BERGVLIET HIGH SCHOOL

MATHEMATICS DEPARTMENT

NOVEMBER EXAMINATION

GRADE 10

MATHEMATICS P1

NOVEMBER 2022

MARKS: **100**

TIME: **2 HOURS**

EXAMINER: **L STOREY**

MODERATOR: **A NAYSMITH**

INSTRUCTIONS AND INFORMATION

1. **This question paper consists of 8 questions. Answer all of the questions.**
   Question 5.3 and 7.1 must be answered on the diagram sheet at the end of the paper.

   ATTACH THE DIAGRAM SHEET TO FRONT OF THE ANSWER PAPER.

2. Clearly show ALL calculations, diagrams, graphs, et cetera that you have used in determining your answers.

3. Answers only will not necessarily be awarded full marks.

4. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.

5. If necessary, round off answers to TWO decimal places, unless stated otherwise.

6. Number the questions correctly according to the numbering on the question paper. Write neatly and legibly.

QUESTION 1

1.1 Simplify fully:

1.1.1. $(-3y^{-2})^2$ (2)

1.1.2. $(2a-3)^2-(3a-4)(3a+4)$ (4)

1.1.3. $(2x-1)(4x^2+2x+1)$ (3)

1.1.4. $\dfrac{3^{x+1}-4.3^x}{3^{x+2}}$ (3)

1.2. Factorise fully:

1.2.1. x^3-27 (2)

1.2.2. $2x^3-18x$ (3)

1.2.3. $3x^3-9x^2$ (2)

1.2.4. Use the factorised forms from 1.2.1., 1.2.2. and 1.2.3. above to determine the lowest common multiple of the three expressions. (2)

1.3. Factorise fully:

1.3.1. $x^2-14x+48$ (2)

1.3.2. $7x^2+16x-15$ (3)

1.3.3. $2x^2+2px-2mx-2mp$ (4)

1.4. Given: $f(x)=\dfrac{2}{x-3}+x$

1.4.1. What value of x will make the function undefined? (1)

1.4.2. Give the domain of $f(x)$. (2)

[33]

QUESTION 2

2.1. Solve for x:

2.1.1. $4x^2 - 3x = 0$ (3)

2.1.2. $\frac{-6}{x+2} = \frac{x-3}{4} - \frac{3}{2}$ (5)

2.1.3. $\frac{x+3}{2} + 5 > 8$ (3)

2.1.4. $200 \times 2^{x+8} + 400 = 13200$ (3)

2.2. Solve for x and y simultaneously:

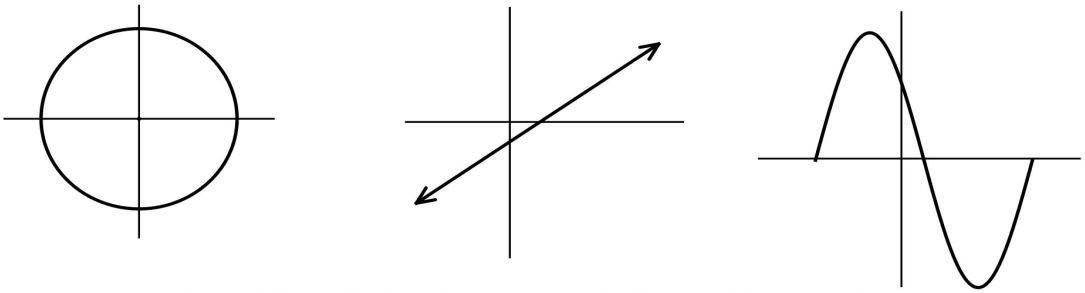
$3x + y = 2 \quad and \quad 6x - y = 25$ (4)

[18]

QUESTION 3

3.1. Write down the question number of the graph(s) given below which **are** functions. Give a reason for your answer.

3.1.1. 3.1.2. 3.1.3.



(3)

3.2. Given: $f(x) = -x^2 + 3$, determine:

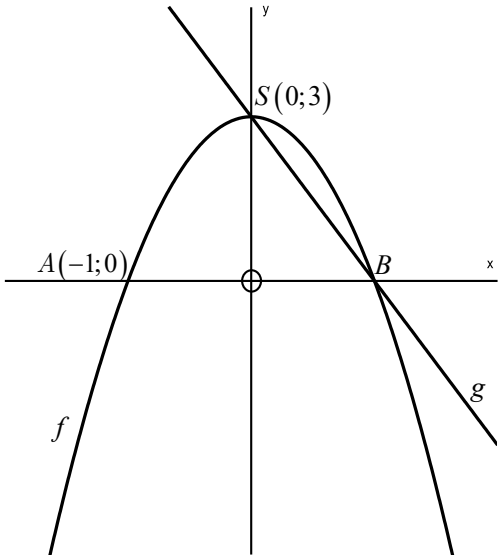
3.2.1. $f(2)$ (2)

3.2.2. $2f(x) - 4$ (2)

[7]

QUESTION 4

Given parabola $f(x)$ with the straight line $g(x)$ passing through the points S(0;3) and B.
$A(-1;0)$ is an x-intercept of f.



4.1. Write down the co-ordinates of B. (1)

4.2. Determine the equation of $f(x)$ in the form $y = ax^2 + c$. (3)

4.3. Determine the equation of $g(x)$. (2)

4.4. What is the equation of the axis of symmetry of the parabola (f)? (2)

4.5. For what values of x is $f(x) > g(x)$ *?* (2)

4.6. For which values of x is the graph of $f(x)$ increasing? (2)

4.7. What is the equation of the new graph *h(x)* if $f(x)$ is reflected in the x-axis and then moved two units up? (2)

[14]

QUESTION 5

Given the function: $f(x) = -\frac{6}{x} + 2$

5.1. State the equation(s) of the asymptote(s) of $f(x)$. (2)

5.2. Determine the x- and y-intercepts of f. (3)

5.3. Sketch the graph of f on the DIAGRAM SHEET provided at the end of the paper. Show all intercepts with the axes and the asymptotes. (3)

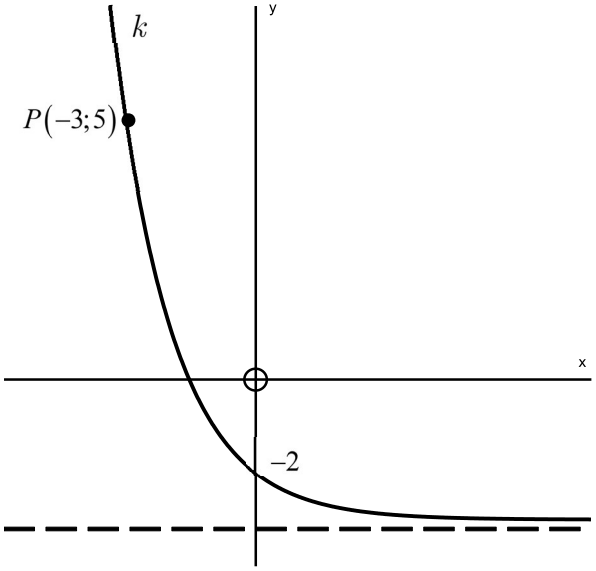
5.4. Write down the equation of the axis of symmetry to f that has a positive gradient. (2)

5.5. State the domain of the graph. (1)

[11]

QUESTION 6

The graph $k(x) = b^x + q$ is given below. The point $P(-3;5)$ lies on k and the graph passes through the y-axis at -2.



6.1. Write down the equation of the asymptote of $k(x)$. (1)

6.2. Determine the equation of $k(x)$. (3)

6.3. Determine the equation of $j(x)$ if $k(x)$ is reflected about the y axis to form j. (2)

[6]

QUESTION 7

In a Grade 10 class there is an 80% probability that a randomly chosen learner will pass English (E) and a 70% probability of passing Afrikaans (A). The probability of passing both English and Afrikaans is 60%.

7.1. Complete the Venn diagram on the DIAGRAM SHEET to illustrate the information above. (3)

7.2. Determine the probability that a Grade 10 learner chosen at random will:

7.2.1 Pass English only. (1)

7.2.2 Pass neither of the subjects. (1)

7.3. Is the probability of passing English or Afrikaans mutually exclusive? (1)

[6]

QUESTION 8

Given the integers from 10 to 20, with set A as all the even numbers and set B being the multiples of 3.

8.1. Write down set A (the even numbers) and set B (the multiples of 3). (2)

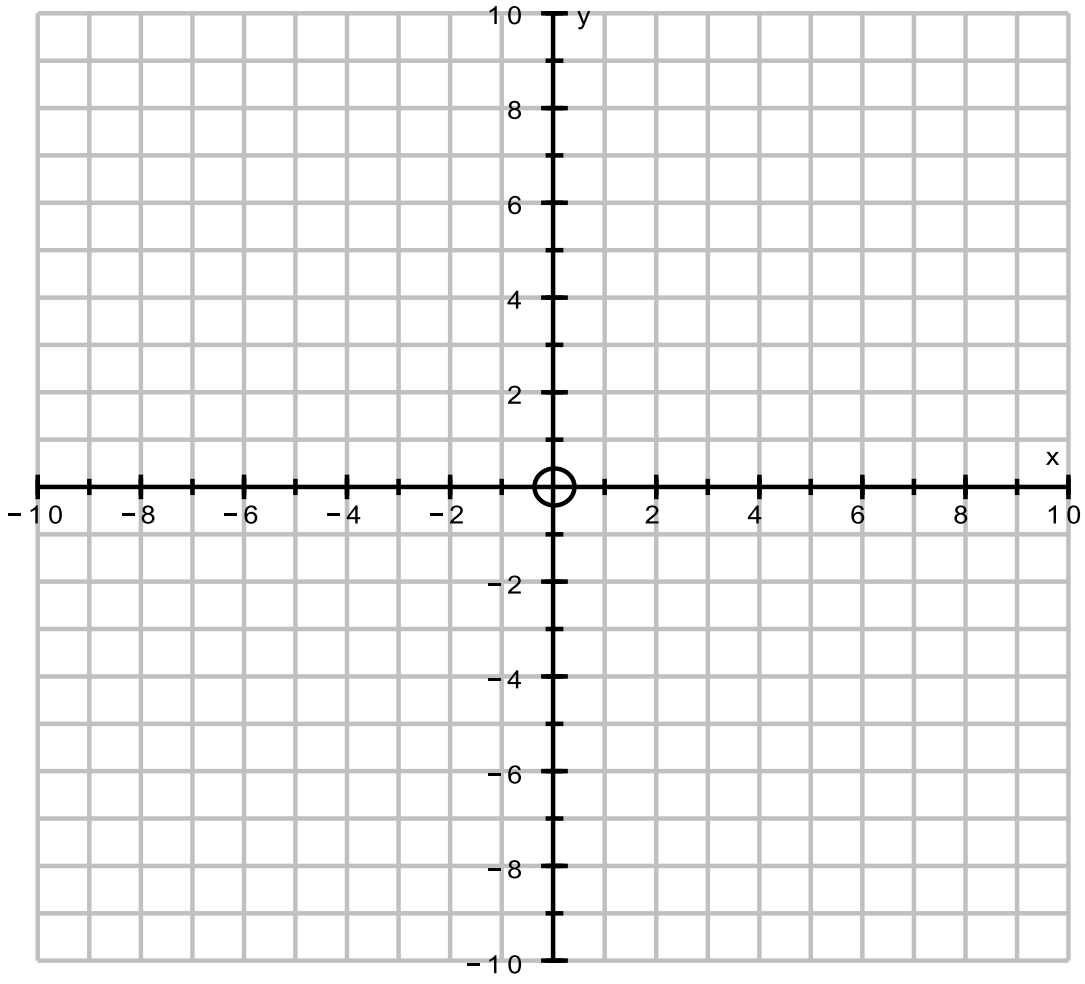
8.2. Determine the probability of being in set A OR in set B. (3)

[5]

NAME: _____ **TEACHER:** _____

DIAGRAM SHEET

QUESTION 5.3



QUESTION 7.1

