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Mechatronics Engineering

0

$y = y_0 e^{kt}$

$y = 3y_0 \; ; \; \frac{y}{y_0} = 3$

$\frac{y}{y_0} = e^{kt} = 3$ at $t = 9$

$\frac{y}{y_0} = e^{kt} = 9$ at $t = 18$

$y_0 = 50 \; -(i)$

$y_0 = 150 \; -(ii)$

$\therefore y = 50e^{kt} \; -(iii)$

$y = 150e^{kt} \; -(iv)$

$3 = e^{kt}$

$\ln 3 = kt$

$\ln 3 = 9k$

$k = \frac{\ln 3}{9} = 0.122$

$9 = e^{kt}; \; \ln 9 = 18k$

$\frac{\ln 9}{18} = k; \; k = 0.122$

$y = 50e^{0.122t} \; -A$

$y = 150e^{0.122t} \; -B$

$t := 0..15$

$A(t) := 50 \cdot \exp(0.122 \cdot t)$ $B(t) := 150 \cdot \exp(0.122 \cdot t)$

$A(t) =$

50
56.488
63.817
72.098
81.453
92.022
103.962
117.451
132.691
149.908
169.359
191.334
216.161
244.209
275.896
311.694

$B(t) =$

150
169.463
191.452
216.293
244.358
276.065
311.885
352.354
398.073
449.725
508.078
574.003
648.483
732.626
827.687
935.083