HOMEWORK 1: SOLUTIONS - MATH 111
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Problem 1 *Sketch the graph of $y = \frac{1}{2}x - 2$.*

    Solution:

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Problem 2 *Find the x- and y-intercepts of the graph in 1.*

    Solution:
    For the x-intercept, set $y = 0$. Then $\frac{1}{2}x - 2 = 0$, whence $x = 4$.
    For the y-intercept, set $x = 0$. Then $y = -2$.   ■

Problem 3 *Sketch the graph of $y = -2x - 5$.*

    Solution:

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Problem 4 *Find the x- and y-intercepts of the graph in 3.*

    Solution:
    For the x-intercept, set $y = 0$. Then $-2x - 5 = 0$, whence $x = -\frac{5}{2}$.
    For the y-intercept, set $x = 0$. Then $y = -5$.   ■

Problem 5 *Find the slope of the line passing through the points* $(-2, 3)$ *and* $(2, -9)$.

Solution:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-9 - 3}{2 - (-2)} = -\frac{12}{4} = -3.$$

■

Problem 6 *Find the equation of the line having slope* $m = \frac{1}{3}$ *and y-intercept* $b = -2$.

Solution:
Use the slope intercept form $y = mx + b$. Since the slope $m = \frac{1}{3}$ and the y-intercept is $b = -2$, we have $y = \frac{1}{3}x - 2$. ■

Problem 7 *Find the equation of the line that is parallel to* $y = -\frac{1}{3}x + 5$ *and goes through the point* $(2, 5)$.

Solution:
The slopes of the two lines will have to be the same since they are parallel. Thus the slope of the line we are looking for is $m = -\frac{1}{3}$. Now since we also have the point $(a, b) = (2, 5)$ on that line we may use the point-slope form $y - b = m(x - a)$. We get $y - 5 = -\frac{1}{3}(x - 2)$ or $y - 5 = -\frac{1}{3}x + \frac{2}{3}$, i.e., $y = -\frac{1}{3}x + \frac{17}{3}$. ■

Problem 8 *Find the equation of the line that has slope* $m = -\frac{1}{4}$ *and goes through the point* $(-4, 3)$.

Solution:
Working in the same way as in 7, with $m = -\frac{1}{4}$ and $(a, b) = (-4, 3)$, we get $y - 3 = -\frac{1}{4}(x + 4)$ or $y = -\frac{1}{4}x + 2$. ■