

MAT1375, Classwork3, Fall2025

Ch3. Functions via Graphs

1. The definition of a Relation:

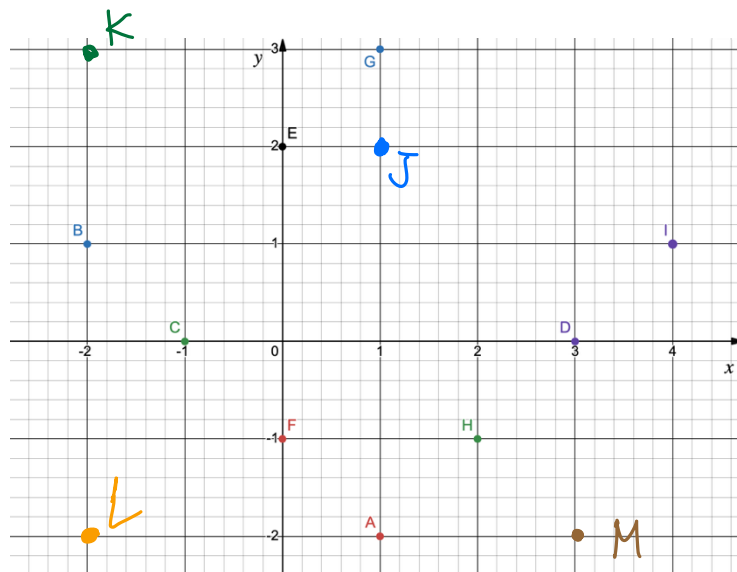
A relation is any set of ordered pairs. The set of all first components of the ordered pair is called the domain of the relation and the set of all second components is called the range of the relation.

2. Write down the ordered pair points in the given coordinate:

A: (1 , -2); B: (-2 , 1); C: (-1 , 0);

D: (3 , 0); E: (0 , 2); F: (0 , -1);

G: (1 , 3); H: (2 , -1); I: (4 , 1).



3. Plot the given points in a rectangular coordinate:

J:(1, 2); K:(-2, 3); L:(-2, -2); M:(3, -2).

4. From a relation to a function:

Each element in domain only gets one element from range.

5. Linear Functions and the Slopes:

A linear function is a function of the form

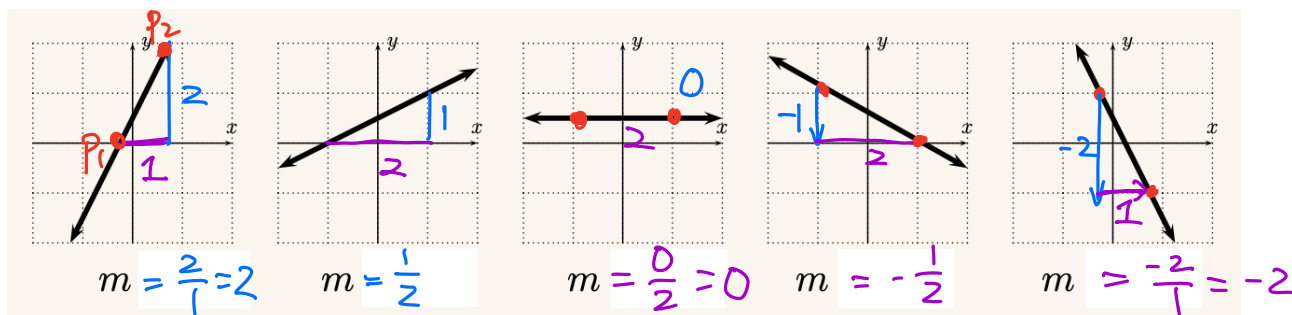
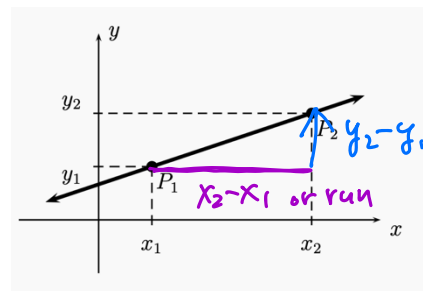
$$f(x) = m \cdot x + b$$

where m is the slope of the line and $(0, b)$ is y-intercept of the line. The domain of a line is All Real Number, \mathbb{R} , $(-\infty, \infty)$

6. The slope and its sign:

Given two points of a line $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$. Then the slope m is

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad \left(\frac{\text{rise}}{\text{run}} \right)$$



7. Find the equation of the line by the given information:

(1) $m = 2$ and y-intercept is $(0, -1)$

$$f(x) = 2 \cdot x - 1$$

(2) the line passes $P_1(1, 1)$ and $P_2(-1, -3)$

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

$$f(x) = 2 \cdot x + b \Rightarrow f(x) = 2x - 1$$

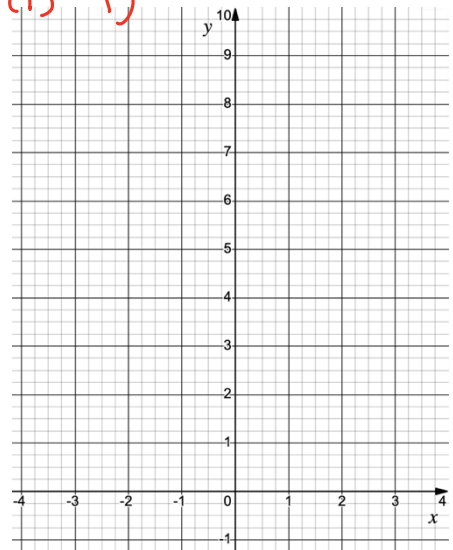
Using P_1 (when $x=1$, $f(1)=1$)

$$1 = 2 \cdot 1 + b$$

$$1 = 2 + b \Rightarrow -1 = b$$

8. Functions given by graphs

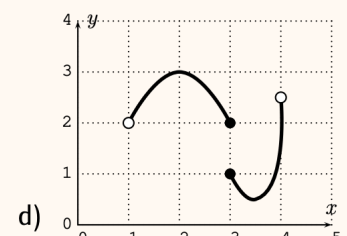
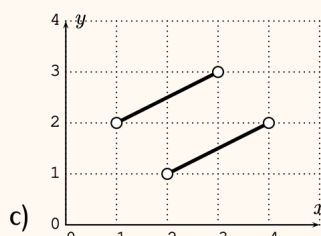
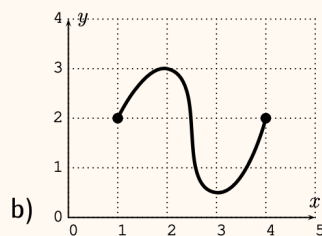
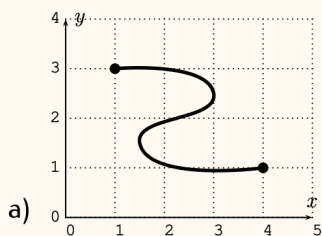
Let $y = x^2$ with domain $D = \mathbb{R}$. Graph this on the given coordinate.



9. Vertical Line Test:

A graph is the graph of a function precisely when every vertical line intersects the graph at most once.

10. Use **Vertical Line Test** to determine which of the following are the graphs of functions.



11. Let f be the function given by the following graph.

(a) What is the domain of f ?

(b) What is the range of f ?

(c) For which x is $f(x) < 0$?

(d) Find $f(0) + 5$.

(e) Find $f(0 + 5)$.

