

Start here for
Question Number: **9**

a) First 500 invested for 240 months = $500 \left(\frac{0.05}{12} + 1 \right)^{240}$
 second 500 invested for 239 months = $500 \left(\frac{0.05}{12} + 1 \right)^{239}$
 third

\therefore 240th 500 invested for 1 month = $500 \left(\frac{0.05}{12} + 1 \right)^1$

$$\therefore P = 500 \left(\frac{1.0041667}{12} \left(\frac{241}{240} \right)^1 + \left(\frac{241}{240} \right)^2 \dots + \left(\frac{241}{240} \right)^{240} \right)$$

$$P = 500 \times \frac{241}{240} \left(\left(\frac{241}{240} \right)^{240} - 1 \right)$$

$$\frac{241}{240} - 1$$

$$= \$ 232\,175.55$$

$$b) A_1 = P \left(\frac{0.05}{12} + 1 \right)^1 - 2000$$

$$A_2 = P \left(\frac{0.05}{12} + 1 \right)^2 - 2000 \left(1 + \left(\frac{0.05}{12} \right) \right)$$

$$A_n = P \left(\frac{0.05}{12} + 1 \right)^n - \frac{2000 \left(\left(\frac{1}{240} \right)^n + 1 \right)}{r - 1}$$

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

$$2) \quad A_{n0} = 0$$

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

$$1.005^n P - 400\,000 (1.05)^n = -400\,000$$

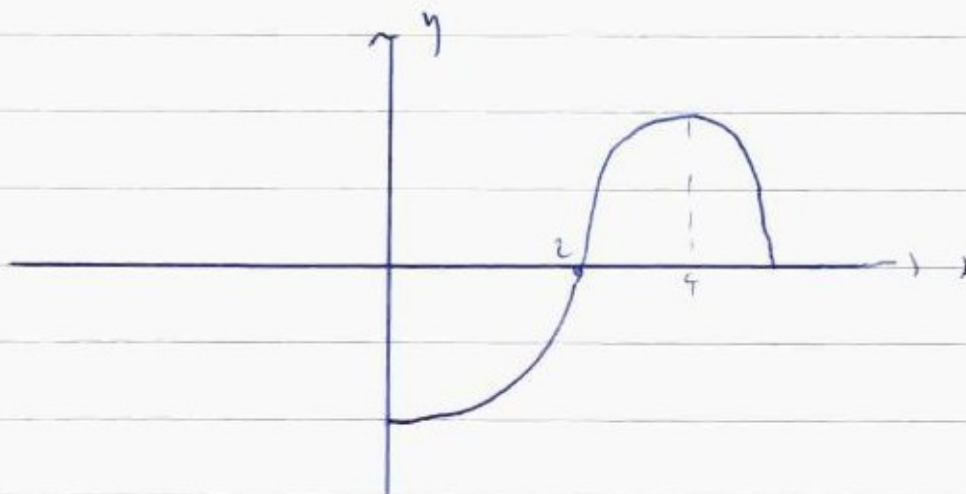
$$b) \text{ i) } \quad f'(x) > 0$$

$$\therefore \quad 0 < x < 2$$

$$\text{ii) } \quad x = 2$$

$$\text{iii) } \quad y = f(6)$$

$$y = -3$$



Additional writing space on back page.