Functions

Definition 0.1. A *function* f is a rule that assigns to each element x in a set A (called the *domain*) exactly one element, called $f(x)$ in a set B (called the *range*).

Convention 0.1 (Domain)**.** *Then the domain is not explicit we use the domain convention: the domain of the function is the set of all possible inputs that the rule returns a real number.*

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. Let C be the function that takes percentages, x, and returns course marks:

$$C(x) = \begin{cases} 0 & \text{if } 0 \le x < 57 \\ .1x - 5 & \text{if } 57 \le x \le 90 \\ 4.0 & \text{if } 90 < x \le 100 \end{cases}$$

   (a) Find $C(75)$.

   (b) Find the percentage(s), x so that $C(x) = 4.0$.

   (c) Given that C is a function, what is the domain of C?

2. Let f be a function defined algebraically by: $f(x) = \dfrac{1}{1 - x^2}$

   (a) Find $f(2.2)$.

   (b) Find $f(a + h)$.

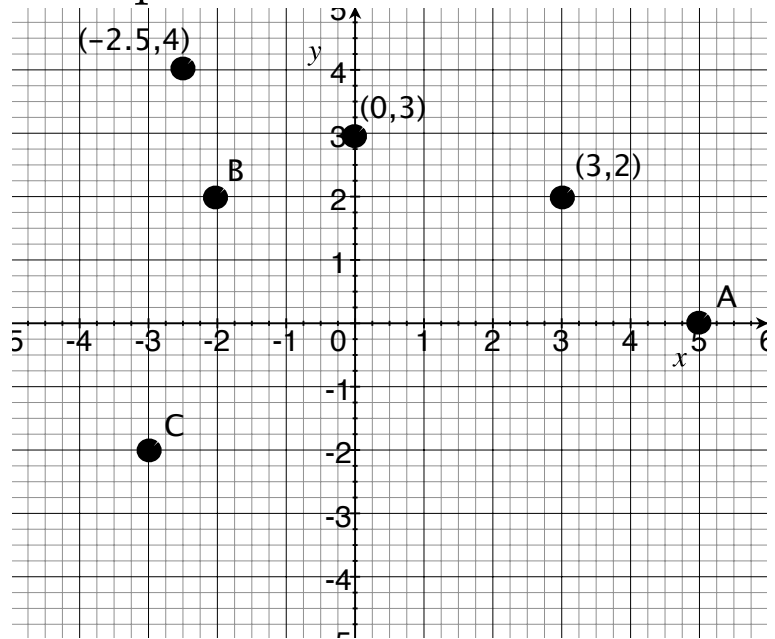   (c) Given that f is a function, use the domain convention to find the domain of f?

Graphs

The cartesian plane uniquely identifies all the points on a plane with two coordinates called an ordered pair.

For example, the point (-2.5,4) corresponds to the point 2.5 units to the left of the y-axis, and 4 units above the x-axis.

Write down the ordered pair for the following points:

(a) A

(b) B

(c) C

3. Identify the ordered pair $(2, -4)$ on the axes above.

4. The cartesian plane divides the plane into four quadrants. The first quadrant is the upper right, where both the x and y coordinates are positive. On the cartesian plane above, identify the 2nd and 4th quadrants.

Definition 0.2. The *graph* of a function f is the set of ordered pairs (x, y) where $y = f(x)$.

5. Consider the function defined below:

x	$f(x)$
-4	16
-2	4
2	4

Most of the graph of f is graphed on the right. Look at the definition of a graph and finish graphing the function f.
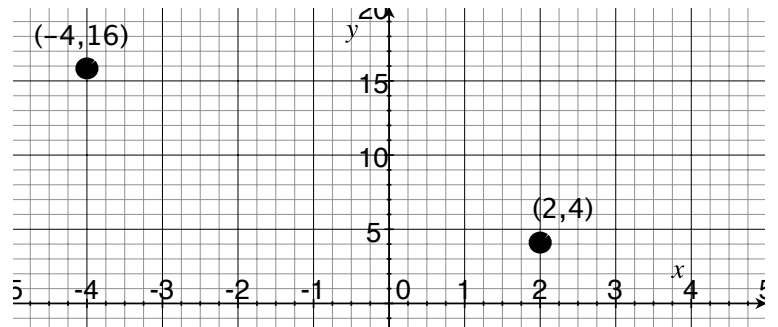
Convention 0.2 (Vertical Line). *A curve in the coordinate plane is the graph of a function if and only if no vertical line intersects the curve more than once.*

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