 $y = 3x + 2$.

10. 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 $y = -3x + 5$.

11. 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 $y = 2x - 5$.

12. 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 $y = -3x + 1$.

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

14. 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 $y = x + 7$.

15. 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 $y = 2x + 3$.

16. 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 $y = 2x + 3$.

17. 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 $y = x - 4$.

18. 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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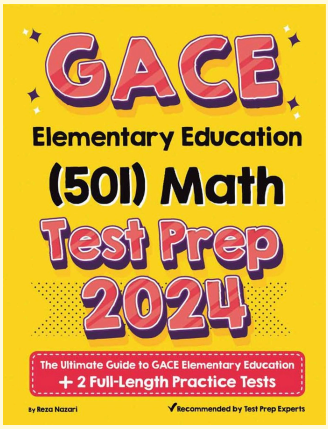

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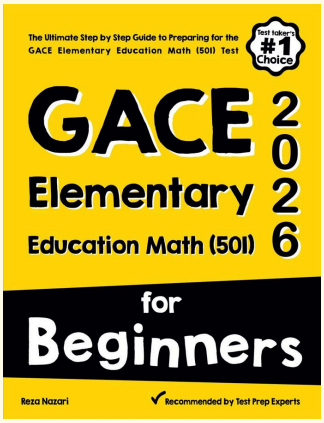

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