

Applications of Derivatives Study Group Activity

(Groups of 3 or 4 people)

Purpose of activity: Gain a deeper understanding of applications of derivatives by solving a problem on your own and then teaching it to your peers.

Due Date: Monday October 1st.

Individual Portion: Everybody in the group should choose ONE of the problems below. Solve your problem on your own before you meet with your group.

1. The position function of a particle is given by $s(t) = t^3 - 4.5t^2 - 7t$ for $t \geq 0$. Here s is given in meters and t in seconds. When does the particle reach a velocity of 5 meters per second.
2. If a ball is thrown vertically upward with a velocity of 80 feet per second, then its height after t seconds is given by $s(t) = 80t - 16t^2$. What is the velocity of the ball when it is 96 feet above the ground on its way down?
3. A stone is dropped into a lake, creating a circular ripple that travels outward at a speed of 60 centimeters per second. Find the rate at which the area within the circle is increasing after 3 seconds.
4. A spherical balloon is being inflated. Find the rate of increase of the surface area with respect to radius when the radius is 3 feet.

Group Portion: Take turns teaching your problem to the rest of the group. Use a whiteboard to clearly show each step to your groupmates. Record your teaching using a phone or camera.

Assessment: Upload your video to Blackboard.