

Start here for

Question Number:

9

$$\begin{aligned}
 \text{a) i) } A_{240} &= 500 \times 1.005 \\
 A_{239} &= 500 \times 1.005^2 \\
 &\vdots \\
 A_1 &= 500 \times 1.005^{240}
 \end{aligned}
 \qquad
 \begin{aligned}
 P &= 500 (1.005 + 1.005^2 + \dots + 1.005^{240}) \\
 &= 500 \times S_n \\
 &= 500 \times \frac{a(r^n - 1)}{r - 1} \qquad \begin{array}{l} a = 1.005 \\ r = 1.005 \end{array} \\
 &= 500 \times \frac{1.005(1.005^{240} - 1)}{0.005} \\
 &= 500 \times 464.35 \dots \\
 &= 232\,175.55
 \end{aligned}$$

$$\begin{aligned}
 \text{ii) } A_1 &= P - 2000 \times 1.005 \\
 A_2 &= (P - 2000 \times 1.005) - 2000 \times 1.005 \\
 &= P \times 1.005^{-2} - 2000 \times 1.005 - 2000 \\
 A_3 &= (P \times 1.005^{-2} - 2000 \times 1.005 - 2000) \times 1.005 - 2000 \\
 &= P \times 1.005^{-3} - 2000 \times 1.005^2 - 2000 \times 1.005 - 2000 \\
 A_n &= P \times 1.005^{-n} - 2000 (1 + 1.005 + 1.005^2 + \dots + 1.005^{n-1})
 \end{aligned}$$

$$\begin{aligned}
 \text{iii) } A_n &= (P - 400\,000) \times 1.005^{-n} + 400\,000 \\
 P=0 & \quad (P - 400\,000) \times 1.005^{-n} = -400\,000
 \end{aligned}$$

172 months with \$0 in the
173rd month.

8)

b) I) increasing when ~~x~~ $0 < x < 2$

II) ^{when} $x = 2$ $y = f(x)$
 $x = 8$ is highest point

III) $f(6)$ $4 \times 6 = 24$

Additional writing space on back page.

