6. [8 points] Derivative Girl lifts a bucket of water at a constant velocity from the ground up to a platform 50 meters above the ground. The bucket and water start at a total mass of 20 kg, but while it is being lifted, a total of 3 kg of water drips out at a steady rate through a hole in the bottom of the bucket.

For this problem, you may assume that acceleration due to gravity is $g = 9.8 \text{ m/s}^2$.

a. [2 points] Give an expression giving the mass of the bucket and water when the bucket is $h$ meters above ground. Include units.

**Answer:** Mass of water = ______________

b. [3 points] Suppose $\Delta h$ is small. Write an expression (not involving integrals) that approximates the work required to lift the bucket from a height of $h$ meters above the ground to a height of $h + \Delta h$ meters above the ground. Include units.

**Answer:** Work $\approx$ ______________

c. [3 points] Write, but do not evaluate, an integral that gives the work required to lift the bucket from the ground to the platform. Include units.

**Answer:** ______________