

Prepa Tec
Calculus I 3rd partial
Quiz # 1B

Name Pegina Solorio Méndez Mat. A01570106

I. Determine if true or false for each of the following statements (10 points each)

1. F The third derivative of $y = 4e^{3x}$ is $\frac{d^3y}{dx^3} = 36e^{3x}$

2. F The derivative of $4x^2y - 8x = 6y^2 + 5$ is $\frac{dy}{dx} = \frac{2}{2x-3y}$

3. T The derivative of $y = x^{3x+1}$ is $y' = x^{3x}(3x \ln x + 3x + 1)$

4. F The area of a circle is decreasing at a rate of 40 cm^2 per hour. Then the rate at which its radius is changing when its radius measures 30 cm is $\frac{dr}{dt} = \frac{2}{3\pi} \left[\frac{\text{cm}}{\text{hour}} \right]$

II. Answer the following problem. (10 points each letter)

A baseball is thrown upward while being in the moon (hypothetically), with an initial velocity of 80 meters/second . The height of the ball is given by $s = 80t - 8t^2$ → velocity

a) The equation that gives the velocity of the ball at any time.

$$v = 80 - 16t //$$

b) The time when velocity is zero (that is the time to reach the maximum height)

$$v = 80 - 16t \quad t = \frac{-80}{-16}$$

$$0 - 80 = -16t$$

$$t = 5 \text{ s} //$$

c) The maximum height of the ball (that is when velocity is zero)

$$s = 80t - 8t^2$$

$$s = 80(5) - 8(5)^2$$

$$s = 200 \text{ m} //$$

d) The times (on the way up and on the way down) when the height is at 128 feet .

$$s = 80t - 8t^2 - 128$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$t = \frac{-80 \pm \sqrt{(80)^2 - 4(-8)(-128)}}{2(-8)} \rightarrow -16$$

$$t_1 = 2 \text{ s} //$$

$$t_2 = 8 \text{ s} //$$

e) The velocities of the ball when the height is 128 feet .

$$v = 80 - 16t$$

$$v_1 = 48 \text{ m/s} //$$

$$v_1 = 80 - 16(2) \quad v_2 = 80 - 16(8)$$

$$v_2 = -48 \text{ m/s} //$$

f) The equation that gives the acceleration of the ball at any time.

$$v = 80 - 16t //$$

$$a = -16 \text{ m/s}^2 //$$