9. [10 points] Tracy Johnson is taking the trash out of her apartment on State Street. In order to throw the trash bag into the dumpster, she lifts the bag at a constant speed from the ground up to a height of 2 meters. The bag of trash weighs 5 kg initially, but an unfortunate hole causes the bag to leak trash at a constant rate. Recall that the gravitational constant is $g = 9.8 \text{ m/s}^2$.

If the bag weighs 3 kg when it is one meter from the ground, compute the work required for Tracy to lift the bag of trash into the dumpster. Evaluate by hand any integrals you compute.