

GRADE 11 | 2024 | PRACTICE EXAM

Mathematics

PAPER 1

Time: 3 hours

Total: 150 marks

Paper 1 - Practice Exam

INSTRUCTIONS

- Read all questions carefully before answering.
- Number your answers exactly as the questions are numbered.
- Show ALL calculations. Answers without working will receive NO marks.
- Approved scientific calculator may be used.
- All answers must be rounded to TWO decimal places where applicable.
- Write neatly and legibly.

QUESTION 1 [40 marks]**ALGEBRA AND EQUATIONS****1.1 (4)**Solve for x : $2x^2 - 7x + 3 = 0$

1.2 (4)Solve for x : $x(x - 2) = 8$. (Show all working.)

1.3 (6)Solve for x and y simultaneously:

$$3x - 2y = 10$$

$$y = x - 1$$

1.4 (8)

Simplify fully:

$$(a) (2x^2 - 8) / (x^2 + 2x - 8)$$

(b) $(x^2 - 9) / (x^2 + x - 6) \times (2x - 4) / (x + 3)$

1.5 (5)

Solve for x : $\log_2(x) + \log_2(x - 2) = 3$

1.6 (4)

Without using a calculator, determine the value of:

$3^{(2x)}$ if $3^x = 5$

1.7 (4)

Factorise completely: $2x^3 - 6x^2 - 8x$

1.8 (5)

Solve for x : $|2x - 3| = 7$

QUESTION 2 [30 marks]

NUMBER PATTERNS AND SEQUENCES

2.1 (7)

Consider the sequence: 5, 9, 13, 17, ...

- (a) Write down the next two terms.
- (b) Determine a formula for the n th term.
- (c) Is 101 a term of this sequence? Show your reasoning.

2.2 (10)

A geometric sequence has $T_2 = 6$ and $T_5 = 48$.

- (a) Determine the first term and the common ratio.

- (b) Determine T_8 .
- (c) Determine the sum of the first 10 terms (S_{10}).

2.3 (8)

The sum of an arithmetic sequence is given by $S_n = 2n^2 + 3n$.

- (a) Determine the first three terms of the sequence.
- (b) Determine the 15th term.

2.4 (5)

Determine the value of sum from $k=1$ to 8 of $(3k - 1)$.

QUESTION 3 [40 marks]**FUNCTIONS AND GRAPHS****3.1 (10)**

Given: $f(x) = (x - 2)^2 - 9$

- (a) Write down the coordinates of the turning point.
- (b) Determine the x-intercepts.
- (c) Determine the y-intercept.
- (d) Sketch $f(x)$, showing ALL key points.

3.2 (8)

Given: $g(x) = -2 / (x + 1) + 3$

- (a) Write down the equations of the asymptotes.
- (b) Determine the x-intercept and y-intercept.
- (c) Sketch $g(x)$ on a set of axes.

3.3 (10)

Given: $h(x) = 2^{x-1} + 3$

- (a) Write down the equation of the asymptote.
 (b) Determine $h^{-1}(x)$ (the inverse of h).
 (c) Sketch both $h(x)$ and $h^{-1}(x)$ on the same set of axes.

3.4 (8)

The graph of $f(x) = a(x - p)^2 + q$ has turning point (2, -8) and passes through (0, 0).

- (a) Determine the values of a , p and q .
 (b) For what values of x is $f(x) > 0$?

3.5 (4)

Determine the equation of the line perpendicular to $2x - 3y = 6$ and passing through (-3, 1).

QUESTION 4 [40 marks]**FINANCE, GROWTH AND DECAY****4.1 (8)**

Sipho invests R25 000 at 9.5% per annum compound interest.

- (a) Calculate the value of the investment after 6 years.
 (b) How many years will it take to double in value? (Use logarithms.)

4.2 (7)

A car is bought for R320 000. It depreciates at 15% per year on the REDUCING BALANCE.

- (a) Calculate its value after 4 years.
 (b) After how many years will its value fall below R100 000?

4.3 (9)

A loan of R80 000 is taken at an interest rate of 12% per annum, compounded monthly.

Monthly repayments are R2 100.

(a) How many months will it take to pay off the loan? (Show working or trial and error.)

(b) What is the final (smaller) payment?

4.4 (8)

Nomsa saves R1 500 per month into an account earning 8% per annum, compounded monthly.

How much will she have saved after 5 years?

Formula: $F = x[(1 + i)^n - 1] / i$

4.5 (4)

Explain the difference between simple interest and compound interest. State which benefits a BORROWER more.

END OF EXAMINATION | Check your work.