1. If the point \((1, 3)\) is on the graph of \(y = f(x)\), what point MUST be on the graph of \(y = 2f(x - 2)\)?

2. Suppose the graph of \(f\) is given below. On the same axes, sketch a graph of \(y = f(x + 1) - 3\).

3. Suppose a rectangle in the first quadrant has one corner on the graph \(y = -7x + 10\), another at the origin, a third on the positive \(y\)-axis and a fourth on the positive \(x\)-axis. Express the area \(A\) as a function of \(x\).

4. What is the domain of the function \(A\) computed above?

5. Are you keeping up with homework assignments, working on lessons as soon as the lecture is covered?
   
   Yes. No.
Solutions

1. Note that the new graph is constructed by shifting right 2 units, then vertically stretching by a factor of 2. We just have to chase the point \((1, 3)\) through this sequence of transformations.

\[(1, 3) \rightarrow (3, 3) \rightarrow (3, 6).
\]

In other words, the point \((3, 6)\) must be on the graph.

2. Notice that the new graph can be constructed by shifting left 1 unit, then shifting down 3 units. We show the graph in red below. [Hint: If you cannot shift the whole graph at once, shift key points such as the endpoints and corners.]

3. The area of the rectangle is \(A = xy\). Note that from the description, we see that \(y = -7x + 10\). It follows that the area \(A\) as a function of \(x\) is given by

\[A(x) = x(-7x + 10) = -7x^2 + 10x.
\]

4. We see that \(x\) gives us the width of the base of the rectangle. Thus we must have \(x > 0\). Furthermore, the far corner must lie in the first quadrant on the line \(y = -7x + 10\). It follows that we must have \(-7x + 10 > 0\). We solve and get \(x < \frac{10}{7}\). Putting it together we get

\[\text{dom}(A) = \left(0, \frac{10}{7}\right)
\]

in interval notation.

5. NA