Quiz #6

Directions: Carefully read each question below and answer to the best of your ability in the space provided. Your answer to problem # 2 should be written in a clear and concise manner.
You **MUST** show your work to receive full credit!

1. (1 point) A population of protozoa develops with a constant relative growth rate of 0.7944 per member per day. On day zero the population consists of two members. Find the population size after six days. **Round to the nearest integer.**

   A. 235

   B. 8

   C. 54

   D. 116,797

   E. 27

2. (2 points) If a rock is thrown vertically upward from the surface of Mars with velocity 15 m/s, its height after t seconds is $h(t) = 15t - 1.86t^2$.

   (a) What is the velocity of the rock after 2 second?

   Solution: Take the derivative of $h(t)$ and then evaluate it at 2 second. That is

   $$v(2) = h'(t)\Big|_{t=2} = 15 - 3.72t\Big|_{t=2} = 15 - 3.72 \cdot 2 = \boxed{7.56 \text{ m/s}}$$

   (b) What is the velocity of the rock when its height is 25 m on its way up? On its way down?

   Solution: First find times when the rock at the height 25 m, that is

   $$15t - 1.86t^2 = 25 \quad i.e. \quad 15t - 1.86t^2 - 25 = 0$$

   and

   $$t_1 \approx 2.353 \text{ s} \quad \text{and} \quad t_2 \approx 5.711 \text{ s}.$$

   Now, evaluate $v(t)$ at t_1 and t_2, so

   $$v(t_1) = 15 - 3.72t\Big|_{t=2.353} \approx \boxed{6.24 \text{ m/s}}$$
   $$v(t_2) = 15 - 3.72t\Big|_{t=5.711} \approx \boxed{-6.24 \text{ m/s}}.$$

Name: _____

Question:	1	2	Total
Points:	1	2	3
Score:			