READING ASSIGNMENT 06

§6.5 (Work and Energy)

NAME: SOLUTIONS

Due 9 July 2018

LEARNING OBJECTIVES

By the end of this lesson, you will be able to:

- Setup and evaluate integrals to compute work done against gravity.
- Estimate work done against gravity using a Riemann sum.

REVIEW

- Again, similar triangles and basic geometry. You may also wish to review the chapter of your physics class that introduced work.

READING

- Read section 6.5 (Work and Energy)

QUESTIONS

(1) Why is an integral needed to compute the work performed in building a tank, but not to compute the work performed in lifting up the (full) tank?

SOLUTION: To lift a tank through a vertical distance d, the force needed to move the tank remains constant; hence, no integral is needed to calculate the work done in lifting the tank. On the other hand, pumping water from a tank requires that different layers of the water be lifted through different distances, and, depending on the shape of the tank, may require different forces. Thus, pumping water from a tank requires that an integral be evaluated.

(2) What does it mean when the integral used to compute work gives a negative answer?

SOLUTION: When the integral used to calculate work gives a negative answer, this means that the force being applied to the object acts in the opposite direction to the motion of the object; for example, to slow an object down.