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Assignment Answers

$2y_o = y$

where $t = 5$

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

$dy\left(\frac{1}{y}\right) = dt(t)\,K$

$hy = tK$

$y = e^{tk}\ e^c$ where $e^c = y$

$y = y_o e^{tK}$

$y_o = 20$ and $t = 5$

then $K = ?$

Note that $2y_o = y$

$2y_o = 20e^{(5)K}$

$2 \times 20 = 20e^{5K}$

$40 = 20e^{K5}$

$\frac{40}{20} = e^{K5}$

$2 = e^{5K}$

$\ln 2 = 5K$

$$K = \frac{\ln 2}{5}$$

$$K = \frac{0.09315}{5}$$

$$K = 0.1386$$

Hence the model becomes;

$$y = y_0 e^{0.1386t}$$

$$\therefore y = 20e^{0.1386t}$$

11 The population of the bacteria in $1\frac{1}{2}$ days.

$= 24 + 12 = 36$ hours

$$y = y_0 e^{0.1386t}$$

$t = 36$ hours

$$y = y_0 e^{0.1386 \times 36}$$

$$y = 20e^{0.1386 \times 36}$$

$$y = 20e^{4.99}$$

$$y = 2938.8$$