

## 4. Linear Relations

→ A linear relation is any relationship between two variables that creates a straight line when graphed.

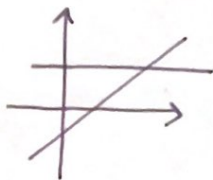
→ Linear relations are very common in everyday life.

→ We can represent a linear relation by:

1) words

2) a table of values  $x/y$

3) a graph



4) an equation  $y = mx + b$

## 5. Graph of a Linear Relation

3 types of lines :

1) Vertical line



Equation :

$$x = \underline{\quad}$$

No  $y$ !

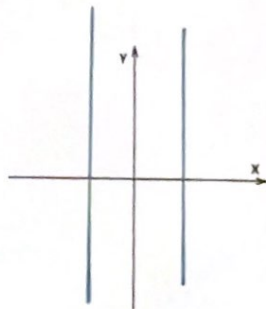
Examples :

$x = 3$

$x = 0$

$x = -5$

$x = \frac{3}{4}$

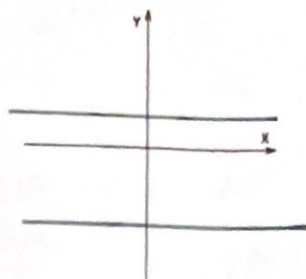


## 2) Horizontal line ↔

Equation:  $y = \underline{\hspace{2cm}}$

No x!

Examples:  $y = 2$     $y = 0$   
 $y = -6$     $y = \frac{1}{3}$



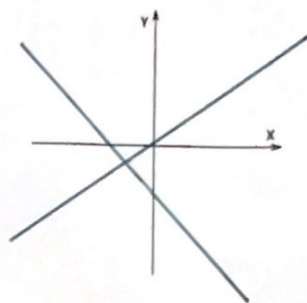
## 3) Slanted line (Diagonal)

Equation:  $y = mx + b$

> m is the slope (how steep the line is)

> b is the y-intercept (zero-term)

Examples:  $y = 2x + 1$     $y = -\frac{1}{3}x + 2$   
 $y = -8x$



We can easily graph a linear relation using its equation!

- Steps:
- 1) Choose 3 values for x (-1, 0, 1 are easy to calculate)
  - 2) Make a table of values
  - 3) Substitute each value in the equation to find the corresponding y-coordinate