Start here for Question Number: 9

a) i) $a = 500 \quad r = 0.6 \quad n = 240$

$A_1 = 500 \times 1.005$

$A_2 = 500 \times 1.005 \times 1.005^2$

$A_3 = 500 \times 1.005 \times 1.005^2 \times 1.005^3$

$\vdots$

$A_{240} = 500 \times 1.005 \times 1.005^2 \times 1.005^3 \times \ldots \times 1.005^{240}$

$\therefore P = 500 \times (\underbrace{1.005 \times 1.005^2 \times 1.005^3 \times \ldots \times 1.005^{240}}_{a = 1.005 \quad r = 1.005 \quad n = 240})$

$S_n = \dfrac{a(r^n - 1)}{r - 1}$

$= \dfrac{1.005 \times (1.005^{240} - 1)}{1.005 - 1} \times 500$

$P = 232175.5498$

$= 232175.55$

$P = 232175.55 \quad M = 2000$

ii) $A_1 = 232175.55 \times 1.005 - M$

$A_2 = (232175.55 \times 1.005 - M) \times 1.005 - M$

$A_3 = (P \times 1.005 - M) \times (1.005 - M) \times 1.005 - M$

$= P \times 1.005^3 - 1.005^2 - M$

$\vdots$

$A_n = P \times 1.005^n - M1.005^{n+1} - M1.005^{n+2} + \ldots - M1.005^{n+n} - M$

$= P \times (\underbrace{1 + 1.005^n + 1.005^{n+1} + 1.005^{n+2} + \ldots + 1.005^{n+n}}_{a = 1 \quad r = 1.005 \quad n = n}) - M$

$= \dfrac{1(1.005^n - 1)}{1.005 - 1}$

$= P \times \dfrac{1.005^n - 1}{0.005} - M$

$\therefore A_n = (P - 400\,000) \times 1.005^n + 400\,000$

2) $A_n = (P - 400\,000) \times 1.005^n + 400\,000$

$(P - 400\,000) \times 1.005^n + 400\,000 = 0$

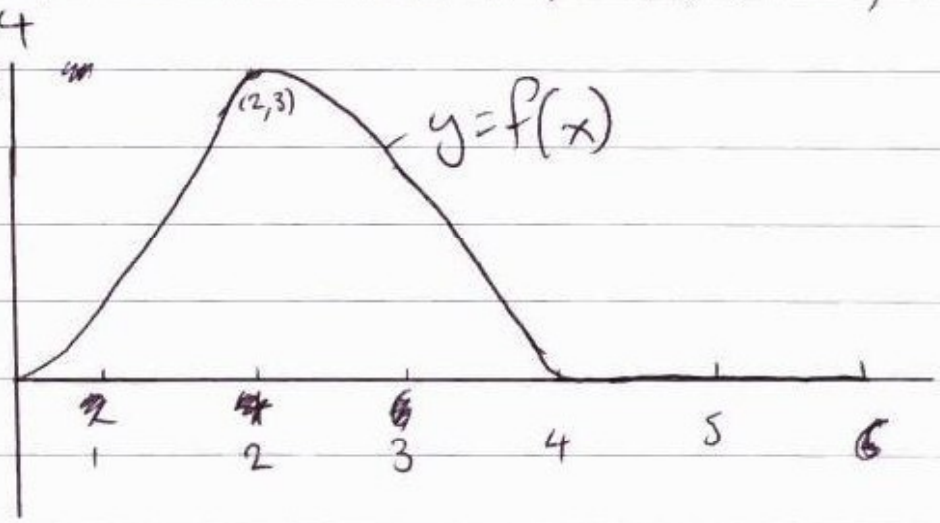
$\ln \frac{P - 400\,000}{1.005} * \ln 400\,000 = n$

b) i) between $x=0$ and $x=2$, $f(x)$ is increasing

ii) Maximum value of $f(x) = 2$, $x = 2$

iii)

iv)



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