

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

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$$\frac{1}{y} = ky/dy$$

$$\int dt = \frac{1}{k} \int dy/y$$

$$t + C = \frac{1}{k} \ln y$$

$$kt + C = \ln y$$

Dividing through by ln

$$e^{kt+C} = y$$

$$e^{kt} \cdot e^C = y$$

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

$$y(t) = C e^{kt}$$

When $t = 0$ $y = 20$

$$20 = C \cdot e^{k \cdot 0}$$

$$20 = C, C = 20$$

When $t = 5$

$$y(5) = 20 \cdot e^{k \cdot 5} \quad y = 40$$

$$40 = 20 e^{5k}$$

$$2 = e^{5k}$$

Multiply both sides by ln

$$\ln 2 = 5k$$

$$0.69315 = 5k$$

$$k = 0.1386$$

$$y(t) = 20 \cdot e^{0.1386t}$$

1 1/2 days = 36 hrs

$$y(t) = 20 \cdot e^{0.1386 \cdot 36}$$

$$= 2937.55 \text{ bacteria}$$



