



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 10

**MATHEMATICS P1
EXEMPLAR PAPER - 2006**

MARKS: 100

TIME: 2 hours

This question paper consists of 7 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions:

1. This question paper consists of SEVEN questions. Answer ALL the questions.
2. Clearly show ALL the calculations, diagrams, graphs, et cetera you have used in determining the answers.
3. An approved calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
4. If necessary, answers should be rounded off to TWO decimal places, unless stated otherwise.
5. Number the answers EXACTLY as the questions are numbered.
6. Diagrams are NOT necessarily drawn to scale.
7. It is in your own interest to write legibly and to present the work neatly.

QUESTION 1

1.1 Simplify:

1.1.1 $(2x - 3)(5x^2 - 2x + 1)$ (4)

1.1.2 $\frac{3^{x-1} \cdot 2^{x+1}}{6^x}$ (4)

1.1.3 $\frac{3x+7}{5} - \frac{x-2}{3}$ (4)

1.2 Factorise:

1.2.1 $2x^2 - 5x - 3$ (2)

1.2.2 $5xy - 3y + 10x - 6$ (3)

1.3 Show that $(2x - 1)^2 - (x - 3)^2$ can be simplified to $(x + 2)(3x - 4)$. (4)**[21]****QUESTION 2**

2.1 Solve the following equations:

2.1.1 $(x + 1)(x - 2) = 4$ (5)

2.1.2 $2^x = 13$ (answer correct to ONE decimal digit) (3)

2.2 Solve the following inequality. Illustrate your answer graphically.

$$-5 < 2x - 3 \leq 7$$
 (5)

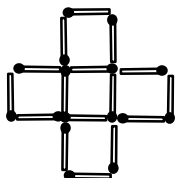
2.3 Three rulers and five pencils cost R10. One pen and ten pencils cost R10. Let the cost of a ruler be x rand and the cost of a pencil be y rand.2.3.1 Write down a system of equations, in terms of x and y that reflect the above-mentioned situation. (2)

2.3.2 Solve the system of equations in QUESTION 2.3.1 simultaneously and state the cost of a ruler and the cost of a pencil. (5)

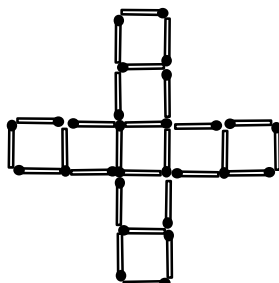
[20]

QUESTION 3

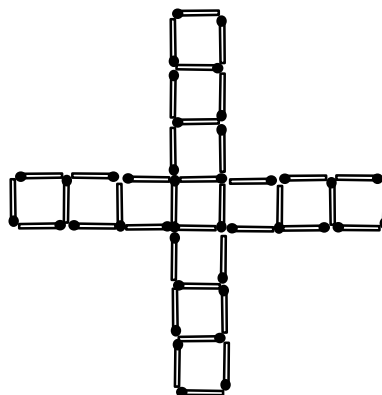
Thandi builds patterns that consist of squares as shown below:



Picture 1



Picture 2



Picture 3

Assume the pattern is continued, answer the following questions:

- 3.1 How many squares will Picture 5 have? (2)
 - 3.2 Make a conjecture about the number of matches required for any pattern. (2)
 - 3.3 Use a variable to write an algebraic statement to generalise the relationship between the number of squares and the picture number. (2)
- [6]**

QUESTION 4

- 4.1 Andrew invested R5 000 at 15% simple interest per annum for 5 years. Cheryl invested R5 000 at 12% compound interest per annum for 5 years. Which person gained more interest on their investment? Substantiate your answer. Show ALL calculations. (8)
- 4.2 Siphon wants to buy a motor bike for R10 500. He has a deposit of R2 000. He wishes to pay the balance using a hire purchase agreement over 3 years. The interest charged on the loan is 18% per annum. Included in the agreement, is an insurance cost of 2% per annum on the purchase price of the motor bike.

Calculate his monthly instalment. (7)

- 4.3 The foreign exchange table below indicates the average exchange rate of the South African rand to other currencies.

FOREIGN EXCHANGE TABLE

COUNTRY	CURRENCY	AVERAGE EXCHANGE RATE OF THE RAND
United Kingdom (UK)	Pound (£)	11,85
United States of America (USA)	Dollar (\$)	6,30

A company in South Africa exports steel tables to the UK and USA. The total cost to manufacture a table in South Africa is R275, 00 per table.

- 4.3.1 How much, in dollars (\$), will a company in the USA pay for a table? (2)
- 4.3.2 How much, in pounds (£), will a company in the UK pay for a table? (2)
- 4.3.3 If the UK could manufacture the same tables at a price of £20 each, will they still buy from South Africa?

Show ALL your calculations to substantiate your answer. (2)
- 4.3.4 As a result of increasing costs in manufacturing the tables, South Africa wishes to increase the prices by 10%. How much will the USA now pay for a single table in dollars? (2)

[23]

QUESTION 5

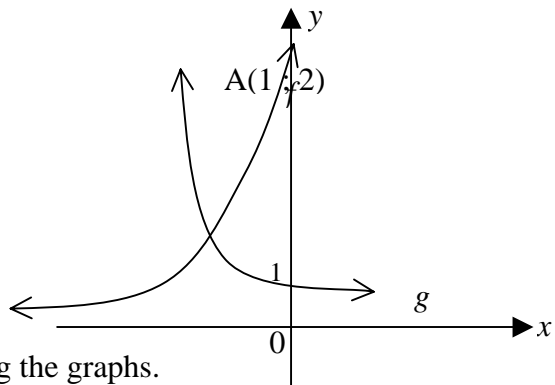
Given functions $f(x) = -x^2 + 9$ and $g(x) = 3x + 9$

- 5.1 Draw f and g on the same system of axes. (6)
- 5.2 Use your graphs to solve for x if:
- 5.2.1 $f(x) = g(x)$ (2)
- 5.2.2 $f(x) > 0$ (2)
- 5.3 How does the graph of $h(x) = -x^2 - 9$ compare with the graph of $f(x)$? (2)
- 5.4 Give the equation of the reflection of f in the x -axis. (2)

[14]

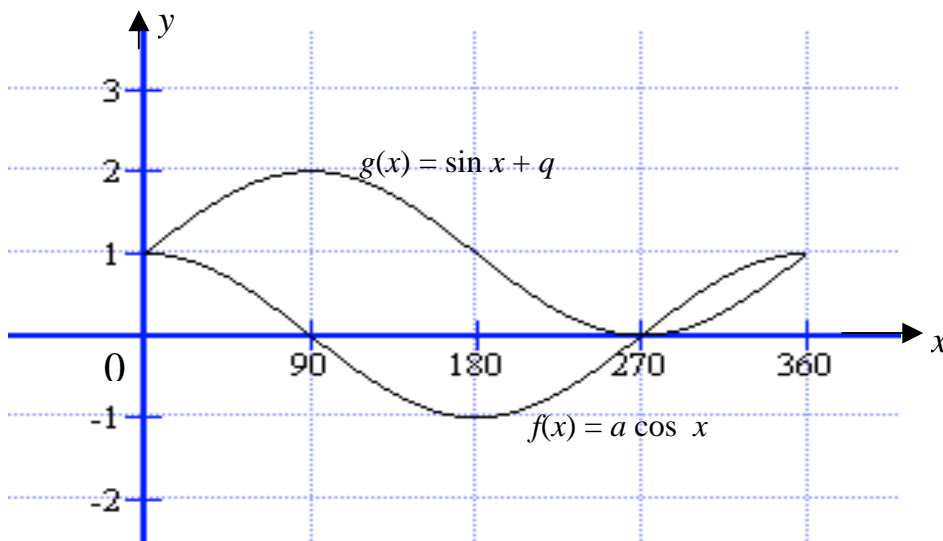
QUESTION 6

- 6.1 The graph of $f(x) = 2^x$ and $g(x) = \frac{k}{x}$ are represented alongside.
The graphs intersect at A.



Answer the following questions by using the graphs.

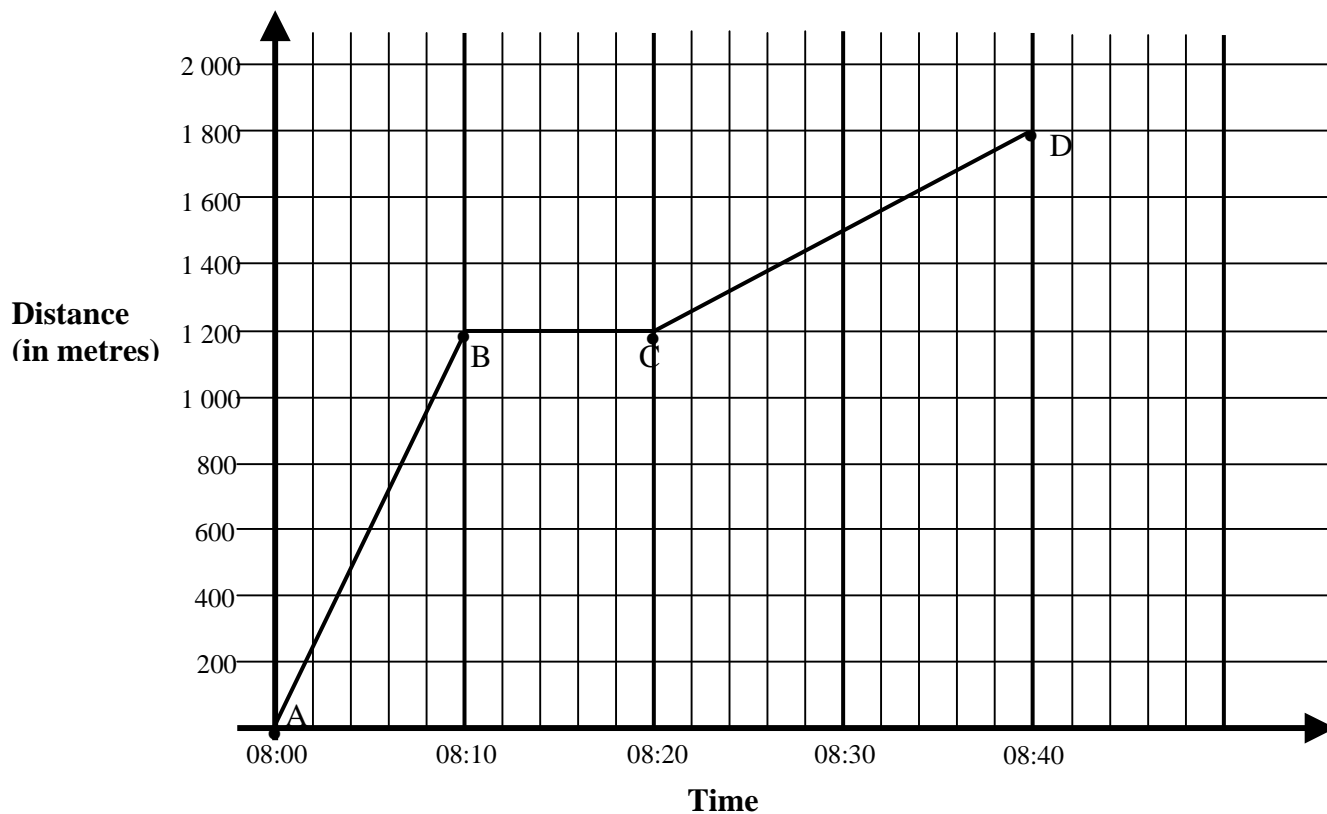
- 6.1.1 What is the domain of f ? (1)
- 6.1.2 Give the equation of the asymptote of the graph of $y = 2^x - 2$. (2)
- 6.1.3 What is the value of k ? (1)
- 6.2 The diagram below represents the graphs of the functions $f(x) = a \cos x$ and $g(x) = \sin x + q$



- 6.2.1 What is the value of a ? (1)
- 6.2.2 Write down the value of q . (1)
- 6.2.3 What is the range of g ? (2)
- 6.2.4 For which values of x is $g(x) - f(x) = 2$? (2)

[10]

QUESTION 7



The distance–time graph above represents Rowan’s journey from home to school.

- 7.1 How fast in m/s was Rowan travelling during the first 10 minutes? (2)
- 7.2 How far was Rowan from home at 08:15? (1)
- 7.3 Describe in your own words, the stage of Rowan's journey represented by the line BC. (2)
- 7.4 What was the average speed of the journey from home to school? (2)

[7]

TOTAL: 100