1. The table below shows the growth of bacteria for a 5-day period. Write the equation of the line that models the situation.

<table>
<thead>
<tr>
<th>Day</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm²</td>
<td>1.99</td>
<td>2.3</td>
<td>2.63</td>
<td>3.05</td>
<td>3.5</td>
<td>4.03</td>
</tr>
</tbody>
</table>

2. Write the equation of each graph. Hint: Use the form $Q = Q_0 a^t$.

a)

b)
Write an exponential equation, then solve. Hint: Use the form $Q = Q_o a^t$, $Q = Q_o e^{kt}$, or $Q = Q_o s^{\frac{1}{p}}$.

3. The population in 2000 is 50,000. If there is an annual growth of 3%, then in how many years will the population be 75,000?

4. The size of a fungus doubles every 13 days. If after 2 days the fungus is 3 mm², then what is the size after 30 days?
5. Strontium-90 is a radioactive substance whose half-life is 29 years. What percent remains 40 years after being exposed to it?

6. After 10 years, 70% of a substance remains. What is its half-life?
7. Bacteria, \( B \), grows according to the equation \( \frac{dB}{dt} = kB \). Suppose the bacteria doubles every 5 days.

a) Then the value of \( k \) is

(A) 0.072  (B) 0.139  (C) 0.693  (D) 1.733  (E) 3.466

b) Find the annual growth rate.

(A) 8.334\%  (B) 9.869\%  (C) 14.869\%  (D) 71.530\%  (E) 73.509\%
8. The population of a certain city increases at a rate proportional to the current population. If the population doubles in 30 years, then in how many years will the population triple?

(A) \( \frac{2 \ln 3}{\ln 2} \)  (B) \( \frac{30 \ln 3}{\ln 2} \)  (C) \( 30 \ln \left( \frac{3}{2} \right) \)  (D) \( \ln \left( \frac{3^{30}}{2} \right) \)  (E) \( \ln \left( \frac{30^{3}}{2} \right) \)

9. During a certain epidemic, the number of people that are infected at any time increases at a rate proportional to the number of people that are infected at that time. If 1,000 people are infected when the epidemic is first discovered, and 1,200 are infected 7 days later, how many people are infected 12 days after the epidemic is first discovered?

(A) 343  (B) 1,343  (C) 1,367  (D) 1,400  (E) 2,057
10. The number of bacteria in a culture is growing at a rate of $3,000e^{2t/5}$ per unit of time $t$. At $t = 0$, the number of bacteria present was 7,500. Find the number present at $t = 5$.

(A) $1,200e^2$  (B) $3,000e^2$  (C) $7,500e^2$  (D) $7,500e^5$  (E) $\frac{15,000}{7}e^7$