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AP Mock Paper 2 MEMO.Question 1.

$$P = 10\,000. \quad \frac{6,5\% \text{ pa.}}{2}$$

$$A = 10\,000 \left(1 + \frac{6,5\%}{2} \right)^{20}$$

$$= 18\,958,38$$

$$\text{Interest} = \underline{\underline{8\,958,38}}$$

Question 2.

$$2\,00\,000 \left(1 + \frac{8,2\%}{12} \right) = 201\,366,67 - 16\,500$$

$$BO \text{ after 1 payment} = \underline{184\,866,67}$$

$$184\,866,67 \left(1 + \frac{8,2\%}{12} \right) = 186\,129,92 - 16\,500$$

$$= \underline{169\,629,92}$$

$$BO \text{ after 2 payments} = 169\,629,92$$

$$169\,629,92 \left(1 + \frac{8,2\%}{12} \right) = 170\,789,06 - 16\,500$$

$$(b) \quad BO_{n+1} = BO_n \left(1 + \frac{8,2\%}{12} \right) - 16\,500$$

$$\text{with } BO_1 = \underline{200\,000}$$

$$= \underline{154\,289,06}$$

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Question 3.

(a) loan 20 000

deferred payment for 3 months.

~~new P = 20 000(1 + 15%)~~

$$1 + 15\% = \left(1 + \frac{i_{nom}}{m}\right)^m \quad m = 12$$

$$\sqrt[12]{1 + 15\%} - 1 = \frac{i_{nom}}{m}$$

$i_{nom} = 14,06\% \text{ p.a. p.m.}$

$$\text{new P} = 20\,000 \left(1 + \frac{14,06\%}{12}\right)^3$$

$$= 20\,711,27$$

$$20\,711,27 = x \left(1 - \left(1 + \frac{14,06\%}{12}\right)^{-60}\right)$$

$$242,667 = x \left(0,50287\right)$$

$RA82,56 = x$

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(b) $20\,711,27 = x \left(1 - \left(1 + \frac{14,06\%}{12}\right)^{-57}\right)$

$$242,667 = x \left(1 - \left(1 + \frac{14,06\%}{12}\right)^{-57}\right)$$

$$242,667 = x (0,485195)$$

$500,14 = x$

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Question 4.

$$(u) \quad 50\,000 = 1500 \left(\frac{1 - \left(1 + \frac{8,36\%}{12}\right)^{-n}}{\frac{8,36\%}{12}} \right)$$

$$\frac{50\,000}{1500} \times \frac{8,36\%}{12} = 1 - \left(1 + \frac{8,36\%}{12}\right)^{-n}$$

$$1 - \frac{209}{900} = \left(1 + \frac{8,36\%}{12}\right)^{-n}$$

$$\frac{691}{900} = (1,006966)^{-n}$$

$$-n = \log_c \left(\frac{691}{900} \right)$$

$$+n = +38,063$$

38 monthly payments.

$$(u) \quad 50\,000 = 1500 \left(\frac{1 - \left(1 + \frac{8,36\%}{12}\right)^{-38}}{\frac{8,36\%}{12}} \right) + x \left(1 + \frac{8,36\%}{12}\right)^{39}$$

$$50\,000 = 49927,33 + x \left(1 + \frac{8,36\%}{12}\right)^{39}$$

$$72,67 = x \left(1 + \frac{8,36\%}{12}\right)^{39}$$

R. 95,27 = x final payment.

(v) BO after 24th payment 20 000.

$i = 10\% \text{ pa cm.}$

$$20\,000 = x \left(\frac{1 - \left(1 + \frac{10\%}{12}\right)^{-14}}{\frac{10\%}{12}} \right)$$

$$\frac{500}{3} = x (0,10968)$$

1519,46 = x

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4000 (2997,92)

Question 5.

(a) $x = 4000$

$$n = (65 - 25) \times 12 + 1$$

$$FV = 4000 \left(\frac{-1 + \left(1 + \frac{7,02\%}{12}\right)^{481}}{\frac{7,02\%}{12}} \right) \left(1 + 7,25\% \right)^{12} = \left(1 + \frac{i_m}{12} \right)^{12}$$

$$= R. 10624168,16$$

$$= 7,02\% \text{ pa. cm}$$

(a) find x $n = (65 - 40) \times 12 + 1$

$$= 301$$

$$10\,500\,000 = x \left(\frac{-1 + \left(1 + \frac{A}{A}\right)^{301}}{A} \right)$$

$$x = \frac{61425}{B}$$

$$= R. 12\,829,99 \text{ pm.}$$

$$(c) \quad 10\,500\,000 = x \left(\frac{1 - \left(1 + \frac{6,4\%}{12}\right)^{-186}}{\frac{6,4\%}{12}} \right)$$

$$56\,000 = x \left(\frac{0,56^{12}}{B} \right)$$

$$x = R. 99\,315,65$$

Question 6

(a) $\frac{\Delta P}{P} = -0,000253P + 0,3$

$$r = 0,3$$

$$(2)$$

$$\frac{\Delta P}{P} = -\frac{r}{K}P + r$$

(b) $\frac{+r}{K} = +0,000253$

$$\frac{0,3}{0,000253} = K$$

$$K = 1186$$

$$0,08 = -0,000253P + 0,3$$

$$\frac{11}{50} = 0,000253P$$

$$870 = P$$

(c) $\frac{\Delta P}{P} = \text{growth rate.}$

$$(4)$$

(A) [13]

$$(d) P_{n+1} = P_n + r P_n \left(1 - \frac{P_n}{K}\right)$$

$$7,791 = 6 + 0,3 \cdot 6 \left(1 - \frac{6}{1200}\right)$$

$$P_1 = 7,791$$

$$P_2 = 10,1131$$

$$\underline{P_{12} = 129} \quad \checkmark \checkmark$$

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Question 7.

(a) yearly growth rate = % females $\times$ survival rate $\times$ no of babies $\rightarrow$ death rate.

$$= \left(10 \times \frac{1}{3} \times 40\%\right) - \frac{1}{12}$$

$$= \underline{1,25\% \text{ pa.}} \quad \checkmark$$

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$$(b) P_{n+1} = \underline{1,2 P_n} \quad \checkmark \checkmark$$

(2)

$$(c) P_1 = 1,2 \times 30 = 36 \quad \checkmark$$

$$P_2 = 43,2 \quad \checkmark$$

$$P_3 = 51,84 \approx \underline{52 \text{ wild dogs.}} \quad \checkmark \checkmark \quad (5)$$

$$(d) P_{n+1} = 1,2 P_n - x$$

$$52 = 1,2 \cdot 52 - x$$

$$\underline{x = 10.} \quad \checkmark$$

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Question 8

(6)

(a) 1,5 is intrinsic growth rate of prey. (2)

(b) 700. carrying capacity of prey. (2)

(c) life span of fox.

$$0,02778 = \frac{1}{x}$$

$$x = \frac{36}{0,02778} = 3 \text{ years} \quad (3)$$

(d) b. = deadly attack rate.

$$180 = b \cdot 200 \times 15.$$

$$0,06 = b \quad (3)$$

(e) f. b. R. n. F. n. = 4.

$$f. 0,06 \times 200 \times 15 = 4$$

$$f = 0,022 \quad (3)$$

(f) f is the rate at which predators turn prey into food & therefore reproduce. (2)

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