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GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

JUNE 2024

GRADE 10

MATHEMATICS

(PAPER 1)

TIME: 1 hour

MARKS: 50

This question paper consists of 6 pages

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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. This question paper consists of FIVE questions.
3. Present your answers according to the instructions of each question.
4. Clearly show ALL calculations, diagrams, graphs et cetera, which were used in determining the answers.
5. Answers only will NOT necessarily be awarded full marks.
6. Use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. Where necessary, answers should be rounded-off to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. Number the questions correctly according to the numbering system used in the question paper.
10. Write neatly and legibly.

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QUESTION 1

If $x \in \{0;1;2;3;4\}$, write down a value of x such that $K = \sqrt{\frac{9}{4-x}}$ is:

1.1 Undefined (1)

1.2 Rational (1)

1.3 Irrational (1)

[3]

QUESTION 2

2.1 Simplify the following:

2.1.1 $2b(b-5c)^2$ (2)

2.1.2 $\frac{3x-2.3^{x-1}}{3^{x+2}+2.3^{x+1}}$ (3)

2.2 Factorise completely:

$a^2 - ax - 1 + x$ (3)

[8]

QUESTION 3

3.1 Solve for x:

3.1.1 $3x^2 = 2x$ (2)

3.1.2 $\frac{7}{3-x} = \frac{5}{x+3} + \frac{4}{x^2-9}$ (4)

3.1.3 $16,2^{x-1} = (0,5)^{x-4}$ (4)

3.2 Given: $2 - \frac{3x}{4} < 14$

3.2.1 Solve the inequality. (2)

3.2.2 Write down the first natural number that will satisfy the inequality. (1)

3.3 Solve simultaneously:

$2x + y = 8$ and $2y + 3x = -2$ (4)

[17]

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QUESTION 4

Consider the functions $f(x) = ax^2 + c$ and $g(x) = bx + q$. f ang g intersect at points A(–1 ;–3) and B (2; 0).

4.1 Calculate the values of a and c. (4)

4.2 Calculate the values of b and q. (3)

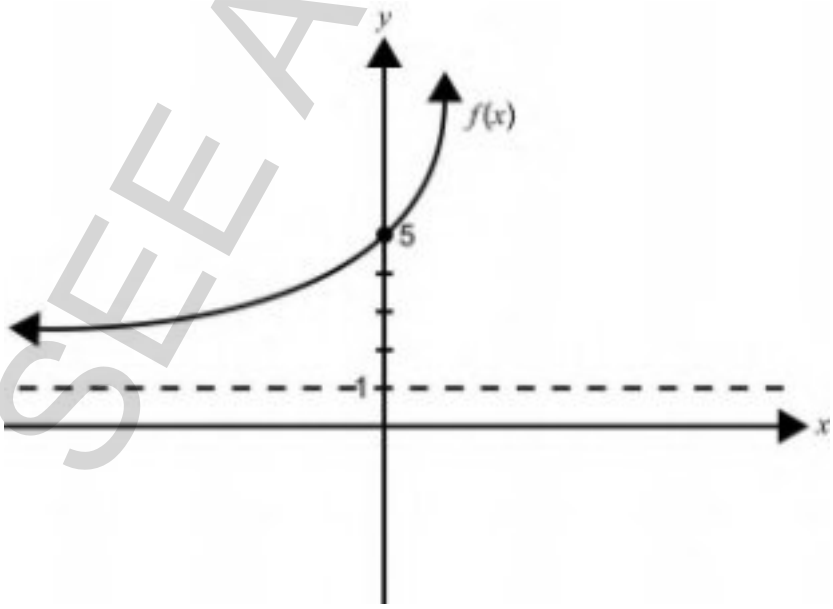
4.3 Use the ANSWER SHEET provided to sketch the graphs f *and* g on the same set of axis. (6)

4.4 Determine the value of $g(x) - f(x)$. (2)

4.5 For which values of x is $g(x) \geq f(x)$. (2)
[17]

QUESTION 5

The graph of $f(x) = 2^{x+2} + k$ is drawn below.



5.1 Use the laws of indices to show that $2^{x+2} + k$ is the same as $4.2^x + k$. (2)

5.2 Determine the value of k. (2)

5.3 Write down the equation of the asymptote of f. (1)
[5]

TOTAL: 50

END

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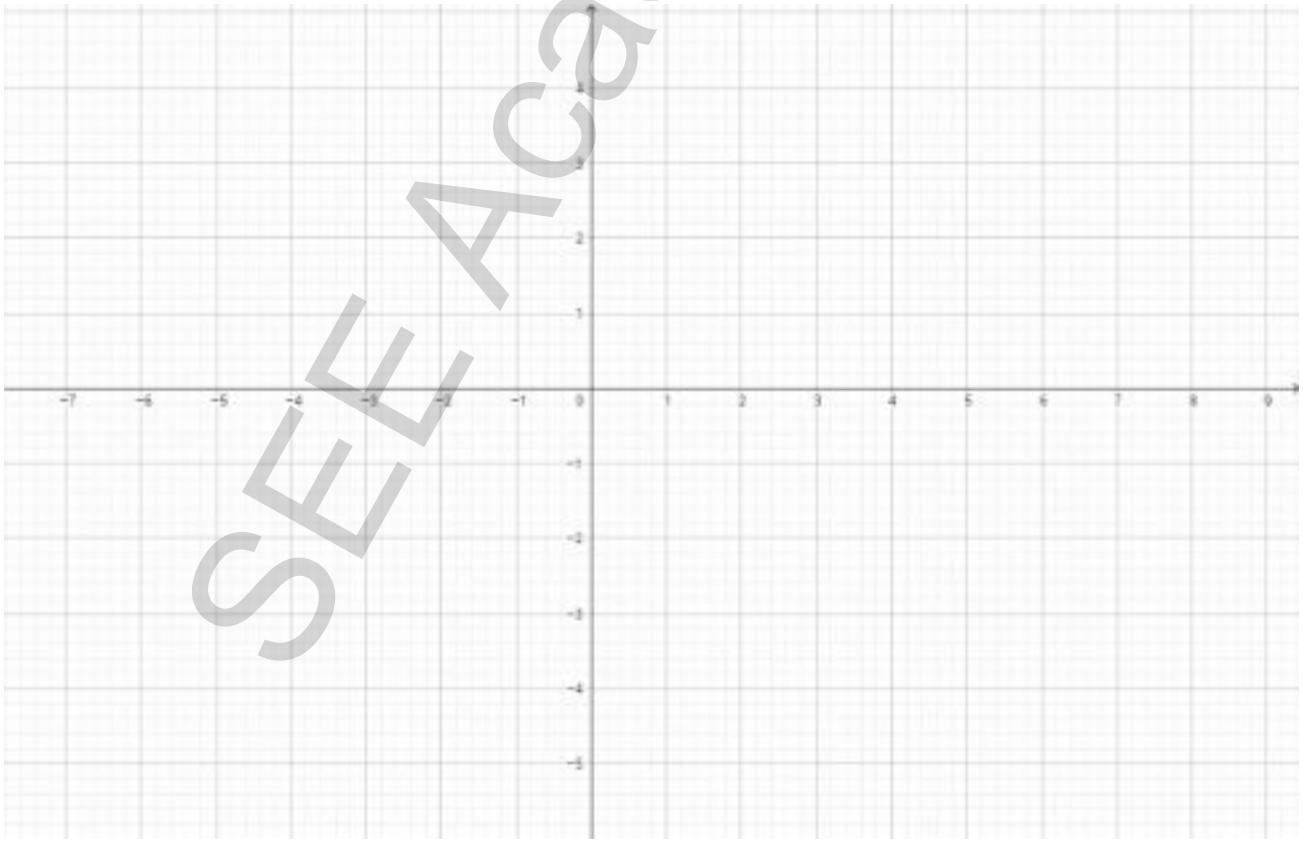
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ANSWER SHEET

QUESTION 4.3



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INFORMATION SHEET

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

$$A = P(1+ni) \qquad A = P(1-ni) \qquad A = P(1-i)^n \qquad A = P(1+i)^n$$

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

$$T_n = ar^{n-1} \qquad S_n = \frac{a\,r^n - 1}{r-1} \;;\; r \neq 1 \qquad S_\infty = \frac{a}{1-r} \;;\; -1 < r < 1$$

$$F = \frac{x(1+i)^n - 1}{i} \qquad P = \frac{x\,1-(1+i)^{-n}}{i}$$

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

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \qquad M\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c \qquad y - y_1 = m(x - x_1) \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad m = \tan\theta$$

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

In ΔABC: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$ $\qquad a^2 = b^2 + c^2 - 2bc.\cos A$

$$\text{area } \Delta ABC = \frac{1}{2}ab.\sin C$$

$$\sin(\alpha+\beta) = \sin\alpha.\cos\beta + \cos\alpha.\sin\beta \qquad \sin(\alpha-\beta) = \sin\alpha.\cos\beta - \cos\alpha.\sin\beta$$

$$\cos(\alpha+\beta) = \cos\alpha.\cos\beta - \sin\alpha.\sin\beta \qquad \cos(\alpha-\beta) = \cos\alpha.\cos\beta + \sin\alpha.\sin\beta$$

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

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

$$P(A) = \frac{n(A)}{n(S)} \qquad P\ (A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$\hat{y} = a + bx \qquad b = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sum(x-\bar{x})^2}$$

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