

**GEVORDERDEPROGRAM-WISKUNDE
KEUSEMODULE: FINANSIES EN MODELLERING**

NASIENRIGLYNE

Tyd: 1 uur

100 punte

Hierdie nasienriglyne is opgestel vir gebruik deur eksaminators en sub-eksaminators van wie verwag word om almal 'n standaardiseringsvergadering by te woon om te verseker dat die riglyne konsekwent vertolk en toegepas word by die nasien van kandidate se skrifte.

Die IEB sal geen bespreking of korrespondensie oor enige nasienriglyne voer nie. Ons erken dat daar verskillende standpunte oor sommige aangeleenthede van beklemtoning of detail in die riglyne kan wees. Ons erken ook dat daar sonder die voordeel van die bywoning van 'n standaardiseringsvergadering verskillende vertolkings van die toepassing van die nasienriglyne kan wees.

VRAAG 1

- 1.1 (a) A (2)
(b) D (2)
(c) B (2)
- 1.2 (a) R780 000 (1)
(b) 14% (2)
(c) R366 933,07 (2)
- [11]**

VRAAG 2

$$2.1 \quad P_v = \frac{8\,645 \left[1 - \left(1 + \frac{0,072}{12} \right)^{-180} \right]}{\frac{0,072}{12}} \quad P_v = R\,949\,951,21 \quad (5)$$

$$2.2 \quad 8\,645 - 949\,951,21 \left(\frac{0,072}{12} \right) = 2\,945,29$$

$$\text{OF} \quad 949\,951,21 \left(1 + \frac{0,072}{12} \right) - 8\,645 = 947\,005,92$$

$$949\,951,21 - 947\,005,92 = 2\,945,29 \quad (4)$$

$$2.3 \quad \left(1 + \frac{0,072}{12} \right)^{12} = \left(1 + \frac{i}{365} \right)^{365}$$

$$\frac{i}{365} = 0,000196 \dots \quad i = 7,1792\% \quad (8)$$

[17]

VRAAG 3

$$3.1 \quad 1\,200\,000 = \frac{x \left[1 - \left(1 + \frac{0,0624}{12} \right)^{-240} \right]}{\frac{0,0624}{12}} \quad x = 8\,764,15$$

$$\text{Jaarliks} = 8\,764,15 \times 3 \times 12 = \mathbf{R315\,509,24} \quad (8)$$

$$3.2 \quad OB = \frac{8\,764 \left[1 - \left(1 + \frac{0,0624}{12} \right)^{-112} \right]}{\frac{0,0624}{12}} + 17\,000 \left(1 + \frac{0,0624}{12} \right)^{13}$$

$$= 742\,580,92 + 18\,185,75 = \mathbf{R760\,766,67}$$

OF

$$OB = 1\,200\,000 \left(1 + \frac{0,0624}{12} \right)^{128} - \frac{8\,764 \left[\left(1 + \frac{0,0624}{12} \right)^{128} - 1 \right]}{\frac{0,0624}{12}} + 17\,000 \left(1 + \frac{0,0624}{12} \right)^{13}$$

$$= \mathbf{R760\,805,40} \quad (8)$$

$$3.3 \quad 761\,000 \left(1 + \frac{0,0624}{12} \right)^{112} - \frac{9\,200 \left(1 + \frac{0,0624}{12} \right) \left[\left(1 + \frac{0,0624}{12} \right)^{109} - 1 \right]}{\frac{0,0624}{12}}$$

$$= 1\,360\,386,80 - 1\,351\,662,47 = \mathbf{8\,724,32}$$

OF

$$761\,000 \left(1 + \frac{0,0624}{12} \right)^{111} - \frac{9\,200 \left[\left(1 + \frac{0,0624}{12} \right)^{109} - 1 \right]}{\frac{0,0624}{12}}$$

$$= 1\,353\,349,38 - 1\,344\,670,19 = 8\,679,19$$

$$8\,679,19 \left(1 + \frac{0,0624}{12} \right) = \mathbf{8\,724,32}$$

OF

$$761\,000 \left(1 + \frac{0,0624}{12} \right)^2 - \frac{9\,200 \left[1 - \left(1 + \frac{0,0624}{12} \right)^{-109} \right]}{\frac{0,0624}{12}}$$

$$768\,934,98 - 764\,003,71 = 4\,931,27$$

$$4\,931,27 \left(1 + \frac{0,0624}{12} \right)^{110} = \mathbf{8\,724,33} \quad (10)$$

[26]

VRAAG 4

4.1 (a) Verdubbeling vind plaas teen 'n konstante tempo elke 35 jaar. (2)

(b) aanwas = geboorte – sterfte
 $0,02 = \text{geboorte} - 1/56$ **birth = 0,037 857 = 3,79%** (4)

4.2 (a) $A = \frac{0,054\ 571}{2,52} = \mathbf{0,021\ 655}$

$$B = \frac{7,22 - 2,52}{2020 - 1950} = \mathbf{0,067\ 143}$$

$$C = \frac{0,067\ 143}{5,12} = \mathbf{0,013\ 114}$$

$$D = \frac{10,12 - 5,12}{2055 - 1985} = \mathbf{0,071\ 429}$$

OR

$$\mathbf{D = 0,009\ 893 \times 7,22 = 0,071\ 427} \quad (8)$$

(b) Op sakrekenaar, $x = P$ en $y = \Delta P/P$
 regressiemodellering vir $y = A + Bx$: $A = 0,027\ 435 \approx \mathbf{2,74\%}$ (4)
[18]

VRAAG 5

5.1 $1 / 0,083 = \mathbf{12\ jaar}$ (2)

5.2 $\frac{\text{b.f.L.W}}{\text{b.L.W}} = \frac{0,000\ 000\ 169}{0,000\ 655} = \mathbf{0,000\ 258}$ (4)

5.3 $0,345 = 1 \times 1 \times 0,6 \times \text{vroulik}$ **vroulik = 57,5%** (4)

5.4 $W_{n+1} = W_n + 0,345.W_n \left(1 - \frac{W_n}{25\ 000}\right) - 0,000\ 655.W_n.L_n$ waar $W_{n+1} = W_n$

$$0,345.W_n \left(1 - \frac{W_n}{25\ 000}\right) = 0,000\ 655.W_n.L_n$$

$$L_n = \frac{0,345 \cdot \left(1 - \frac{5\ 500}{25\ 000}\right)}{0,000\ 655} \quad \mathbf{L_n = 410,8 \approx 410\ of\ 411} \quad (8)$$

[18]

VRAAG 6

6.1 $T_2 = 1 \quad T_3 = 2 \quad T_4 = 3 \quad T_5 = 5$ (6)

6.2 $q = 0,8 < 1$
 $|p| = 2 \not< 0,8 + 1$ **nie stabiel nie** (4)
[10]

Totaal: 100 punte