Start here for Question Number: 8

A) $\frac{dP}{dt} = kP$ | $P = Ae^{kt}$

~~$P = Ae^{k \cdot 25}$~~ $= 200$

$1935 = 102$

$2010 = 200\,0000$

$2000000 - 102 = 1999898$

$= 75$

$= 26665.30667$

ii)

$\therefore P = 102e^{26665.30667 \times 100}$

$= 102e^{2666530.667}$

$102P = e^{2666530.667}$

$102P = \ln 2666530.667$

$P = \frac{\ln 2666530.667}{102}$

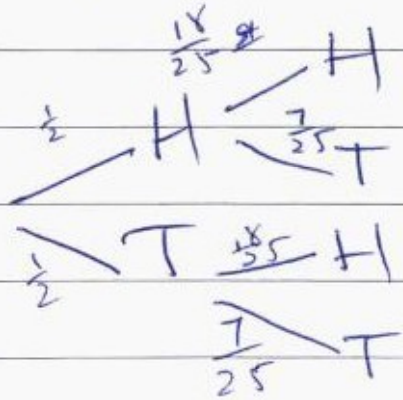
$= 0.145061655$

$= 0.145.$

$2035 \div 2666632.67$ cane toads

$\therefore$ approx 2666633 cane toads.

B)



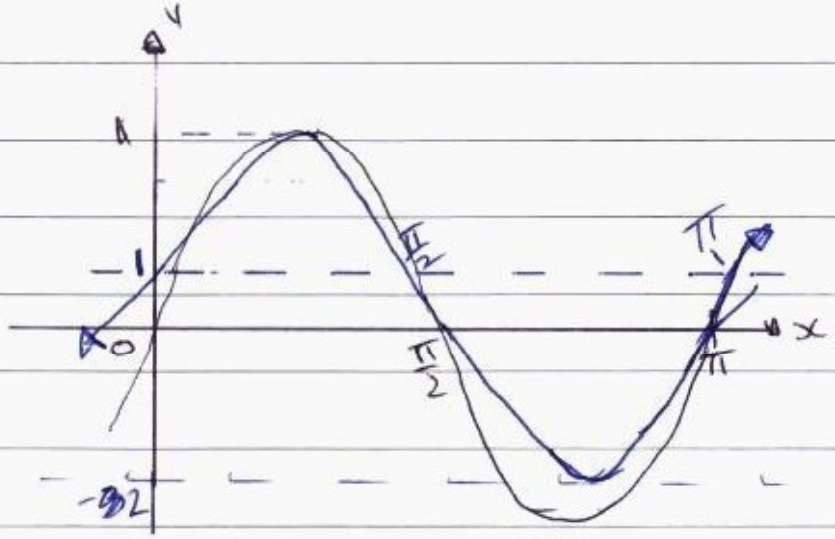
$\therefore P(TT) = \frac{1}{2} \times \frac{7}{25}$

$= \frac{7}{50}$

c) i) $A = 4$

ii) $b = 1$

iii)



d) $f(x) = x^3 - 3x^2 + bx + 8$

$f'(x) = 3x^2 - 6x + b$

increasing when $f'(x) > 0$

$\therefore \quad 3x^2 - 6x + b > 0$

$b > (-3x^2 + 6x)$

$b > 3x(-x + 2)$

$\therefore b > -\frac{1}{2}$ ~~$\frac{1}{2}$~~

$\therefore$ ~~$b > \frac{1}{2}$~~ ~~$-\frac{1}{2} < x$~~

$b > -\frac{1}{2}$ and 3

Additional writing space on back page.