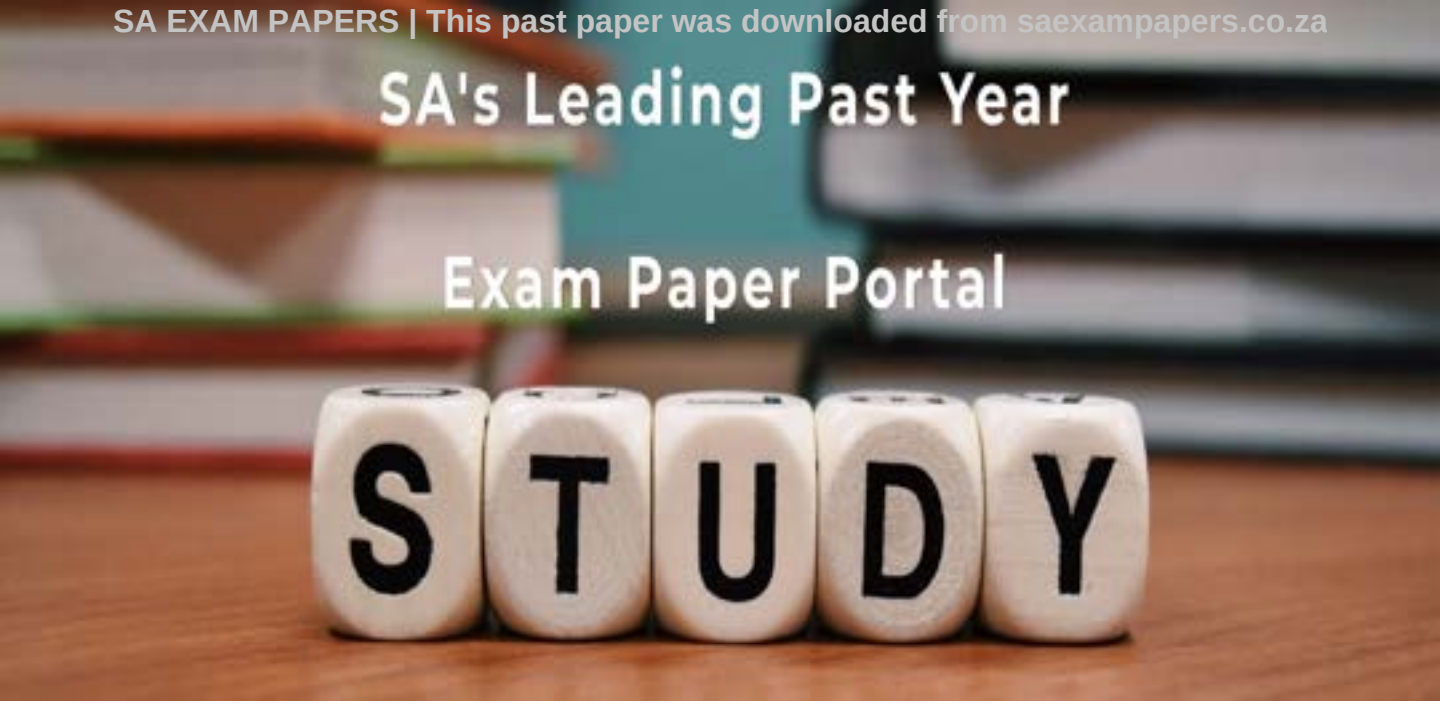

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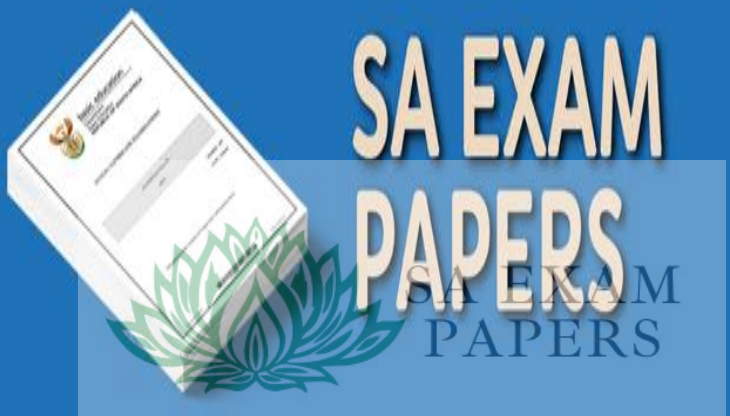


LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF
EDUCATION

CAPRICORN SOUTH DISTRICT

GRADE 12

MATHEMATICS PRE FORMAL TEST

TEST 1

MARKS: 100

TIME: 2 Hours

DATE: 06/03/2024

This question paper consists of 6 pages

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 6 Questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations, diagrams and graphs that you have used in determining your answers.
4. Answers only will NOT necessarily be awarded full marks.
5. An approved scientific calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
6. If necessary, answers should be rounded off to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. Number your answers correctly according to the numbering system used in this question paper.
9. It is in your own interest to write legibly and to present your work neatly.

QUESTION 1

1.1 Solve for *x:*

1.1.1 $2 + 3x = x - 26$ (2)

1.1.2 $2x^2 + x - 15 = 0$ (3)

1.1.3 $3x^2 + 2x - 4 = 0$ (round off your answer to TWO decimal places) (4)

1.1.4 $(x - 1)^2 > 4$ (4)

1.1.5 $\sqrt{-7x + 2} = -x + 2$ (4)

1.2 Solve for *x* and *y* if they satisfy the following equations simultaneously:

$x - y = -1$

$x^2 - 2xy + 3y^2 = 9$ (6)

[23]

QUESTION 2

2.1 Consider the quadratic sequence $3; 9; 17; 27; ...$

2.1.1 Determine an expression for the nth term of the sequence. (3)

2.1.2 What is the value of the first term of the sequence that is greater than 269? (3)

2.2 Given the following arithmetic sequence: $p + 3; 2p - 3; p - 5; ...$

2.2.1 Determine the value of p. (2)

2.2.2 Determine the 10th term of the sequence. (2)

2.2.3 How many terms of the sequence must be added to give a sum of -984? (3)

[13]

Question 3

2.1 ` A certain quadratic pattern has the following features:

- $T_1 = x$
- $T_2 = 18$
- $T_4 = 4x$
- $T_3 - T_2 = 10$

Determine the value of x. (4)

2.2 Given the geometric series: $15 + p + \frac{5}{3} + \frac{5}{9} + \ldots$

2.2.1 Determine the value of p. (3)

2.2.2 Calculate the sum of the first 8 terms of the series. (3)

2.2.3 Explain why the series is convergent. (2)

2.2.4 Evaluate $\sum_{n=1}^{\infty} 5(3^{2-n})$ (3)

[15]

Question 3

Consider the function: $g(x) = \frac{-4}{x+1} - 3$

3.1 Write down the range of g. (1)

3.2 Write down the y-intercept of g. (1)

3.3 Calculate the x-intercept of g. (2)

3.4 Sketch the graph of g, clearly indicating the intercepts with the axes and the asymptotes. (3)

[07]

QUESTION 4

4.1 Given the function $p(x) = \left(\frac{1}{3}\right)^x$.

4.1.1 Is p an increasing or decreasing function? (1)

4.1.2 Determine p^{-1}, the inverse of p, in the form $y = \ldots$ (2)

4.1.3 Write down the domain of p^{-1}. (1)

4.1.4 Write down the equation of the asymptote of $p(x) - 5$. (1)

4.2 Given: $f(x) = \frac{4}{x-1} + 2$

4.2.1 Write down the equations of the asymptotes of f. (2)

4.2.2 Calculate the x-intercept of f. (2)

4.2.3 Sketch the graph of f, label all asymptotes and indicate the intercepts with the axes. (4)

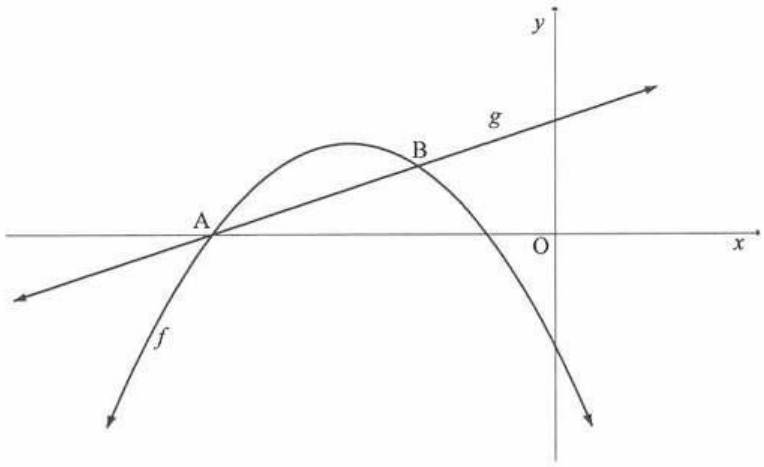
4.2.4 Use your graph to determine the values of x for which $\frac{4}{x-1} \geq -2$. (2)

4.2.5 Determine the equation of the axis of symmetry of $f(x-2)$, that has a negative gradient. (3)

[18]

QUESTION 5

The graphs of the functions $f(x) = -(x+3)^2 + 4$ and $g(x) = x + 5$ are drawn below.
The graphs intersect at A and B.



5.1 Write down the coordinates of the turning point of f. (2)

5.2 Write down the range of f. (1)

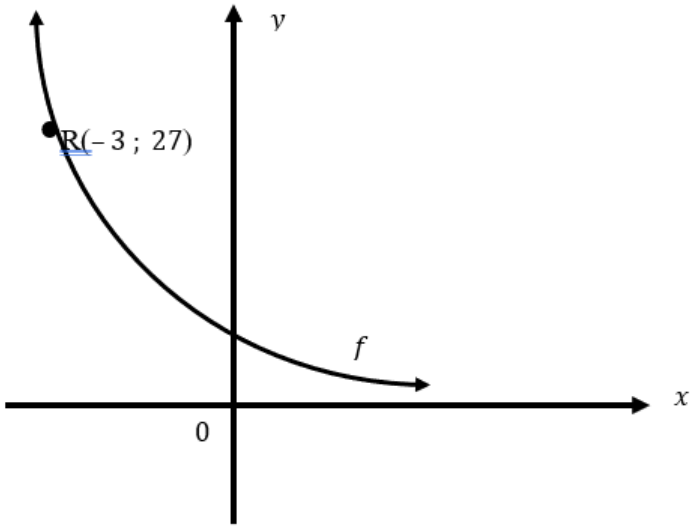
5.3 Show that the x-coordinates of A and B are -5 and -2 respectively. (4)

5.4 Hence, determine the values of c for which the equation $-(x+c+3)^2 + 4 = (x+c)+5$ has ONE negative and ONE positive root. (2)

5.5 The maximum distance between f and g in the interval $x_A < x < x_B$ is k.
If $h(x) = g(x) + k$, determine the equation of h in the form $h(x) = \ldots$ (5)
[14]

Question 6

The graph of $f(x) = a^x$ is drawn below. The point $R(-3\,;\,27)$ lies on f.



6.1 Write down the domain and range of f (2)

6.2 Write down the coordinates of the y – intercept of f. (2)

6.3 Calculate the value of a. (2)

6.4 Determine the equation of f^{-1}, the inverse of f, in the form $y = \ldots\ldots$ (2)

6.5 Write down the values of x for which $f^{-1}(x) \geq -3$. (2)

[10]

//100//