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Solution

$2y_0 = y$

Where $t = 5$.

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

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

$\int dy = tK$

$y = e^{tK}\, e^c$ where $e^c = y_0$

$y = y_0 e^{tK}$

If $y_0 = 20$ and $t = 5$

then $K = ?$

Note that $2y_0 = y$.

$2y_0 = 20e^{(5)K}$

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

$40 = 20e^{K5}$.

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

$2 = e^{5K}$

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

(ii) The population of the bacteria in $1\frac{1}{2}$ days:

$= 24 + 12 = 36$ hours.

$y = y_0 e^{0.1386t}$

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

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