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NORTH WEST PROVINCE

GRADE 11

MATHEMATICS P1

MID YEAR EXAMINATION 2017

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 6 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, in each of the following:

1.1.1 $2x^2 - 7x = 0$ (3)

1.1.2 $2x(x-3) = 1$ (Leave your answer correct to TWO decimal places.) (4)

1.1.3 $\sqrt{1+x} + 5 = x$ (5)

1.1.4 $x^2 + 3x - \frac{56}{x^2+3x} = 26$ (7)

1.1.5 $(x-3)(2-x) > 0$ (3)

1.1.6 $3x^{\frac{1}{2}} - 5x^{\frac{1}{4}} - 2 = 0$ (4)

1.2 Solve for x and y simultaneously

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

1.3 Given: $x = \frac{4 \pm \sqrt{25 - 5k}}{2}$

1.3.1 If $k = 5$, determine the nature of roots (2)

1.3.2 Determine the value(s) of k for which roots are non-real (2)

[37]

QUESTION 2

2.1 Simplify

2.1.1 $\sqrt{\frac{2^{399} + 2^{396}}{2^{396}}}$ (2)

2.1.2 $(\sqrt{6x} - \sqrt{2x})(\sqrt{6x} + \sqrt{2x})$ (2)

2.1.3 $\frac{10^{n+3}.5^{n-1}}{50^{n+2}}$ (4)

2.2 Given: $4.3^{1-x}+3^{2-x}$

2.2.1 Show that $4.3^{1-x}+3^{2-x}=\frac{21}{3^x}$ (3)

2.2.2 Hence solve for x if

$$4.3^{1-x}+3^{2-x}=63$$

(3)

[14]

QUESTION 3

Macky is saving money for a project in the money box on daily basis. The information is given in the table.

Day	1	2	3	4
Amount**(R)**	2	6	12	20

3.1 Determine how much money he will put in the money box on day 5 and day 6 if pattern continues (2)

3.2 Determine an algebraic formula to calculate how much money will be there on n^{th} day (5)

[7]

QUESTION 4

4.1 Anna receives R12 000 to invest for a period of 5 years. She is offered an interest rate of 8,5% p.a. compounded quarterly.

4.1.1 Determine the effective interest rate. (3)

4.1.2 What is the amount that Anna will receive at the end of the 5 years? (3)

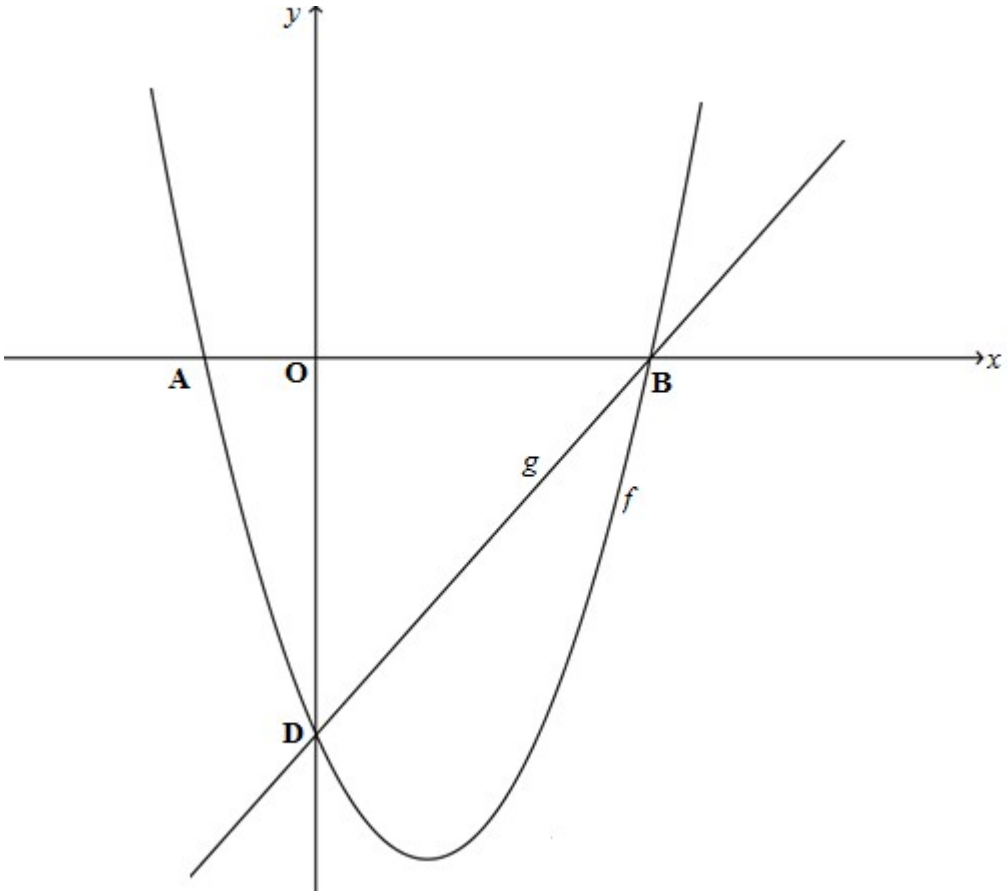
4.2 A company bought office furniture that cost R150 000.
What is the value of the furniture after 5years if the rate of depreciation is 12,4% p.a, using reducing balance method. (3)

4.3 Andrew plans to save R20 000 for a deposit on a new car. He decided to use a part of his annual bonus to pay three equal annual deposits into a savings account at the beginning of every year. Calculate how much money he must deposit to save up R20 000 after three years. Interest on the savings account is 8% p.a. compounded monthly. (4)

[13]

QUESTION 6

The figure below shows the graphs of $f(x) = 2(x + 2)(x - 6)$ and $g(x) = mx + c$.



Determine:

5.1 The lengths of OA and OB (2)

5.2 The coordinates of D, the *y*-intercept of the parabola and the line (2)

5.3 The range of $f(x)$ (3)

5.4 The value(s) of x if $f(x) < g(x)$ (2)

5.5 The values of m and c (2)

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

[13]

QUESTION 6

6.1 Given: $f(x) = \frac{2}{x-3} - 2$

6.1.1 Write down the equations of the asymptotes (2)

6.1.2 Calculate the *x*- and *y*-intercepts of *f*. (3)

6.1.3 Sketch the graph of *f*, showing clearly the intercepts with the axes and the asymptotes. (3)

6.1.4 Write down the domain of *f*. (1)

6.1.5 One of the axes of symmetry of f is an increasing function.

Determine the equation of this axis of symmetry. (2)

6.2 The graph of an increasing exponential function with equation

$g(x) = a.b^x + q$ has the following properties:

- The range is $y < -1$
- The points $(0;-2)$ and $(-1;-4)$ lie on the graph of *g*

Determine the values of *a*, *b* and *q*. (5)

[16]

TOTAL:100