



### Question 8

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

i/  $6 \times e^{-15k}$

$Q_0 = 6$

~~$6 \times e^{-15k}$~~

$Q = 6 \times e^{-15k}$   
 $Q = \log 6 \times \log 15$

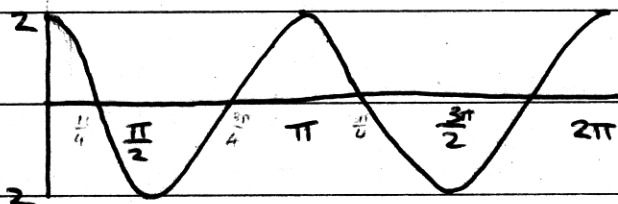
~~iii/  $1/8 = 6e^{-15k}$~~

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b)  $x = \sin 2t + 3$

i/  $x' = 2 \cos 2t$

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ii/  $2 \cos 2t$

$\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

~~$\sin 2t + 3$~~

iii/ speeding up and slowing down at constant rate,  
coming to rest, 4 times.