4.7 Parameters a and b in y = ax + b

Observations on changing the parameters using: <u>TI-83</u> or <u>GeoGebra</u> or <u>graphsketch.com</u>

А	y ₁ = x	$y_2 = 2x$	y ₃ = 0.5x
type of function	Direct	Direct	Direct
R.O.C. (a)	1	2	0.5
Initial value (b)	0	0	0
Description of line	Centered in 1 st and	Steeper than $y_{1.}$	Less steep than $y_{1.}$
	3 rd quadrants.	Increases faster.	Increases slower.
	Increasing line.	Bigger angle of	Smaller angle of
		inclination.	inclination.
В	y ₄ = -x	$Y_5 = -2x$	y ₆ = -0.5x
type of function	Direct	Direct	Direct
R.O.C. (a)	- 1	- 2	- 0.5
Initial value (b)	0	0	0
Description of line	Centered in 2 nd and	Steeper than y _{1.}	Less steep than y _{1.}
	4 th quadrants.	decreases faster	decreases slower.
	Reflection of $y = x$.	Bigger angle of	Smaller angle of
	Decreasing line.	inclination.	inclination.
С	y ₁ = x	y ₇ = x + 2	$y_8 = x - 4$
C type of function	$y_1 = x$ Direct	$y_7 = x + 2$ Partial	$y_8 = x - 4$ Partial
C type of function R.O.C. (a)	y ₁ = x Direct 1	$y_7 = x + 2$ Partial 1	$y_8 = x - 4$ Partial 1
C type of function R.O.C. (a) Initial value (b)	y ₁ = x Direct 1 0	y ₇ = x + 2 Partial 1 2	$y_8 = x - 4$ Partial 1 - 4
C type of function R.O.C. (a) Initial value (b) Description of	$y_1 = x$ Direct 1 0 Centered in 1 st and	$y_7 = x + 2$ Partial 1 2 Parallel to y ₁	$y_8 = x - 4$ Partial 1 - 4 Parallel to y ₁
C type of function R.O.C. (a) Initial value (b) Description of	$y_1 = x$ Direct 1 0 Centered in 1 st and 3 rd quadrants.	y7 = x + 2Partial12Parallel to y1Translated (shifted)	$y_8 = x - 4$ Partial 1 -4 Parallel to y ₁ Translated (shifted)
C type of function R.O.C. (a) Initial value (b) Description of line	$y_1 = x$ Direct 1 0 Centered in 1 st and 3 rd quadrants. Increasing line.	$y_7 = x + 2$ Partial 1 2 Parallel to y ₁ Translated (shifted) up 2 units	$y_8 = x - 4$ Partial 1 -4 Parallel to y ₁ Translated (shifted) down 4 units
C type of function R.O.C. (a) Initial value (b) Description of line D	$y_1 = x$ Direct 1 0 Centered in 1 st and 3 rd quadrants. Increasing line. $y_9 = 3x + 2$	$y_7 = x + 2$ Partial 1 2 Parallel to y ₁ Translated (shifted) up 2 units $y_{10} = 0.5x - 4$	$y_8 = x - 4$ Partial 1 -4 Parallel to y ₁ Translated (shifted) down 4 units $y_{11} = -2x + 6$
C type of function R.O.C. (a) Initial value (b) Description of line D type of function	$y_1 = x$ Direct 1 0 Centered in 1 st and 3 rd quadrants. Increasing line. $y_9 = 3x + 2$ Partial	$y_7 = x + 2$ Partial 1 2 Parallel to y ₁ Translated (shifted) up 2 units $y_{10} = 0.5x - 4$ Partial	$y_8 = x - 4$ Partial 1 -4 Parallel to y ₁ Translated (shifted) down 4 units $y_{11} = -2x + 6$ Partial
C type of function R.O.C. (a) Initial value (b) Description of line D type of function R.O.C. (a)	$y_1 = x$ Direct 1 0 Centered in 1 st and 3 rd quadrants. Increasing line. $y_9 = 3x + 2$ Partial 3	$y_7 = x + 2$ Partial 1 2 Parallel to y ₁ Translated (shifted) up 2 units $y_{10} = 0.5x - 4$ Partial 0.5	$y_8 = x - 4$ Partial 1 -4 Parallel to y ₁ Translated (shifted) down 4 units $y_{11} = -2x + 6$ Partial -2
C type of function R.O.C. (a) Initial value (b) Description of line D type of function R.O.C. (a) Initial value (b)	$y_1 = x$ Direct 1 0 Centered in 1 st and 3 rd quadrants. Increasing line. $y_9 = 3x + 2$ Partial 3 2	$y_7 = x + 2$ Partial Partial 1 2 Parallel to y ₁ Translated (shifted) up 2 units $y_{10} = 0.5x - 4$ Partial 0.5 - 4	$y_8 = x - 4$ Partial 1 -4 Parallel to y1 Translated (shifted) down 4 units $y_{11} = -2x + 6$ Partial -2 6
C type of function R.O.C. (a) Initial value (b) Description of line D type of function R.O.C. (a) Initial value (b) Description of	$y_1 = x$ Direct 1 0 Centered in 1 st and 3 rd quadrants. Increasing line. $y_9 = 3x + 2$ Partial 3 2 3 times steeper than	$y_7 = x + 2$ Partial Partial 1 2 Parallel to y ₁ Translated (shifted) up 2 units $y_{10} = 0.5x - 4$ Partial 0.5 -4 Half as steeper as y ₁	$y_8 = x - 4$ Partial Partial Parallel to y1 Parallel to y1 Translated (shifted) down 4 units $y_{11} = -2x + 6$ Partial -2 6 2 times steeper than
C type of function R.O.C. (a) Initial value (b) Description of line D type of function R.O.C. (a) Initial value (b) Description of line	$y_{1} = x$ Direct 1 0 Centered in 1 st and 3 rd quadrants. Increasing line. $y_{9} = 3x + 2$ Partial 3 2 3 times steeper than y_{1}	$y_7 = x + 2$ Partial Partial 1 2 Parallel to y1 Translated (shifted) up 2 units $y_{10} = 0.5x - 4$ Partial 0.5 -4 Half as steeper as y1 Shifted down 4 units	$y_8 = x - 4$ Partial Partial 1 -4 Parallel to y_1 Translated (shifted) down 4 units $y_{11} = -2x + 6$ Partial -2 6 2 times steeper than y_1 and reflected

Conclusions: For every line y = ax + b (the parameters are a and b affect the look of the line)

a : affects the angle of inclination (steepness of line)

b : affects the vertical translation of the line

