BOARD OF STUDIES
NEW SOUTH WALES

Question 8.

a) i) $Q = Q_0 e^{-kt}$

when $t = 0$ $Q_0 = 6$.

$3 = 6e^{-k \cdot 15}$

$\frac{1}{2} = e^{-k \times 15}$

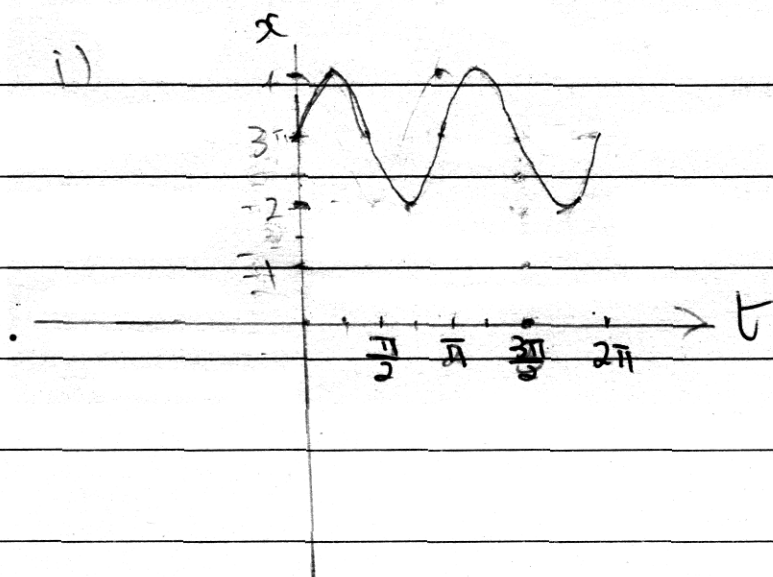
$k = 0.02$.

ii) $\frac{6}{8} = 6e^{-0.02 \times t}$

$\frac{1}{8} = e^{-0.02t}$

$t = 43.48$ hours

b) i)



ii) when $\frac{dx}{dt} = 2\cos 2t$

When $\frac{dx}{dt} = 0$

$t = \frac{\pi}{4}, \frac{5\pi}{4}, \frac{3\pi}{4}, \frac{7\pi}{4}$.

iii) the particle move at a ~~constants~~ speed

when it move $\frac{\pi}{4}$ t it come faster then slower then more slower then faster again