



## BERGVLIET HIGH SCHOOL

Grade 10

MATHEMATICS

2 Hours

Examiner: B. James

PAPER 1

100 Marks

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### INSTRUCTIONS

1. This question paper consists of six questions. Answer ALL the questions.
2. A diagram sheet is attached for question 5.3, write your name and maths teacher's name in the space provided and attach to the back of your answer sheets.
2. Clearly show ALL the calculations, diagrams, graphs, et cetera you have used in determining the answers.
3. An approved calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
4. If necessary, answers should be rounded off to TWO decimal places, unless stated otherwise.
5. Number the answers EXACTLY as the questions are numbered.
6. Diagrams are NOT necessarily drawn to scale.
7. It is in your own interest to write legibly and to present the work neatly.
8. Write your maths teacher's name in the top right of your script.
9. The following formula may be used in this question paper:

$$y = mx + c$$

$$y - y_1 = m(x - x_2)$$

$$A = P(1 + in)$$

$$A = P(1 + i)^n$$

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### Question 1

1.1 Simplify:

1.1.1  $(x - 3y)(x + 2y)$  (2)

1.1.2  $\left(x - \frac{1}{2}\right)^2$  (2)

1.1.3  $\frac{3^{x+2} - 3^x}{3^{x+1} + 3^{x+3}}$  (4)

1.1.4  $\frac{5x - ax}{ay - 5y}$  (3)

1.2 Factorise fully:

1.2.1  $2x^2 + 5x - 12$  (3)

1.2.2  $x^6 + 27y^3$  (3)

[17]

### Question 2

2.1 Solve for  $x$ :

2.1.1  $x^2 - 9x + 20 = 0$  (3)

2.1.2  $\frac{3x}{5} - 2 = \frac{x}{3}$  (4)

2.1.3  $-2(x + 5) \geq 3$  (3)

2.1.4  $9^{x+3} = \frac{1}{27}$  (4)

2.2 Solve for  $x$  and  $y$  simultaneously given:

$$x + y = 3$$

$$2x - 3y = -4$$
 (5)

[19]

### Question 3

3.1 Find the next two terms in the following sequences:

3.1.1  $1 ; 3 ; 6 ; 10 ; \dots\dots\dots$  (1)

3.1.2  $4 ; 9 ; 16 ; 25 ; \dots\dots\dots$  (1)

3.2 Given the sequence:  $2 ; 5 ; 8 ; 11 ; \dots\dots\dots$

3.2.1 Determine the  $n^{\text{th}}$  term of the sequence. (4)

3.2.2 Determine the  $50^{\text{th}}$  term of the sequence. (2)

3.2.3 Which term of the sequence is equal to 104 (2)

[10]

#### Question 4

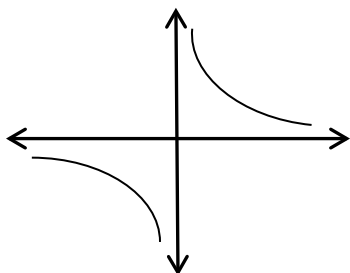
- 4.1 Sean buys Ipad for R6 000. He pays a 10% deposit and pays the remaining amount over 2 years at 21% p.a. simple interest.
- 4.1.1 How much is each monthly instalment? (5)
- 4.1.2 How much will Sean pay in total for the Ipad? (1)
- 4.2 Nicole needs R15 000 for an overseas trip. The bank offers her an interest rate of 9,5% compounded annually. How much does she need to invest now if she wants to go overseas in 4 years' time? (3)
- 4.3 R10 000 is invested at 11% compounded annually, 5 years later the interest rate changes to 9,5% compounded annually. Determine the value of the investment after a further 3 years. (4)
- [13]

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#### Question 5

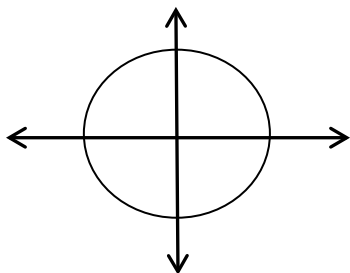
- 5.1 State whether the following graphs are functions or not.

5.1.1



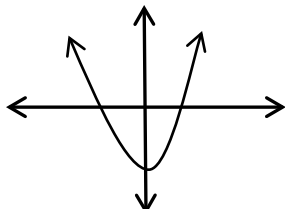
(1)

5.1.2



(1)

5.1.3



(1)

- 5.2 If  $f(x) = 2x^2 - 3$  determine:

5.2.1  $f(-2)$  (2)

5.2.2  $2f(x) + 3$  (3)

5.3 Draw sketches of the following functions on the axes provided on the diagram sheet.

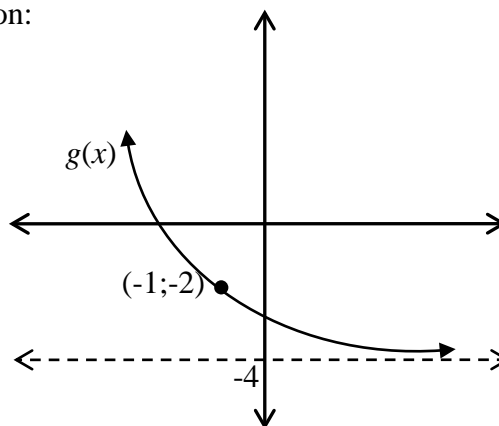
5.3.1  $y = 2x$  (2)

5.3.2  $f(x) = x^2 - 16$  (3)

5.3.3  $y = \frac{6}{x} + 2$  (4)

5.4 The sketch alongside shows the function:

$g(x) = a^x + q$ . The point  $(-1; -2)$  lies on  $g(x)$ .



5.4.1 Determine the equation of  $g(x)$ . (3)

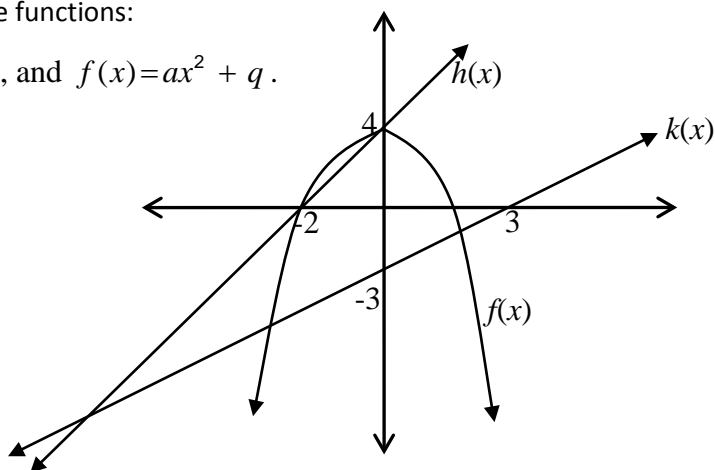
5.4.2 Write down the equation of the asymptote of  $g(x)$ . (2)

5.4.3 State the domain and range of  $g(x)$ . (3)

5.4.4 What would the equation of  $h(x)$  be if it is formed by reflecting  $g(x)$  about the  $y$  axis? (1)

5.5 The sketch alongside shows the functions:

$k(x) = x - 3$ ,  $h(x) = 2x + 4$ , and  $f(x) = ax^2 + q$ .



5.5.1 Determine the point of intersection of  $k(x)$  and  $h(x)$ . (4)

5.5.2 Determine the equation of  $f(x)$  (3)

### Question 6

There are 500 learners in a school.

- 170 learners take part in swimming
- 280 learners take part in athletics only
- 50 learners take part in both athletics and swimming

- 6.1 Use the above information to complete the Venn diagram on the diagram sheet. (4)
- 6.2 Calculate the probability that a learner chosen at random takes part in swimming or athletics. (2)
- 6.3 Calculate the probability that a learner chosen at random does not take part in either sports. (2)

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[8]

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TOTAL [100]

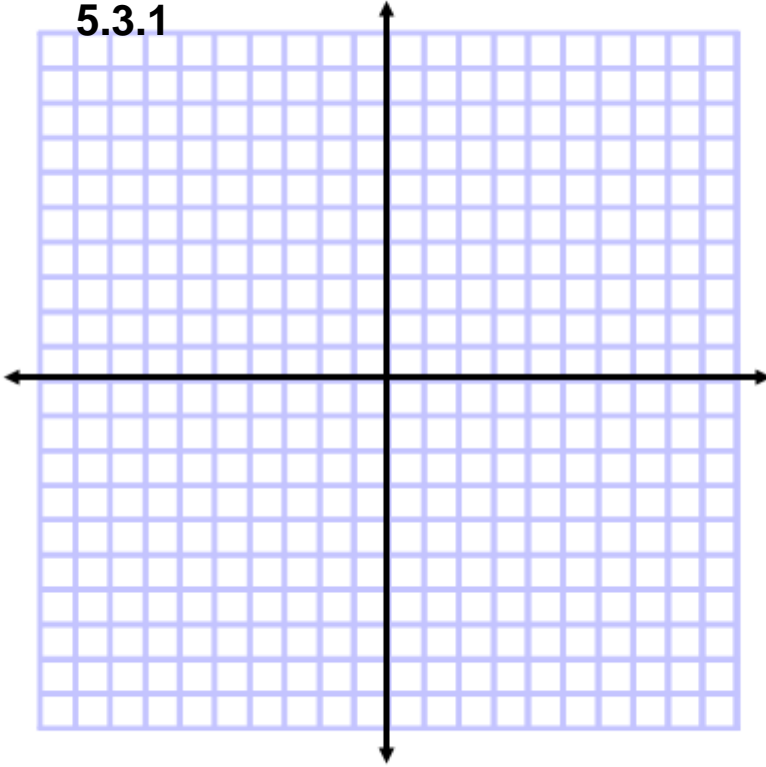
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DIAGRAM SHEET

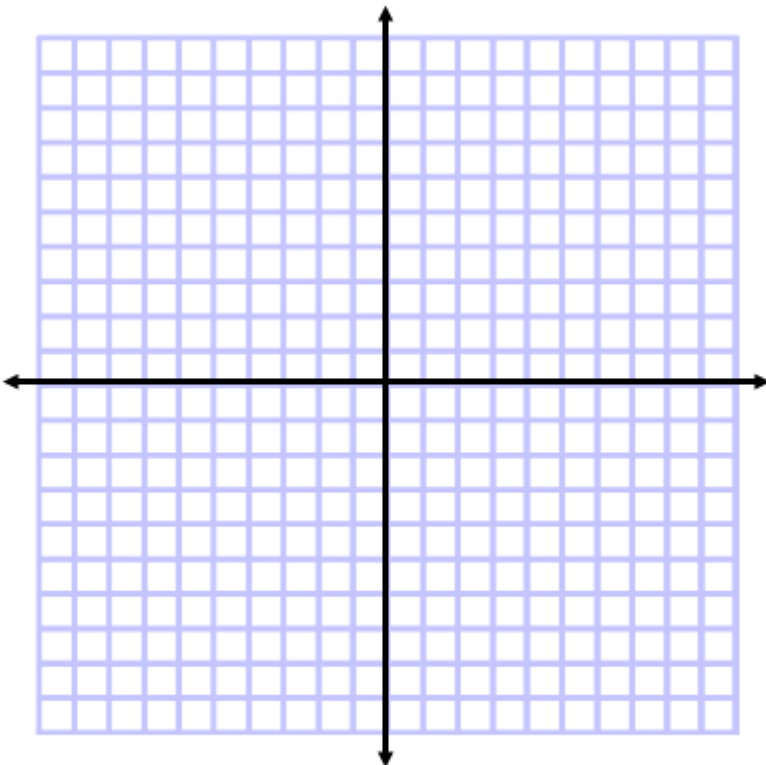
Question 5.3

Name:	
Maths Teacher:	

**5.3.1**



**5.3.2**



5.3.3

