

6. [11 points] The following problem parts are not related.

- a. [2 points] A ball is thrown up in the air from a platform and its height in meters above the ground is

$$H(t) = -4.9(t - 0.9)^2 + 4.5,$$

where t is measured in seconds. What is the greatest height above the ground the ball reaches? And when does it reach that height?

Greatest height: _____ meters

Time: _____ seconds

- b. [4 points] Write a formula for a population of bacteria $P(t)$ that starts with a population of 10^5 and grows by 30% every day. The variable t is measured in days after the experiment starts.

$$P(t) = \underline{\hspace{2cm}}$$

If $E(p)$ is the rate at which energy is given off, measured in joules/second, by p bacteria of this kind, what is the meaning of the following equation?

$$E(P(2)) = 0.3$$

Meaning:

- c. [5 points] A table of some values of the function $h(r)$ is given below:

r	-2	0	2	4
$h(r)$	-3	-1	10	5

Let $g(r) = h(r - 1) + 3$.

To obtain the graph of $g(r)$, one must shift the graph of $h(r)$...

- ...vertically (CIRCLE ONE) UP DOWN by _____
- ...horizontally (CIRCLE ONE) LEFT RIGHT by _____

From the given information, we can deduce the coordinates of several points on the graph of $g(r)$. Give the coordinates of two such points:

_____ and _____