

Kiburdu Benedict I
18/ENG206/036
Mechanical engineering
Maths assignment

$$1. y = y_0 e^{kt}$$

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

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

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

$$\therefore y = 50 \text{ --- (i)}$$

$$y_0 = 150 \text{ (ii)}$$

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

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

$$3 = e^{kt}$$

$$\ln 3 = \ln e^{kt} \text{ (v)}$$

$$\ln 3 = kt$$

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

$$k = 0.122$$

$$\text{OR}$$
$$9 = e^{kt}$$

$$\ln 9 = \ln e^{kt} \text{ (vi)}$$

$$\ln 9 = k \cdot 18$$

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

$$k = 0.122$$

$$\therefore y = 50 e^{0.122t} \text{ --- (v)}$$

$$y = 150 e^{0.122t} \text{ --- (vi)}$$

$t = 0, 1, \dots, 15$

$$A(t) = 50 \exp(0.122 t)$$

$$B(t) = 150 \exp(0.122 t)$$

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

