Simple & Compound Interest: The Grade 10 Question Types

MARKING GUIDELINE

MARKS	DURATION	QUESTIONS
32	50 minutes	3

Name: ..... Class: .....

Date: .....

MARK ____ / 32

INSTRUCTIONS AND INFORMATION

1. Answer **ALL** the questions in this question paper.
2. Answer QUESTION 1 by **circling** the letter (A–D) in the answer grid at the end of that section.
3. Show **ALL** calculations clearly.
4. Show all units where applicable.
5. Number the answers correctly according to the numbering system used in this question paper.
6. A non-programmable calculator may be used, unless stated otherwise.
7. Write neatly and legibly.

QUESTION 1 [10 MARKS]

Four options are given as possible answers to the following questions. Choose the correct answer and circle the letter (A–D) in the grid at the end of this section. If you want to change your choice, put a cross through the wrong letter and circle your new choice.

1.1 R5 000 is invested at 8% p.a. SIMPLE interest for 3 years. The final amount is ... (1)

A) R1 200 **B)** **R6 200 ✓**

C) R5 400 **D)** R6 298,56

> **Answer: B** — $A = P(1 + ni) = 5\,000(1 + 0{,}24) = R6\,200$.
>
> - **A** — that is the INTEREST earned, not the final amount
> - **C** — worked out one year only
> - **D** — used the COMPOUND formula $P(1 + i)^n$

1.2 R5 000 is invested at 8% p.a. COMPOUND interest for 3 years. The final amount is ... (1)

A) R5 400 **B)** R1 298,56

C) **R6 298,56 ✓** **D)** R6 200

> **Answer: C** — $A = P(1 + i)^n = 5\,000(1{,}08)^3 = R6\,298{,}56$.
>
> - **A** — compounded for one year only
> - **B** — that is the INTEREST earned, not the final amount
> - **D** — used the SIMPLE interest formula

1.3 Compound interest earns more than simple interest because ... (1)

A) the principal is larger
B) the period is longer
C) **interest is earned on the interest already added** ✓
D) the interest rate is higher

> **Answer: C** — Each year the interest is worked out on a balance that has already grown.
> - **A** — the principal is the same in both cases
> - **B** — the period is the same in both cases
> - **D** — the rate is the same in both cases

1.4 R20 000 is invested at 6% p.a. compounded for 5 years. The INTEREST earned is ... (1)

A) R6 000
B) R1 200
C) R26 764,51
D) **R6 764,51** ✓

> **Answer: D** — $A = 20\,000(1{,}06)^5 = R26\,764{,}51$, so the interest is $A - P = R6\,764{,}51$.
> - **A** — used simple interest: $20\,000 \times 0{,}06 \times 5$
> - **B** — worked out one year's interest only
> - **C** — that is the final AMOUNT, not the interest

1.5 What principal grows to R12 000 in 4 years at 10% p.a. SIMPLE interest? (1)

A) R4 800
B) **R8 571,43** ✓
C) R8 196,16
D) R7 200

> **Answer: B** — $P = A \div (1 + ni) = 12\,000 \div 1{,}4 = R8\,571{,}43$.
> - **A** — worked out the interest instead of the principal
> - **C** — used the COMPOUND formula, dividing by $(1{,}1)^4$
> - **D** — MULTIPLIED by 0,6 instead of dividing by 1,4

1.6 A fridge costs R6 000 cash. On hire purchase you pay a 10% deposit and repay the balance over 2 years at 14% p.a. SIMPLE interest. The TOTAL paid is ... (1)

A) R6 912
B) **R7 512** ✓
C) R7 680
D) R6 600

> **Answer: B** — Deposit = 10% of R6 000 = R600, so the loan is R5 400. $A = 5\,400(1 + 0{,}14 \times 2) = R6\,912$, and the total paid is $600 + 6\,912 = R7\,512$.
> - **A** — that is the loan repaid; the deposit is money paid too
> - **C** — charged interest on the whole R6 000 instead of on the balance after the deposit
> - **D** — added the deposit to the cash price and charged no interest at all

1.7 Inflation runs at 6% p.a. Something costing R500 today will cost ... in 3 years. (1)

A) R95,51
B) R590
C) **R595,51** ✓
D) R530

> **Answer: C** — $A = 500(1{,}06)^3 = R595{,}51$.
> - **A** — that is the INCREASE, not the new price
> - **B** — used simple growth, $500(1 + 0{,}18)$
> - **D** — grew the price for one year only

1.8 At what SIMPLE interest rate does R4 000 grow to R5 200 in 5 years? (1)

A) 6% p.a. ✓ **B)** 5,4% p.a.

C) 23,1% p.a. **D)** 30% p.a.

> **Answer: A** — The interest is R1 200, and $1\,200 = 4\,000 \times r \times 5$ gives $r = 0{,}06$.
> - **B** — used the COMPOUND formula instead of the simple one
> - **C** — divided by the final AMOUNT instead of the principal, and dropped the years
> - **D** — forgot to divide by the 5 years

1.9 R4 000 grows to R5 324,80 in 3 years at compound interest. The interest RATE is ... (1)

A) 10% p.a. ✓ **B)** 11% p.a.

C) 12% p.a. **D)** 33,1% p.a.

> **Answer: A** — $5\,324{,}80 \div 4\,000 = 1{,}3312$, and $\sqrt[3]{1{,}3312} = 1{,}1$, so $i = 0{,}1$.
> - **B** — $1{,}11^3$ gives R5 465,26, not R5 324,80
> - **C** — $1{,}12^3$ gives R5 619,71, not R5 324,80
> - **D** — that is the TOTAL growth over the three years, not the yearly rate

1.10 R10 000 at 9% p.a. compounded for 4 years, correct to the NEAREST RAND, is ... (1)

A) R13 600 **B)** R14 115,82

C) R10 900 **D) R14 116 ✓**

> **Answer: D** — $A = 10\,000(1{,}09)^4 = \text{R}14\,115{,}82$, which is R14 116 to the nearest rand.
> - **A** — used simple interest, $10\,000(1 + 0{,}36)$
> - **B** — the value is right, but the question asks for the nearest RAND
> - **C** — compounded for one year only

ANSWER GRID — MARKING GUIDELINE

1.1	A	**(B)**	C	D
1.2	A	B	**(C)**	D
1.3	A	B	**(C)**	D
1.4	A	B	C	**(D)**
1.5	A	**(B)**	C	D
1.6	A	**(B)**	C	D
1.7	A	B	**(C)**	D
1.8	**(A)**	B	C	D
1.9	**(A)**	B	C	D
1.10	A	B	C	**(D)**

QUESTION 2 [11 MARKS]

Determine THROUGH CALCULATION which of the two investments below is more profitable.

- R7 000 at 10% p.a. COMPOUND interest for 5 years
- R7 000 at 12% p.a. SIMPLE interest for 5 years

2.1 Calculate the value of the compound-interest investment after 5 years. (3)

> $A = P(1 + i)^n = 7\,000(1{,}1)^5$ *(2)* = **R11 273,57** *(1)*

2.2 Calculate the value of the simple-interest investment after 5 years. **(3)**

> $A = P(1 + in) = 7\,000(1 + 0{,}12 \times 5)$ *(2)* = **R11 200** *(1)*

2.3 State which investment is more profitable and by how much. **(3)**

> The **compound** investment *(1)*
> R11 273,57 − R11 200 *(1)* = **R73,57** more *(1)*

2.4 Explain why the compound investment wins despite its LOWER interest rate. **(2)**

> Compound interest is calculated on the growing balance *(1)*, so it earns interest on interest, while simple interest is always worked out on the original R7 000 *(1)*

QUESTION 3 [11 MARKS]

Samson buys a television and a DVD player for R12 800. He pays R2 200 in cash and the balance through a hire-purchase agreement at 15% p.a. simple interest, repaid over two years.

3.1 Calculate the amount of the loan. **(2)**

> 12 800 − 2 200 *(1)* = **R10 600** *(1)*

3.2 Calculate the total amount that must be repaid on the loan. **(3)**

> $A = 10\,600(1 + 0{,}15 \times 2)$ *(2)* = **R13 780** *(1)*

3.3 Calculate Samson's monthly repayment. **(3)**

> Over 24 months: $\frac{13\,780}{24}$ *(2)* = **R574,17** *(1)*

3.4 Determine how much MORE than the cash price of R12 800 Samson pays in total. **(3)**

> Total paid = 2 200 + 13 780 = R15 980 *(2)*
> 15 980 − 12 800 = **R3 180** *(1)*

TOTAL: 32 marks

This question paper consists of 3 questions.

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