

$$a) N = N_0 e^{kt}$$

$$~~5000 = N_0~~ N = N_0 e^{kt}$$

$$5000 = 18 e^{60k}$$

$$5000 = N_0 e^{73k}$$

$$2500 = 9 e^{60k}$$

$$\log\left(\frac{2500}{9}\right) = 60k$$

$$k = \frac{1}{60} \times \log\left(\frac{2500}{9}\right) = 0.040728291$$

$$b) i) P(A) = \frac{1}{5}$$

$$ii) P(\text{in order}) = \frac{1}{5} \times \frac{1}{5} \times \frac{1}{5} \times \frac{1}{5} \times \frac{1}{5} = \frac{1}{3125}$$

$$c) i) y = f(t)$$

$$\frac{dy}{dx} = f''(t)$$