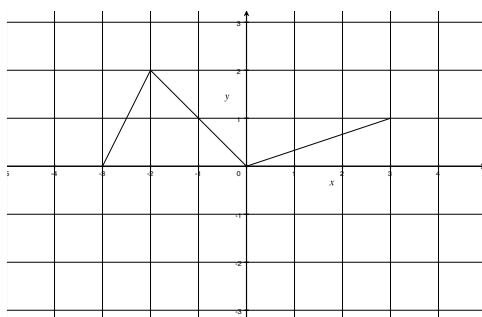# MATH 150: QUIZ 6 (2.5–2.6)

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?
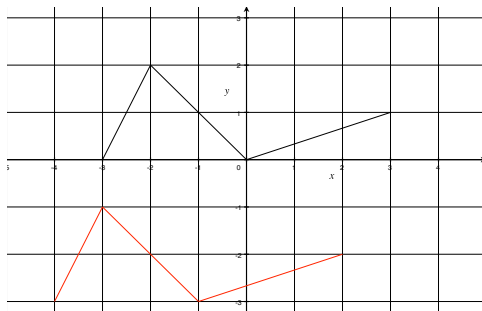
<div align="center">Yes.   No.</div>

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.
$$(1, 3) \to (3, 3) \to (3, 6).$$
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
$$\mathrm{dom}(A) = \left(0, \frac{10}{7}\right)$$
in interval notation.

5. NA