

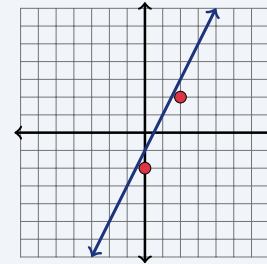
Graphing Lines Using Slope-Intercept Form

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

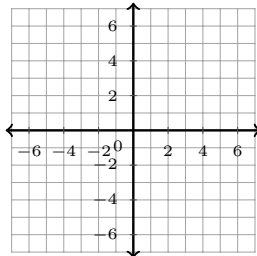


$y = 2x - 1$: start at $b = -1$, slope 2.

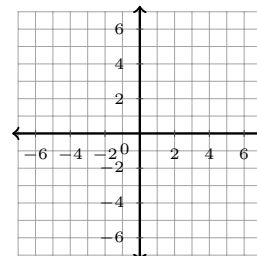
Practice Problems

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

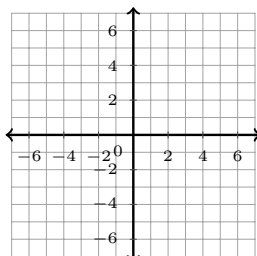
1. Graph $y = 3x + 2$. Then state m and b .



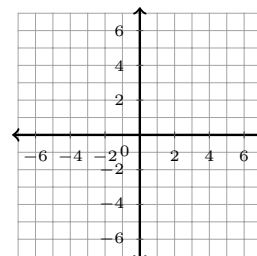
3. Graph $y = \frac{1}{2}x - 4$. Then state m and b .



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



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



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



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



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



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



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



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



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

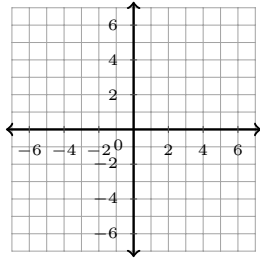


12. Write and graph the line with $m = -3$, $b = 1$.

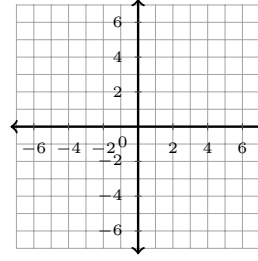




13. Write and graph the line with $m = \frac{1}{4}$, $b = 0$.



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.

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

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

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



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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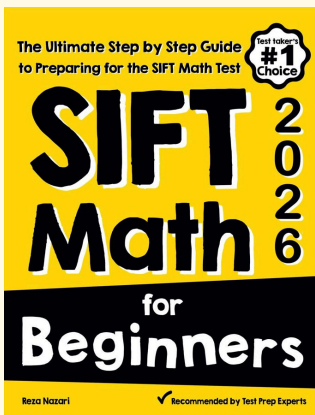
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