

- (1) Kabelo invests R140 000 for three years. His total returns after three years are R173 921. Calculate the interest rate, correct to 1 decimal, per year, if the interest is compounded yearly.

$$A = R173\,921$$

$$A = P(1+i)^n$$

$$P = R140\,000$$

$$173\,921 = 140\,000(1+i)^3$$

$$i = ?$$

$$\frac{173\,921}{140\,000} = (1+i)^3$$

$$n = 3 \text{ years}$$

$$1,242... = (1+i)^3$$

$$\sqrt[3]{1,242...} = 1+i$$

$$\therefore 1+i = 1,0749...$$

$$i = 0,0749...$$

$$\therefore \text{Interest rate} = 0,0749... \times 100$$

$$\approx 7,5\% \text{ pa}$$

- (2) Mr. Calitz buys a refrigerator and a freezer on hire purchase. The price for the refrigerator is R6 799 and for the freezer is R8 299. According to the agreement, the final amount to repay is R21 741,12 in four years' time. Calculate the annual interest rate.

$$A = R21\,741,12$$

$$A = P(1+i \times n)$$

$$P = R6\,799 + R8\,299$$

$$21\,741,12 = 15\,098(1+i \times n)$$

$$= R15\,098$$

$$\frac{21\,741,12}{15\,098} = 1+i \times 4$$

$$i = ?$$

$$1,44 = 1+i \times 4$$

$$n = 4 \text{ years}$$

$$0,44 = 4i$$

$$\frac{0,44}{4} = i$$

$$i = 0,11$$

$$\therefore \text{Interest rate} = 11\% \text{ pa}$$

- (3) Janke plan an overseas tour in 4 years' time. According to all financial indicators she'll need R68 000 to cover all her costs for the tour. She has R40 000 available to invest. At what interest rate yearly compounded, should she invest the money to be assured of sufficient funds to her disposal for the tour in 4 years' time.

$$A = R68\,000$$

$$A = P(1+i)^n$$

$$P = R40\,000$$

$$68\,000 = 40\,000(1+i)^4$$

$$i = ?$$

$$\sqrt[4]{\frac{68\,000}{40\,000}} = 1+i$$

$$n = 4 \text{ years}$$

$$\therefore 1+i = 1,141$$

$$i = 0,141---$$

$$\therefore r = 14\% \text{ p.a.}$$

- (4) An annuity is paid out. The beneficiary decides to invest the total amount of R340 000 for a further three years. After three years he needs a total amount of R400 000. Calculate the annual interest rate if the interest is:

(a) calculated simply.

$$A = R400\,000$$

$$A = P(1+i \times n)$$

$$P = R340\,000$$

$$400\,000 = 340\,000(1+i \times 3)$$

$$n = 3 \text{ years}$$

$$\frac{400\,000}{340\,000} = 1+3i$$

$$i = ?$$

$$1,176-- = 1+3i$$

$$i = 0,0588---$$

$$\therefore r = 5,88\% \text{ p.a.}$$

(b) yearly compounded.

$$A = R400\,000$$

$$A = P(1+i)^n$$

$$P = R340\,000$$

$$400\,000 = 340\,000(1+i)^3$$

$$n = 3 \text{ years}$$

$$\frac{400\,000}{340\,000} = (1+i)^3$$

$$i = ?$$

$$\sqrt[3]{\frac{400}{340}} = 1+i$$

$$i = 0,0556---$$

$$\therefore r = 5,57\% \text{ p.a.}$$

- (5) KC Limited buys machinery for R2,3 million. According to the agreement the total outstanding amount of R3,83 million should be repaid in 54 months. If the interest is compounded yearly, calculate the annual interest rate for which the capital is borrowed.

$$A = R3,83 \text{ milj.}$$

$$A = P(1+i)^n$$

$$P = R2,3 \text{ milj.}$$

$$3,83 = 2,3(1+i)^{4,5}$$

$$n = 54 \text{ months} = 4,5 \text{ years}$$

$$\frac{3,83}{2,3} = (1+i)^{4,5}$$

$$i = ?$$

$$\sqrt[4,5]{1,66\dots} = 1+i$$

$$1,135\dots = 1+i$$

$$\therefore i = 0,135\dots$$

$$\therefore \text{Interest rate} = 14\% \text{ pa}$$