

Math 131 - Homework 3

October 6, 2021

Name _____

Score _____

The following problems are from the suggested homework. Show all work to receive full credit. Supply explanations when necessary. This assignment is due October 13.

1. (3 points) A potato is launched vertically upward with an initial velocity of 100 ft/s from a potato gun at the top of an 85-foot-tall building. The distance in feet that the potato travels from the ground after t seconds is given by $s(t) = -16t^2 + 100t + 85$.

(a) Determine the speed of the potato at 0.5 s.

(b) Determine when the potato reaches its maximum height.

(c) Determine the velocity of the potato as it hits the ground.

2. (2 points) Find the x -coordinates of the points at which the line tangent to the graph of $y = \left(x - \frac{6}{x}\right)^8$ is horizontal.

Turn over.

3. (1 point) A mass hanging from a vertical spring is in simple harmonic motion as given by the following position function, where t is measured in seconds and s is in inches:

$$s(t) = -3 \cos\left(\pi t + \frac{\pi}{4}\right).$$

Find the velocity of the mass at $t = 1.5$ s.

4. (3 points) The graph of the equation $2x^3 + 2y^3 - 9xy = 0$ is called a *folium of Descartes*. Find an equation of the line tangent to the graph at the point $(2, 1)$.

5. (1 point) Find $\frac{dy}{dx}$ if $y = \sin(\cos 7x)$.