



KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

MATHEMATICS

KZN INFORMAL TEST

Date: 19/07/2024

FINANCE, GROWTH AND DECAY

GRADE 12

Marks 25

Duration: 40 Minutes

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Clearly show ALL calculations, diagrams, graphs, et cetera that you have used in determining your answers.
3. Answers only will not necessarily be awarded full marks.
4. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
5. If necessary, round answers off to TWO decimal places, unless stated otherwise.
6. An information sheet, with formulae, is included at the end of the question paper.
7. Number the answers correctly according to the numbering system used in this question paper.
8. Write legibly and present your work neatly.

QUESTION 1

- 1.1. Interest on a credit card is quoted as 23% p.a. compounded monthly. What is the effective annual interest rate? Give your answer correct to two decimal places. (2)
- 1.2. Diane invests a lump sum of 10 000 in a savings account. The investment earns interest at 10% pa, compounded quarterly. Calculate the amount in Diana's saving account at the end of 2 years? (2)
- 1.3. Sandile bought a car for R180 000. The value of the car depreciated at 15% per annum according to the reducing-balance method. Sandile wants to replace his old car with a new one of the same model. The dealer told him that in 3 years' time, A new car will cost much more and its cost escalate at 12% per annum effective. The proceeds from the sale of the old car is used together with the sinking fund to buy the new car. Sandile paid equal monthly amounts into the sinking fund and the interest earned was 9% per annum compounded monthly. The first payment was made exactly 3 years ago, and the last payment was made at the end of the 3-year period.
- 1.3.1 Determine the scrap value of the old car. (2)
- 1.3.2 Determine the cost of the new car. (2)
- 1.3.3 Determine the amount required to be in the sinking fund for him to buy a car. (2)
- 1.3.4 Determine the equal monthly payments Sandile made into the sinking fund account. (3)

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QUESTION 2

2. On 1st of June 2014 a bank granted Amonge a loan of R350 000 at an interest rate of 15% p.a. compounded monthly, to buy a car. Amonge agreed to repay the loan in monthly instalments commencing on 1st of October 2014 and ending on the 1st of June 2019
- 2.1 Calculate the amount Amonge owed the bank on 1st of September 2014, a month before he paid his first monthly instalment. (2)
- 2.2 Having paid the first monthly instalment on 1 October 2014, Amonge will still pay his last monthly instalment on 1 June 2019. Calculate his monthly instalment. (3)
- 2.3 If Amonge paid R 9300 as his monthly instalment starting on 1 October 2014, how many months sooner will he repay the loan? (4)
- 2.4 If Amonge paid R 9300 as a monthly instalment starting on 1 October 2014, calculate the final instalment to repay the loan. (3)

[12]

TOTAL: 25

INFORMATION SHEET: MATHEMATICS

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P(1 + ni)$$

$$A = P(1 - ni)$$

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

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

$$\sum_{i=1}^n 1 = n$$

$$\sum_{i=1}^n i = \frac{n(n+1)}{2}$$

$$T_n = a + (n-1)d$$

$$S_n = \frac{n}{2}(2a + (n-1)d)$$

$$T_n = ar^{n-1}$$

$$S_n = \frac{a(r^n - 1)}{r - 1} ; \quad r \neq 1$$

$$S_\infty = \frac{a}{1 - r} ; \quad -1 < r < 1$$

$$F = \frac{x[(1+i)^n - 1]}{i}$$

$$P = \frac{x[1 - (1+i)^{-n}]}{i}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c$$

$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \tan \theta$$

$$(x - a)^2 + (y - b)^2 = r^2$$

$$\text{In } \triangle ABC: \quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cdot \cos A \quad \text{area } \triangle ABC = \frac{1}{2} ab \cdot \sin C$$

$$\sin(\alpha + \beta) = \sin \alpha \cdot \cos \beta + \cos \alpha \cdot \sin \beta$$

$$\sin(\alpha - \beta) = \sin \alpha \cdot \cos \beta - \cos \alpha \cdot \sin \beta$$

$$\cos(\alpha + \beta) = \cos \alpha \cdot \cos \beta - \sin \alpha \cdot \sin \beta$$

$$\cos(\alpha - \beta) = \cos \alpha \cdot \cos \beta + \sin \alpha \cdot \sin \beta$$

$$\cos 2\alpha = \begin{cases} \cos^2 \alpha - \sin^2 \alpha \\ 1 - 2\sin^2 \alpha \\ 2\cos^2 \alpha - 1 \end{cases}$$

$$\sin 2\alpha = 2 \sin \alpha \cdot \cos \alpha$$

$$(x; y) \rightarrow (x \cos \theta + y \sin \theta; y \cos \theta - x \sin \theta)$$

$$(x; y) \rightarrow (x \cos \theta - y \sin \theta; y \cos \theta + x \sin \theta)$$

$$\bar{x} = \frac{\sum fx}{n}$$

$$\sigma^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}$$

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$\hat{y} = a + bx$$

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$