

Classroom Voting Questions: Calculus II

Section 8.5 Applications to Physics

1. **True or False** It takes more work to lift a 20-lb weight 10 feet slowly than to lift it the same distance quickly.
 - (a) True, and I am very confident
 - (b) True, but I am not very confident
 - (c) False, but I am not very confident
 - (d) False, and I am very confident

2. A constant force of 5.2 lb pushes on an object, moving the object through a distance of 3 feet. Is an integral needed to determine how much work is done?
 - (a) Yes - integral is needed
 - (b) No - just need to multiply force by distance

3. A 3-lb book is lifted 5 feet off the floor. Is an integral needed to determine how much work is done?
 - (a) Yes - integral is needed
 - (b) No - just need to multiply force by distance

4. I'm carrying my garden hose around my yard, laying down hose to set up a path for a traveling sprinkler. Is an integral needed to determine how much work is done?
 - (a) Yes - integral is needed
 - (b) No - just need to multiply force by distance

5. The average value of the force, $F(x)$, exerted on an object while moving the object over the interval $1 \leq x \leq 4$ is 7 N. Is an integral needed to determine how much work is done?
 - (a) Yes - integral is needed
 - (b) No - just need to multiply force by distance

6. I'm pushing a shopping cart around the grocery store, filling it with my groceries. Is an integral needed to determine how much work is done on the shopping cart?
- (a) Yes - integral is needed
 - (b) No just need to multiply force by distance
7. My boat is floating 20 feet offshore, and I use a rope to pull it in to the beach. I pull on the rope with a constant force, but the boat moves faster and faster as it gets closer to the beach so its distance from the shore is given by the function $d(t) = 20 - 3t^2$, where t is in seconds. Is an integral needed to determine how much work is done on the boat? (ignore the weight of the rope)
- (a) Yes - integral is needed
 - (b) No just need to multiply force by distance
8. You are lifting a 15 kg bucket 3 meters up from the ground to the second floor of a building. The bucket is held by a heavy chain that has a mass of 2 kg per meter, so the farther up you lift it, the easier it becomes, because there is less chain out. Recall that the force of gravity (in Newtons) is equal to mass (in kg) times g (in m/s^2), and assume that $g \approx 10 \text{ m/s}^2$. How much work does it take to raise the bucket?
- (a) 45 Joules
 - (b) 90 Joules
 - (c) 450 Joules
 - (d) 540 Joules
 - (e) 630 Joules
 - (f) None of the above