

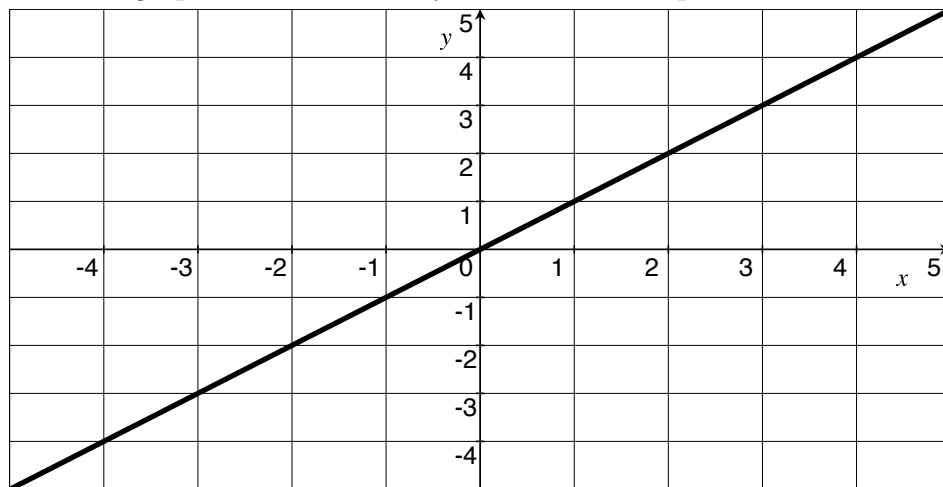
Slopes and Lines

While working in a group make sure you:

- Expect to make mistakes but be sure to reflect/learn from them!
- Are civil and are aware of your impact on others.
- Assume and engage with the strongest argument while assuming best intent.

1. Shape: Let $g(x) = 1 \cdot x$. The graph of g is plotted on the axis below and is an example of a line.

- (a) Let the function h have the rule $h(x) = -2 \cdot x$. We often suppress the multiplication sign and would instead write $h(x) = -2x$. Plot the graph of h below.
- (b) Plot the graphs of the functions $\alpha(x) = \frac{1}{3}x$ and $\beta(x) = 0x$. You should have three different graphs drawn below by the end of this question.



- (c) Let f be the function with the rule $f(x) = mx$ where m be some fixed number (like 2, $\frac{1}{3}$, -4, etc...). Consider the functions you graphed above and determine if the graph of f is increasing, decreasing, or doing neither if:

- $m > 0$:
- $m = 0$:

2. Slope:

- (a) Given two points (a, b) and (c, d) on a line, explicitly find a formula for the slope.

- (b) If $f(x) = mx$ where m be some fixed number (like 2, $\frac{1}{3}$, -4, etc...), what is the slope of the graph of f ?

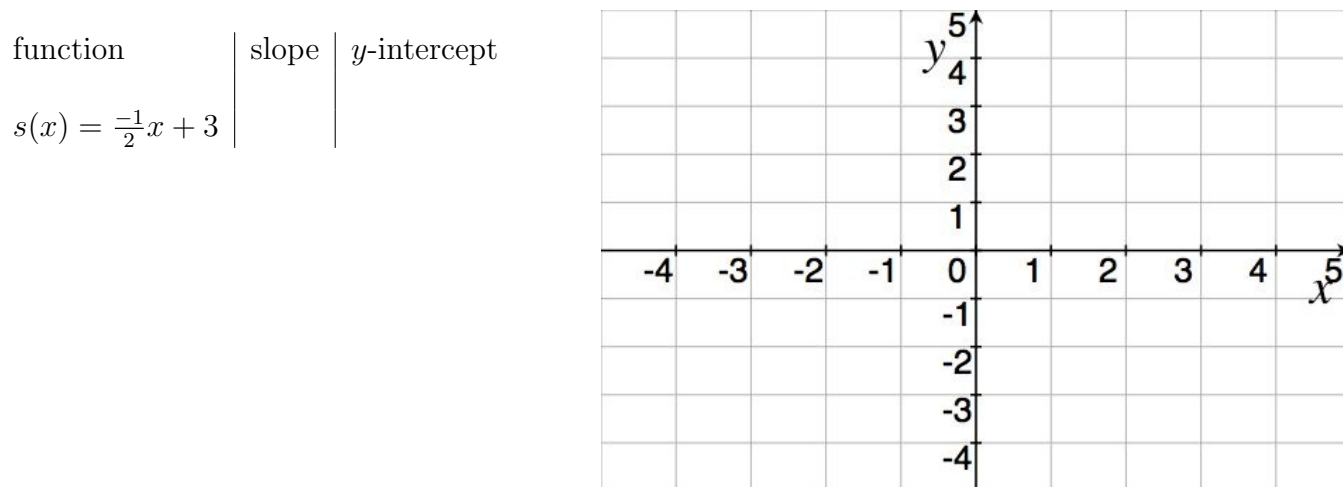
3. Let δ be defined by $\delta(x) = h(x) - 2.5$ where h was the function defined in #1. Since $h(x) = -2x$ we could also write $\delta(x) = -2x - 2.5$. Find the y -intercept of δ .

4. Let m and b be fixed numbers (like 2, $\frac{1}{3}$, -4, etc...) and define $f(x) = mx + b$.

(a) Where is the y -intercept of f ? (Consider looking at #3, if you need help.)

(b) The rule of the function f is a special form called slope intercept form. Why do you think it has this name?

5. Use the the information from #4 to fill in the table below and then graph s .



6. Let the graph of the function α be a line with slope $\frac{-1}{3}$ and assume the graph crosses the y -axis at $(0, 7)$. Find the rule of α without graphing it.

7. Let the graph of the function β be a line with slope $\frac{1}{2}$ and assume it passes through the point $(3, 4)$. Find the rule of β .

Hint: Since you know what m is, write $\beta(x) = mx + b$, and try to solve for b by plugging in points. Otherwise, there is a “point-slope formula” that can be used that is on page 20. *Be warned, you will have no books or notes on the exam and quizzes so make sure whatever materials you use to answer this question can be memorized easily.*

8. Let the graph of the function γ be a line that passes through the points $(-1, 2)$ and $(2, -5)$, find the rule of γ .

9. Parallel Lines: If two lines are parallel, what is the relationship between their slopes?

10. Perpendicular Lines

- (a) If two lines are perpendicular, what is the relationship between their slopes?
- (b) Find the equation of a line perpendicular to the line that passes through $(-2, -1)$ and $(4, 3)$. Note: There are many right answers.