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Civil Engineering

$$\frac{dy}{dt} = ky$$

$$y = y_0 e^{kt}$$

when $t = 9$ hours

$$y = 3y_0$$

$$3 = e^{k \times 9}$$

$$\ln 3 = 9k$$

$$k = \frac{\ln 3}{9}$$

$$k = 0.1221$$

$$y = y_0 e^{kt}$$

Substituting

$$y = 50 \times e^{0.1221 \times 9}$$

$$y = 150.04$$

$$t = \frac{1}{4} \text{ days} = 30 \text{ hrs.}$$

$$y = 50 e^{0.1221 \times 30}$$

$$y = 1948.9$$

In $\frac{1}{4}$ days there will be 1948.9 bacteria