Education and Sport Development
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NORTH WEST PROVINCE

GRADE 11

MATHEMATICS P1

MID YEAR EXAMINATION 2019

MARKS: 100

TIME: 2 hours

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 8 questions.
2. Clearly show ALL calculations, diagrams, graphs, et cetera that you used to determine the answers.
3. Answer only will NOT necessarily be awarded full marks.
4. If necessary, round off answers to TWO decimal places, unless stated otherwise.
5. Diagrams are NOT necessarily drawn to scale.
7. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
8. Write neatly and legibly.

QUESTION 1

1.1 Solve for x:

1.1.1 $(2x + 1)(x – 2) = 0$ (2)

1.1.2 $5x\,(x – 3) = 2$ (Leave your answer correct to TWO decimal places.) (5)

1.1.3 $2x - \sqrt{32-8x} = 0$ (5)

1.1.4 $x^2 + 6x - \dfrac{35}{x^2 + 6x} = 2$ (7)

1.2 Solve for x and y simultaneously

$2x - y = 8$ and $y = x^2 + 4x - 23$ (7)

[26]

QUESTION 2

2.1 The roots of a quadratic equation are given by

$$x = \frac{-4 \pm \sqrt{(k+1)(3-k)}}{2}$$

2.1.1 If $k = 2$, determine the nature of roots (3)

2.1.2 Determine the value(s) of k for which roots are non-real (3)

2.2 For what value(s) of m, will $x^2 + 4mx + 8m + 12$ be a perfect square (4)

[10]

QUESTION 3

3.1 Simplify the following expression

3.1.1 $\left(\sqrt{8x} - \sqrt{12x}\right)\left(\sqrt{8x} + \sqrt{12x}\right)$ (2)

3.1.2 $\dfrac{5^n.10^{2n-1}.2^{4n+1}}{20^{3n}}$ (4)

3.2 Prove that $\dfrac{2.3^{n+1} + 3^{n+2}}{2.3^{n+3} + 3^n}$ is independent of n (3)

[9]

QUESTION 4

4.1 Given the quadratic pattern: 5 ; 10 ; 17 ; 26 ; .....

4.1.1 Write down the next TWO terms of the pattern (2)

4.1.2 Determine the formula for the n^{th} term of the pattern (4)

4.1.3 Which term of the pattern will have a value of 1765 (5)

4.2 Given the quadratic pattern: $x ; 6 ; 9 ; y ; 24; ...$

Calculate the sum of x and y. (6)
[17]

QUESTION 5

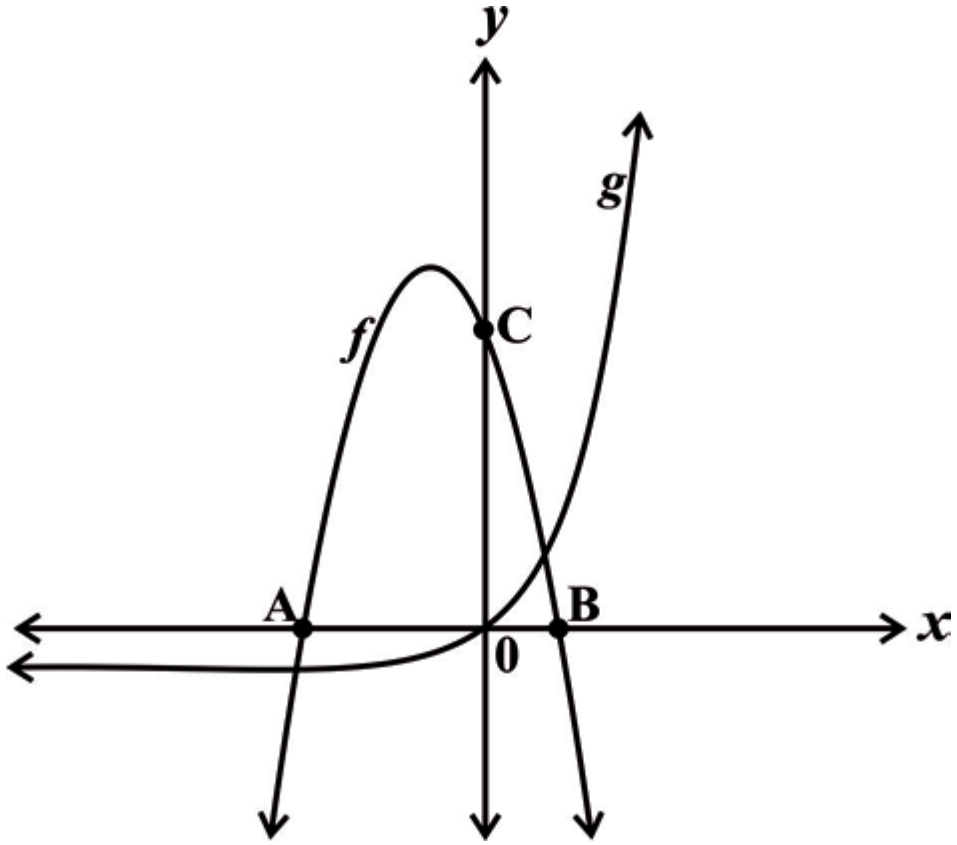
5.1 How much must Mike invest now to have R36000 after 5 years if the interest rate is 9, 5% compounded annually? (3)

5.2 Jason wants to travel overseas in six years' time. He invests R20 000 in a saving account in order to save up for the trip. The interest rate for the six-year period is 11% compounded annually. At the end of fourth year he runs into financial difficulty and withdraws R4000 from the account. How much money will he have saved at the end of six year period? (3)
[6]

QUESTION 6

The sketch represents the graphs of the functions $f(x) = ax^2 + bx + c$ and $g(x) = d^x + q$

- The x-intercepts of f are A (–3;0) and B (1;0).
- The y-intercept of f is C (0;6).
- The graph of g passes through the origin and the point (1 ; 2).



Determine:

6.1 The value of a , b and c (5)

6.2 The range of f (3)

6.3 The equation of g (3)

6.4 The equation of the asymptote of g (1)

6.5 The value(s) of x if $g(x) \leq 0$ (1)

6.6 The coordinates of the turning point of $h(x) = -f(x)$ (2)

[15]

QUESTION 7

The graph of an increasing hyperbolic function with equation

$g(x) = \frac{a}{x-p} + q$ has the following properties:

- The domain is $x \in \Re,\ x \neq -2$
- The range is $y \in \Re,\ y \neq 1$
- The graph passes through (0 ; 0)

7.1 Determine the equation of g. (3)

7.2 Sketch the graph of g in your answer book, clearly showing the asymptotes and intercepts with the axes. (3)

7.3 One of the axes of symmetry of f is a decreasing function. Determine the equation of this axis of symmetry. (2)

[8]

QUESTION 8

In a survey conducted, 80 people were asked whether they preferred brown or white chocolates.

- 20 people do not like chocolates.
- 36 people like white chocolates.
- 50 people like brown chocolates.

8.1 Draw a Venn diagram to illustrate the above information (5)

8.2 Determine:

8.2.1 P (W and B) (2)

8.2.2 P (W or B) (2)

[9]

TOTAL:100