



Part A Q8

(a).  $N = N_0 e^{kt}$  where  $N_0 = 18$

$5000 = 18 e^{70k}$        $N = 5000$        $N_0 = 18$  koalas.

$\frac{5000}{18} = e^{70k}$        $t = 70$

$\log_e \left( \frac{5000}{18} \right) = 70k$

$k = \frac{\log_e \left( \frac{5000}{18} \right)}{70}$        $k = 0.080383163$   
 $= 0.0804$  (4dp).

$N = N_0 e^{0.0804t}$

$N = 18 e^{(0.0804 \times 78)}$        $2007 = 78$  yrs

$= 18 e^{6.269886714}$

$= 9511.515219 = 9512$  koalas approximately.

Part D

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

(ii)  $P(ABCDE) = P(A^{1st}) \times P(B^{2nd}) \times P(C^{3rd}) \times P(D^{4th}) \times P(E^{5th})$

$= \frac{1}{5} \times \frac{1}{5} \times \frac{1}{5} \times \frac{1}{5} \times \frac{1}{5}$

$= \frac{1}{3125}$



Part C

(c). (i) maximum at depth 2m  
minimum at depth 7m.

(ii).  $t = 5 \text{ sec.}$

