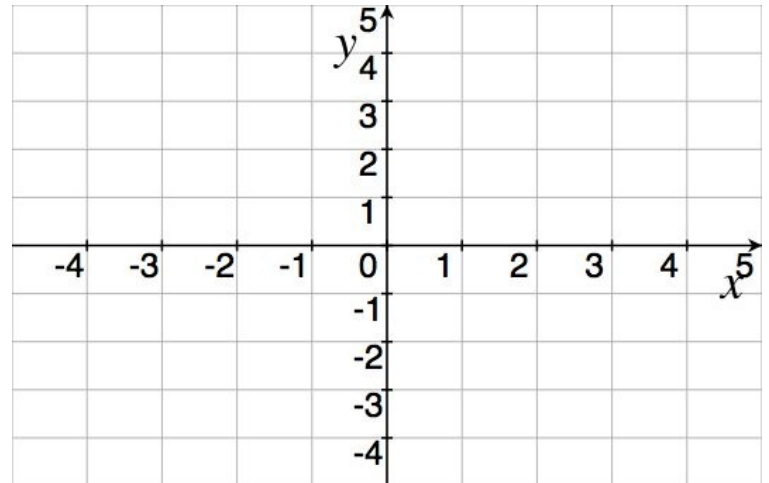


Functions

1. Let C be the piecewise defined function:

$$C(x) = \begin{cases} 3 + 2x & \text{if } -3 \leq x < 0 \\ x^2 & \text{if } 0 \leq x \leq 2 \end{cases}$$

(a) Find $C(-2)$.



(b) Find the output of the function C when $x = 2$.

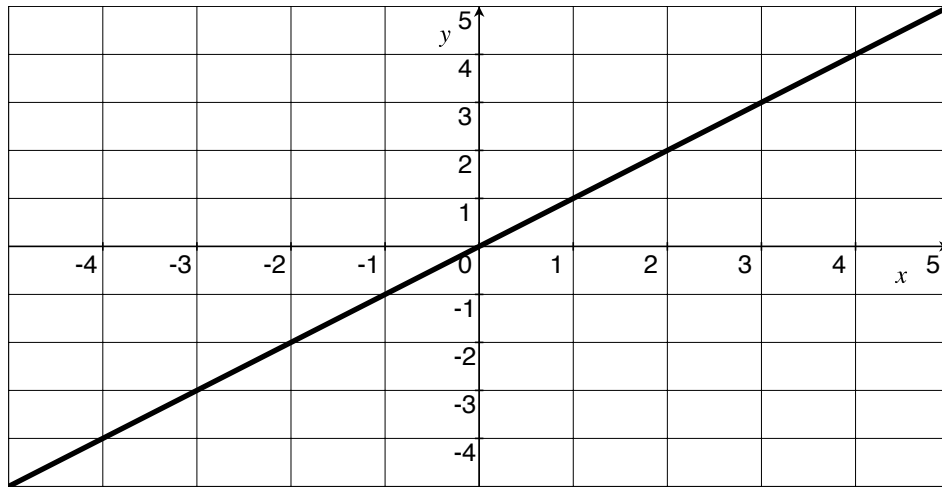
(c) Find the y intercept of C .

(d) Is C a function? Why or why not.

Slopes and Lines

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. All the functions on this worksheet will have graphs that are lines.

- (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 on the set of axes 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:
- $m > 0$:
 - $m = 0$:
 - $m < 0$:

2. Slope:

- (a) Given two points: (a, b) and (c, d) on a line, explicitly find a formula for the slope.
- (b) Let $h(x) = -2x$ be the function you graphed in (1a). Find two points that are on the graph of h and compute the slope of the line defined by h .
- (c) 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 a linear function defined by $\delta(x) = h(x) - 2.5$ where h was the function defined in #1. Since $h(x) = -2x$ we could also write $\delta(x) = -2x - 2.5$. Identify the y -intercept of δ .

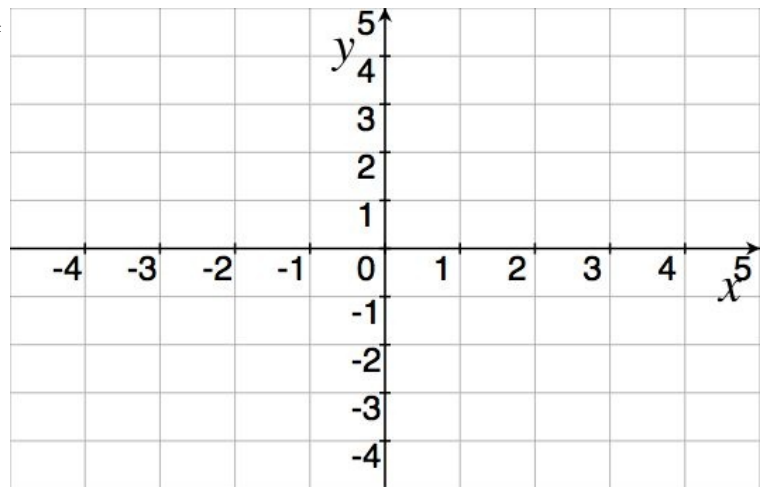
4. Let m and b be fixed numbers (like 2, $\frac{1}{3}$, -4, etc...) and define $f(x) = mx + b$.

(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 does it have this name?

5. Use the the information from #4

function	slope	y -intercept
$t(x) = -2x + 1$		
$s(x) = \frac{-1}{2}x + 3$		



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.