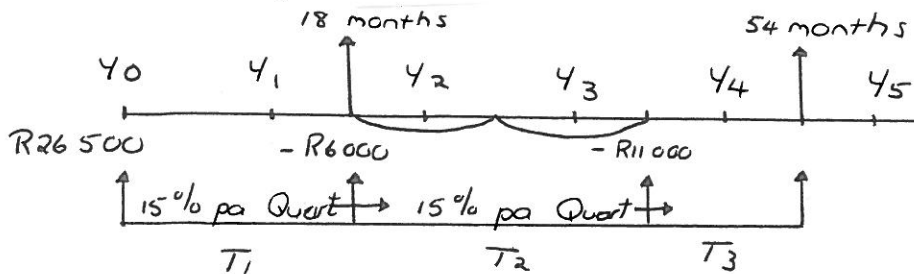


- (1) Rusty applies for a loan of R26 500 and agrees to repay the total outstanding amount, in 54 months' time. The interest on the loan is calculated quarterly at 15% pa. Rusty receives his bonus after 18 months and decides to repay R6 000 of his loan. After a further two years Rusty repay another R11 000 of his loan. Calculate the total outstanding amount of the loan that Rusty owes after the 54 months.



Method 1:

T₁: $n = 1\frac{1}{2}$ years

$$A = P \left(1 + \frac{i(m)}{n}\right)^{m \times n}$$

$$i = 0,15$$

$$= 26\,500 \left(1 + \frac{0,15}{4}\right)^{4 \times 1,5}$$

$$m = 4$$

$$A = R33\,050,23\ldots$$

T₂: $n = 2$ years

$$A = (33\,050,23\ldots - 6\,000) \times \left(1 + \frac{0,15}{4}\right)^{4 \times 2}$$

$$i = 0,15$$

$$A = R36\,314,14\ldots$$

$$m = 4$$

T₃: $n = 1$ years

$$A = (36\,314,14\ldots - 11\,000) \times \left(1 + \frac{0,15}{4}\right)^{4 \times 1}$$

$$i = 0,15$$

$$= R29\,330,25$$

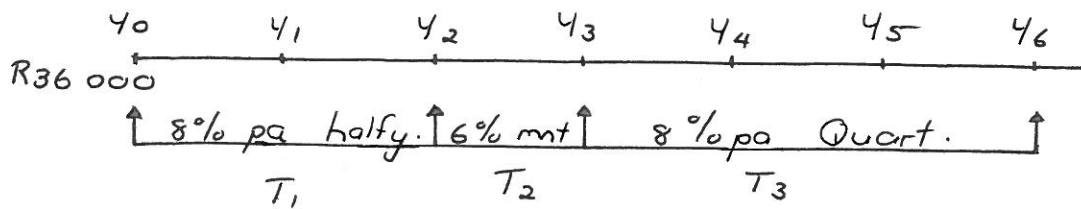
$$m = 4$$

Method 2:

$$A = \left\{ \left[26\,500 \left(1 + \frac{0,15}{4}\right)^6 - 6\,000 \right] \times \left(1 + \frac{0,15}{4}\right)^8 - 11\,000 \right\} \times \left(1 + \frac{0,15}{4}\right)^4$$

$$= R29\,330,25$$

- (2) R36 000 is invested for 6 years. The interest rate for the first two years is 8% pa semi-annually compounded. After two years the interest rate changes to 6% pa monthly compounded for the next year. For the last three years, the interest rate changes once again is 8% pa quarterly compounded. Calculate the accumulated amount after the 6 years.



Method 1:

T_1 : $n = 2 \text{ years}$

$$A = 36000 \left(1 + \frac{0,08}{2} \right)^{2 \times 2}$$

$$m = 2$$

$$A = R42\,114,908\dots$$

$$i = 0,08$$

T_2 : $n = 1$

$$A = 42\,114,908\dots \left(1 + \frac{0,06}{12} \right)^{1 \times 12}$$

$$m = 12$$

$$A = R44\,712,46\dots$$

$$i = 0,06$$

T_3 : $n = 3$

$$A = 44\,712,46\dots \left(1 + \frac{0,08}{4} \right)^{3 \times 4}$$

$$m = 4$$

$$A = R56\,706,22$$

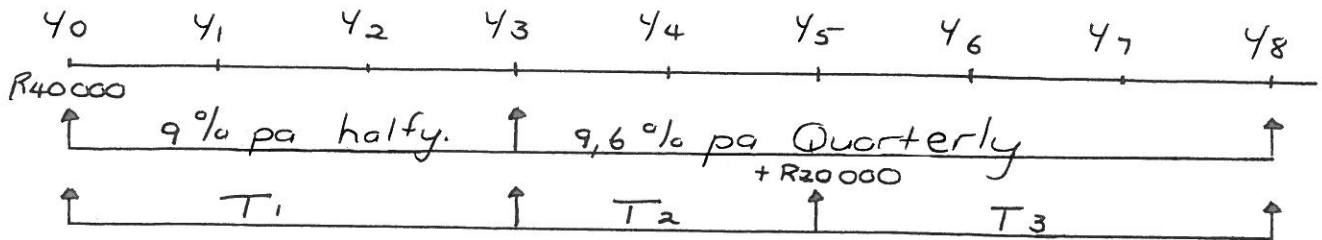
$$i = 0,08$$

Method 2:

$$A = \left[36\,000 \left(1 + \frac{0,08}{2} \right)^4 \right] \times \left(1 + \frac{0,06}{12} \right)^{12} \times \left(1 + \frac{0,08}{4} \right)^{12}$$

$$= R56\,706,22$$

- (3) André invests R40 000 in the money market for 5 years. After five years he decides to invest the total earnings as well as another R20 000 for a further three years. For the first 3 years the interest rate is fixed at 9% pa half yearly compounded after which the interest rate changes to 9,6% pa quarterly compounded for the rest of the period. Calculate the total earnings for André after 8 years.



Method 1:

T_1 : $n = 3$ $A = 40\,000 \left(1 + \frac{0,09}{2}\right)^{2 \times 3}$

$m = 2$

$A = R52\,090,404 \dots$

$i = 0,09$

T_2 : $n = 2$ $A = 52\,090,404 \dots \left(1 + \frac{0,096}{4}\right)^{2 \times 4}$

$m = 4$

$A = R62\,973,435 \dots$

$i = 0,096$

T_3 : $n = 3$ $A = 82\,973,435 \dots \left(1 + \frac{0,096}{4}\right)^{3 \times 4}$

$m = 4$

$A = R110\,290,61$

$i = 0,096$

Method 2:

$A = \left\{ \left[40\,000 \left(1 + \frac{0,09}{2}\right)^6 \right] \times \left(1 + \frac{0,096}{4}\right)^8 + 20\,000 \right\} \times \left(1 + \frac{0,096}{4}\right)^{12}$

$A = R110\,290,61$