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: **4.5** meters Time: **0.9** 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.

$P(t) =$ $10^5 \cdot 1.3^t$

If $E(p)$ is the rate at which is 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: Two days after the experiment starts, the bacteria population is giving off 0.3 joules / second.

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 **3**
- ...horizontally (CIRCLE ONE) LEFT [RIGHT] by **1**

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:

Solution: We can take any of the points give in the table and translate their r-coordinate to the right 1 and their corresponding output up by 3. Two examples are given below:

$(1, 2)$ and $(3, 13)$