

Question 5

A scientist is growing a bacteria culture in a lab. The population of bacteria at time t hours is given by the function:

$$P(t) = 1200e^{0.55t}$$

- (a) What is the population after 4 hours?
- (b) After how many hours will the population reach 10,000?
- (c) By what percentage does the population increase each hour?

Round all answers to two decimal places.

Question 5 - Solution

Use the exact exponential model and keep full precision until the final rounding.

(a)

$$P(4) = 1200e^{2.2}$$

10830.02 bacteria

(b)

$$t = \ln(10000/1200)/0.55$$

3.86 hours

(c)

$$100(P(t+1)/P(t) - 1) = 100(e^{0.55} - 1)$$

73.33 %
