

Question 1

The population of a bacterial culture is modeled by the function

$$P(t) = 500e^{0.3t}$$

where t is measured in hours.

- (a) What is the population after 5 hours?
- (b) After how many hours will the population reach 3000?
- (c) By what factor does the population grow every 4 hours?

Round your answers to two decimal places.

Question 1 - Solution

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

(a)

$$P(5) = 500e^{1.5}$$

2240.84 bacteria

(b)

$$500e^{0.3t} = 3000 \implies t = \ln(6)/0.3$$

5.97 hours

(c)

$$P(t+4)/P(t) = e^{1.2}$$

3.32 growth factor
