This is the homework for the Linear Functions modules. You should write up your solutions according to the guidelines for written homework and submit it in class before July 17, 2016.

1. Each of the following describes a line. Find the slope-intercept form of the line with each of the following properties:

   (a) The line has slope 3 and passes through the point $(-2, 4)$.

   (b) The line passes through the points $(5, 2)$ and $(-3, 4)$.

   (a) Using the point-slope form of the line, $y = m(x - x_0) + y_0$ with $m = 3$ and the point $(-2, 4)$, we get

   $$y = 3(x - (-2)) + 4 = 3(x + 2) + 4 = 3x + 6 + 4$$

   so the slope-intercept form of the line is $y = 3x + 10$.

   (b) First, find the slope through the points $(5, 2)$ and $(-3, 4)$.

   $$m = \frac{2 - 4}{5 - (-3)} = \frac{-2}{8} = -\frac{1}{4}$$

   Then using the point-slope form of the line with the first point,

   $$y = -\frac{1}{4}(x - 5) + 2 = -\frac{x}{4} + \frac{5}{4} + 2$$

   so the slope-intercept form of the line is
   $$y = -\frac{x}{4} + \frac{13}{4}$$

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2. The cost C, in dollars, of renting a moving truck for a day is modeled by the function $C(x) = 0.25x + 35$, where x is the number of miles driven.

   (a) What is the cost if you drive $x = 40$ miles?

   (b) If the cost of renting the moving truck is \$80, how many miles did you drive?

   (c) Suppose that you want the cost to be no more than \$100. What is the maximum number of miles that you can drive?

   (d) What is the the implied domain of C?

   (a) Since $C(40) = 0.25(40) + 35 = 45$, the cost is \$45.

   (b) Solve $C(x) = 80$,
   $$0.25x + 35 = 80$$
   $$0.25x = 45$$
   $$x = \frac{45}{0.25} = 180$$

   so 180 miles were driven.

(c) In this case, we solve $C(x) < 100$

$$0.25x + 35 < 100$$
$$0.25x < 65$$
$$x < \frac{65}{0.25} = 260$$

So to keep the cost under \$100, you must drive less than 260 miles.

(d) The values of x that make sense for this problem is only positive miles can be driven, so the domain is $(0, \infty)$.

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3. Plot each of the lines on the following axes. You should use knowledge of the y-intercept and the slope for this. Do not just plot points. Label each line (a)-(d).

(a) $y = 2x - 3$

(b) $y = -\frac{2}{3}x + 4$

(c) $y = 4$

(d) $x = -1$

Need a solution for this.