Slope-Intercept Form: y = mx + b

y = mx + b. b is the y-intercept, the value when x is 0, the starting point on the y-axis. m is the slope, rise over run, the steepness and direction. Read them, graph from them, read them off a graph.

Name _____ Date _____

Words we use say the math word, then the plain English

WORD	PLAIN ENGLISH	WHAT YOU DO
Slope-intercept form	y = mx + b, the form that shows the slope and the y-intercept.	Read m and b straight off it. Graph from it: plot b, step by m.
y-intercept (b)	Where the line crosses the y-axis: the value of y when x is 0. The starting value.	Plot it first, at (0, b).
Slope (m)	The steepness and direction: rise over run, how much y changes for each step of x.	Step from the y-intercept: rise up or down, run to the right.
Starting value	Another name for b in a story: what you have when x = 0.	Read it off the y-axis.
Invisible 1	y = x + 3 means y = 1x + 3, and y = –x means y = (–1)x.	m = 1 or –1.
Flat line	y = b with m = 0: no x term. Every point has the same y.	Plot b and step right with no rise.

Part A Read m and b

Which number is on the x? Which stands alone? Watch the careful cases. Row 1 is done for you.

EQUATION	M	B	CAREFUL BECAUSE
y = 5x + 1	5	1	the plain case
y = x – 4			
y = –3x			
y = 6			
y = 2 + 4x			
y = –2/5 x + 3			

Part B Why b is on the y-axis

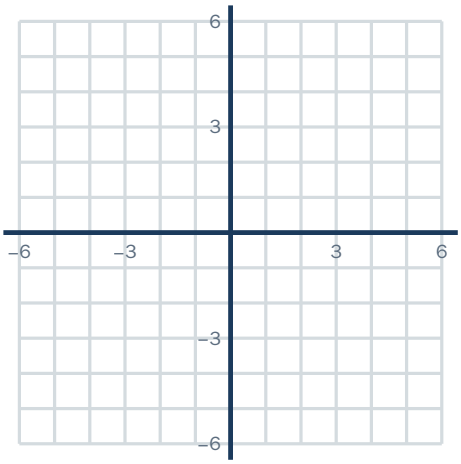
1. Put x = 0 into y = 3x + 4. What is y? Why does that mean (0, 4) is on the line?

2. Finish the sentence: the y-axis is the line where x = ____, so every line y = mx + b crosses it at the point (____, ____).

Part C Graph from the equation

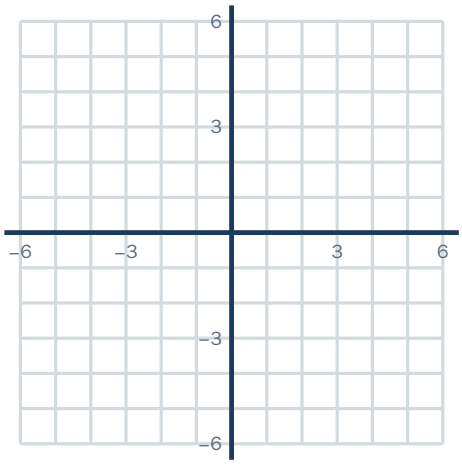
Plot b first, step by m twice, draw the line. Write the three dots you used.

1. y = 2x + 1



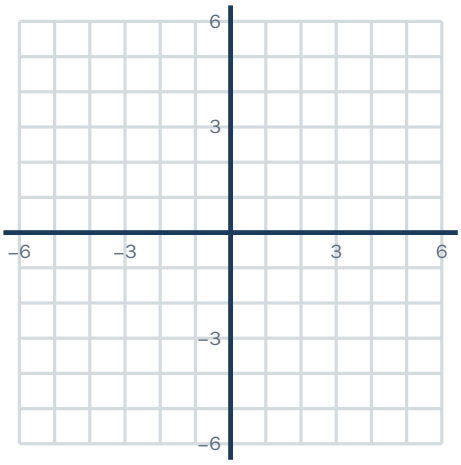
dots: _____

2. y = –x + 3



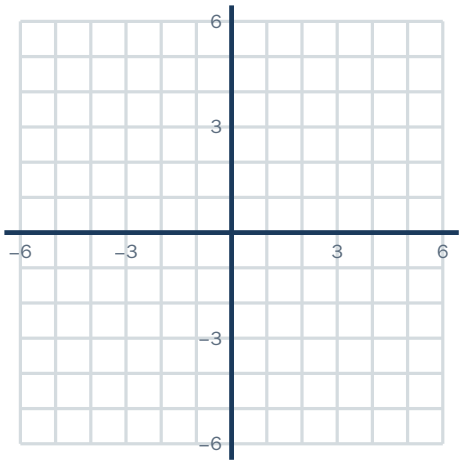
dots: _____

3. y = 1/2 x – 2



dots: _____

4. y = –2



dots: _____

Part D Read the equation off a graph

Each line is described by where it crosses the y-axis and one more point. Find b and m, then write y = mx + b.

1. Crosses at (0, 2), passes through (1, 5).

2. Crosses at (0, –3), passes through (2, –1).

3. Crosses at (0, 4), passes through (3, 2).

4. Crosses at (0, 0), passes through (4, 2).

Part E Match by elimination

y = –3x + 1. Graph A climbs and crosses at 1. Graph B falls steeply and crosses at 1. Graph C falls gently and crosses at 1. Graph D falls steeply and crosses at –1. Which fits? Write the rule that ruled out each of the others. Do not plug in points.

Part E2 In your own words

1. What are the two jobs of m and b? Say both.

2. How do you know y = 7 is a flat line?

Part F Exit ticket

1. y = –2x + 5: m and b, and what each does.

2. Three dots for y = 1/3 x + 2.

Answer key

Part A. y = x – 4: m 1, b –4 (invisible 1, negative b). y = –3x: m –3, b 0. y = 6: m 0, b 6 (no x, flat). y = 2 + 4x: m 4, b 2 (terms traded places). y = –2/5 x + 3: m –2/5, b 3.

Part B. 1. y = 3(0) + 4 = 4, so (0, 4) is on the line. 2. x = 0; (0, b).

Part C. 1. (0, 1), (1, 3), (2, 5). 2. (0, 3), (1, 2), (2, 1). 3. (0, –2), (2, –1), (4, 0). 4. (0, –2), (1, –2), (2, –2), flat.

Part D. 1. b 2, m 3, y = 3x + 2. 2. b –3, m 1, y = x – 3. 3. b 4, m –2/3, y = –2/3 x + 4. 4. b 0, m 1/2, y = 1/2 x.

Part E. B. A climbs but m is negative; C is gentle but the size of m is 3; D crosses at –1 but b is 1.

Part E2. 1. b: starting point on the y-axis, value when x = 0. m: steepness and direction, rise over run. 2. No x term, so m = 0: y never changes.

Part F. 1. m –2 (down 2 per step, falling), b 5 (crosses at (0, 5)). 2. (0, 2), (3, 3), (6, 4).