Education and Sport Development

Department of Education and Sport Development
Departement van Onderwys en Sportontwikkeling
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NORTH WEST PROVINCE

GRADE 11

MATHEMATICS P1

MID YEAR EXAMINATION 2018

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 7 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 Given: $(3x-1)(x+3) = c$, Find the value(s) of x if

1.1.1 $c = 0$ (2)

1.1.2 $c = -5$ (Leave your answer correct to TWO decimal places) (5)

1.2 Solve for x in the following:

1.2.1 $\sqrt{x+2} + x = 4$ (5)

1.2.2 $4(x^2 - x) - \frac{2}{x^2 - x} = 7$ (7)

1.2.3 $3^{x-2} + 3^{x+1} = 28$ (4)

1.2.4 $x^2 \leq 4x$ (4)

1.3 Solve for x and y simultaneously

$x - 3 - y = 0$ and $xy = -2$ (7)

[34]

QUESTION 2

2.1 Given: $x = 3 \pm \sqrt{18 - 2a^2}$

Determine the value(s) of a for which roots are equal (3)

2.2 State, giving a reason, the nature of the roots of a quadratic equation if the discriminant is

2.2.1 $(a+3)^2 + 12$ (2)

2.2.2 $-4(a-b)^2$, if $a \neq b$ and $a, b \text{ are} \in \text{R}$ (2)

[7]

QUESTION 3

3.1 Simplify

3.1.1 $\sqrt[4]{\frac{3^a.9^{a+1}}{27^{a+2}}}$ (3)

3.1.2 $\frac{2^{x+3}-3.2^{x-1}}{2^{x-2}}$ (3)

3.2 Find the value of 10^{x+3} if $10^x = 1{,}7$ (2)

3.3 Given: $3^a = p$ *and* $2^b = q$.
Write $2.9^a + 3.2^{-b}$ in terms of p and q (3)

[11]

QUESTION 4

The sequence 4 ; 9 ; x ; 37 ; ..... is a quadratic pattern.

4.1 Calculate the value of x. (3)

4.2 Determine the nth term of the sequence. (4)

4.3 Which term of the sequence will be equal to 212 (4)

[11]

QUESTION 5

5.1 Lerato invests R120 000 for a period of 4 years. She is offered an interest rate of 7,5% p.a. compounded monthly.

5.1.1 Determine the effective interest rate. (3)

5.1.2 What is the amount that Lerato will receive at the end of the 4 years? (3)

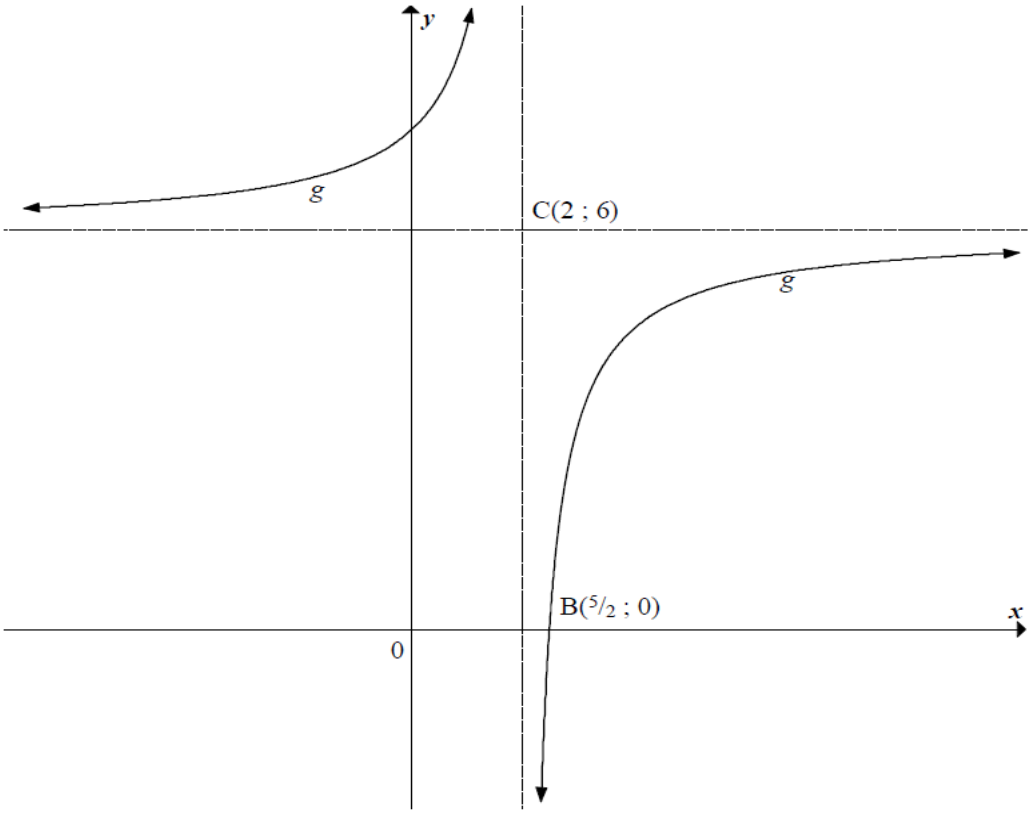
5.2 A firm bought computers that cost R80 000. Calculate the value of the computer after 3years if the rate of depreciation is 12% p.a, using reducing balance method? (3)

5.3 Jabu invested an amount of money for 5 years. He receives an interest rate of 12% p.a compounded quarterly for the first 3 years. The interest rate changes to 14% p.a compounded semi annually for the remaining years. The money grows to R 95000 at the end of the 5 year period.
Calculate how much Jabu invested initially. (5)

[14]

QUESTION 6

Sketched below is the graph of $g(x) = \frac{a}{x-p} + q$. C(2;6) is the point of intersection of the asymptotes of g. B$\left(\frac{5}{2};0\right)$ is the x-intercept of g.



6.1 Determine the equation of g in the form $g(x) = \frac{a}{x-p} + q$. (4)

6.2 Write down the domain of g (1)

6.3 For which value(s) of x is $g(x) \leq 0$? (2)

6.4 F is the reflection of B across C. Determine the coordinates of F. (2)

[9]

QUESTION 7

7.1 Given: $f(x) = 2^{x-1} - 4$

7.1.1 Write down the equation of the asymptote (1)

7.1.2 Calculate the co-ordinates of the *x*-intercept of *f*. (3)

7.1.3 Sketch the graph of *f*, showing clearly the intercept with the axes and the asymptotes. (4)

7.1.4 Write down the range of *f*. (1)

7.1.5 Calculate the value of m if (1 ; m) is a point on the graph (1)

7.2 Draw the sketch graph of $y = ax^2 + bx + c$ if $a > 0, b > 0, c < 0\ \Delta > 0$ (4)

[14]

TOTAL:100