



Class 9 Maths Chapter 2 – Exercise 2.6

Visualising Linear Relationships

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Exercise 2.6 contains **one main question with five parts**. The purpose is to understand how the values of **a (slope)** and **b (y-intercept)** affect the graph of a linear relationship $y = ax + b$.



Question 1

Draw the graphs of the following sets of lines. In each case, reflect on the role of **a** and **b**.

(i) $y = 4x$, $y = 2x$, $y = x$

All three equations are of the form:

$$y = ax$$

Therefore:

$$b = 0$$



Points for plotting

x	y = 4x	y = 2x	y = x
-2	-8	-4	-2
-1	-4	-2	-1
0	0	0	0
1	4	2	1

2 8 4 2

All three lines pass through **(0, 0)**.

Observation

- $y = x \rightarrow$ slope $a = 1$
- $y = 2x \rightarrow$ slope $a = 2$
- $y = 4x \rightarrow$ slope $a = 4$

As the positive value of a increases, the line becomes **steeper**.

Conclusion:

a controls the slope/steepness of the line, while $b = 0$ keeps the line passing through the origin. ([StudySolv](#))

(ii) $y = -6x, y = -3x, y = -x$

Again:

$b = 0$

Points for plotting

x	$y = -6x$	$y = -3x$	$y = -x$
-2	12	6	2
-1	6	3	1
0	0	0	0
1	-6	-3	-1
2	-12	-6	-2

All three lines pass through **(0, 0)**.

Observation

All slopes are negative:

- -6
- -3
- -1

Therefore, all lines slope **downward from left to right**.

The greater the magnitude of the negative slope, the steeper the line.

✓ Conclusion:

A **negative a** gives a downward-sloping line. A larger **|a|** makes the line steeper.

● (iii) $y = 5x$ and $y = -5x$

Points for plotting

x	$y = 5x$	$y = -5x$
-2	-10	10
-1	-5	5
0	0	0
1	5	-5
2	10	-10

Both lines pass through:

(0, 0)

Their slopes are:

- $y = 5x \rightarrow a = 5$
- $y = -5x \rightarrow a = -5$

Observation

The two lines have equal but opposite slopes.

- $y = 5x$ rises from left to right.
- $y = -5x$ falls from left to right.

✓ Conclusion:

Changing the **sign of a** changes the direction of the slope.

● (iv) $y = 3x - 1$, $y = 3x$, $y = 3x + 1$

Here:

a = 3 for all three lines.

But **b** changes:

Equation a b

$$y = 3x - 1$$

$$y = 3x$$

$$y = 3x + 1$$

📊 Points for plotting

x	$3x - 1$	$3x$	$3x + 1$
-1	-4	-3	-2
0	-1	0	1
1	2	3	4
2	5	6	7

🔍 Observation

All three lines have the **same slope = 3**.

Therefore, they are **parallel**.

Changing **b** moves the line **up or down** without changing its slope.

✓ Conclusion:

a determines the slope, while **b** determines the y-intercept/vertical position of the line.

● (v) $y = -2x - 3$, $y = -2x$, $y = 2x + 3$

Compare the coefficients

Equation	a	b
$y = -2x - 3$	-2	-3
$y = -2x$	-2	0
$y = 2x + 3$	2	3

Observation

The first two equations have:

$$a = -2$$

Therefore, their graphs are **parallel**.

The third equation has:

$$a = +2$$

Therefore, it slopes in the **opposite direction**.

The values of **b** determine where the lines cross the y-axis:

- $y = -2x - 3 \rightarrow$ y-intercept **-3**

- $y = -2x \rightarrow$ y-intercept **0**
- $y = 2x + 3 \rightarrow$ y-intercept **3**

✓ Conclusion:

- Same $a \rightarrow$ **parallel lines** when b is different.
 - Positive $a \rightarrow$ line rises.
 - Negative $a \rightarrow$ line falls.
 - b shifts the graph vertically.
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Complete Exercise 2.6 Concept

For a linear relationship:

$$y = ax + b$$



$a =$ Slope

It controls:

- direction of the line
- steepness of the line

Positive $a \rightarrow$ rising line ↗

Negative $a \rightarrow$ falling line ↘

Larger $|a| \rightarrow$ steeper line



$b =$ y-intercept

It tells us where the line crosses the **y-axis**.

Changing b moves the line **up or down** without changing its slope.



Most important rule

Same slope + different y-intercepts = parallel lines.



Exercise 2.6 – Quick Answer Key

Part	Main Observation
(i)	Larger positive $a \rightarrow$ steeper positive slope
(ii)	Negative $a \rightarrow$ downward slope
(iii)	Opposite signs of $a \rightarrow$ opposite directions
(iv)	Same a , different $b \rightarrow$ parallel lines
(v)	Same negative slope $\rightarrow$ parallel; changing sign of a changes direction