

## Quiz #6

**Directions:** Carefully read each question below and answer to the best of your ability in the space provided. You **MUST** show your work to receive full credit! Your answer to problem # 2 should be written in a clear and concise manner using a combination of complete sentences and symbolic expressions. An answer without explanation or that is poorly presented may not 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. 8  
B. 27  
C. 54  
**D. 235**  
E. 116,797

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

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

Name: \_\_\_\_\_

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