Unit 7: Lesson 01

Writing the equation of a line given the slope and one other piece of information

In this unit we will write the equations of lines. Just as drawing a line is possible with a minimum of two points specified, to write its equation requires **at least two pieces of information**:

In this lesson, one piece of information will be the **slope** of the line. The second piece of information could be any of the following:

- a point
- a y-intercept
- an x-intercept (also called a root)

In the following examples, use the two given pieces of information about a line to find the equation of the line in **slope-intercept form** (y = mx + b).

Example 1: slope = 3; passes through the point (-8, 5)

$m = 3$

$y = mx + b$

$y = 3x + b$ sub in (-8, 5)

$5 = 3 \cdot (-8) + b$

$5 + 24 = b$

$29 = b$

$y = mx + b$

$y = 3x + 29$

Example 2: m = -7; y-intercept = 4

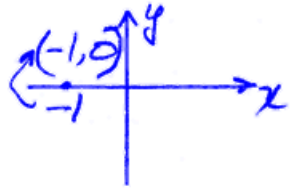
$m = -7 \quad b = 4$

$y = mx + b$

$y = -7x + 4$

Example 3: slope = 2; x-intercept = -1

$m = 2$



so x-intc = -1 really gives us the point (-1,0)

$y = mx + b$

$y = 2x + b$ (-1,0)

$0 = 2(-1) + b$

$2 = b$

$y = mx + b$

$y = 2x + 2$

Assignment: In the following problems, use the two given pieces of information about a line to find the equation of the line in **slope-intercept form** (y = mx + b).

1. slope = -3; passes through the points (5, 6)	2. slope = 5; y-intercept = 11
3. slope = 1; (7, 1) is on the line	4. slope = 1/3; x-intercept = -8
5. m = 10; the y-intercept is at the origin	6. slope = 4; (4, -3) is on the line

7. The line rises 3 for every 4 it runs and passes through the y-axis at -6.	8. The rate of change of *y* along a line with as x changes is 4/5. The line passes through (4, 1).
9. The line is horizontal and passes through (-2, -6).	10. Moving along a line results in it changing horizontally to the right 8 units for every 3 units it changes vertically upward. The line passes through (5, -7).
11. m = 4; x-intercept = 5	12. The ratio of rise to run is 11 and the line pass through (4, 5).

13. m = 1/8; passes through the origin

14. m = 6; b = 22

15. slope = -3/2; passes through the x-axis at x = 12

16. The line is horizontal and crosses the y-axis at y = 4.