BERGVLIET HIGH SCHOOL

MATHEMATICS DEPARTMENT

NOVEMBER EXAMINATION

GRADE 10

MATHEMATICS P1

NOVEMBER 2021

MARKS:	**100**
TIME:	**2 HOURS**
EXAMINER:	**L STOREY**
MODERATOR:	**A NAYSMITH**

INSTRUCTIONS AND INFORMATION

1. This question paper consists of **NINE** questions. Answer all of the questions. Question 7.1.1 and 7.2.3 must be answered on the diagram sheet.

   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 $(3x-2)^2-2(x-5)$ (3)

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

1.2 For which value(s) of x will $\frac{2\sqrt{x-3}}{4}$ be non- real? (2)

[7]

QUESTION 2

2.1 Factorise fully:

2.1.1 $4x(2a-b)-2y(2a-b)$ (3)

2.1.2 $ab-ac-3b+3c$ (3)

2.1.3 $16x^4-\frac{1}{y^8}$ (4)

2.2 Determine the lowest common multiple of the three expressions given below:

a^2-4a+4

a^2-4

a^3-8 (4)

[14]

QUESTION 3

3.1 Solve for x:

3.1.1 $4x^2+7x-2=0$ (3)

3.1.2 $\frac{2x+1}{x}+\frac{2x}{2x-1}=3$ (5)

3.2 Solve simultaneously for x and y:

$3x+y=2$

$6x-y=25$ (5)

[13]

QUESTION 4

4.1 Simplify fully:

4.1.1 $\dfrac{5^{2x+1}\times 3^{2x-3}}{15^{2x}}$ (3)

4.1.2 $\dfrac{3.2^{x}-2^{x+2}}{2^{x}+2^{x+1}}$ (3)

4.1.3 $\dfrac{\sqrt{2^{3000}}}{\sqrt{2^{2990}}}$ (2)

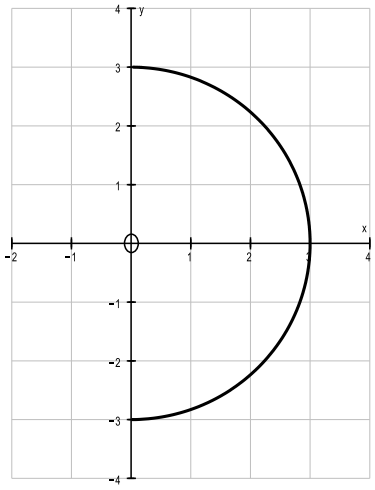
4.2 Solve for x:

$25^{(1-2x)}=5^{4}$ (3)

[11]

QUESTION 5

5.1 Is the graph given alongside a function? Give a reason for your answer.



(2)

5.2 Given: $f(x)=2(3x^{2}-4)-x$

Determine the value of: $2f(3)$ (2)

5.3 Given: $f(x)=-\dfrac{1}{2}x+2$

Determine the equation of the line perpendicular to $f(x)$ and passing through the point (1;6). (3)

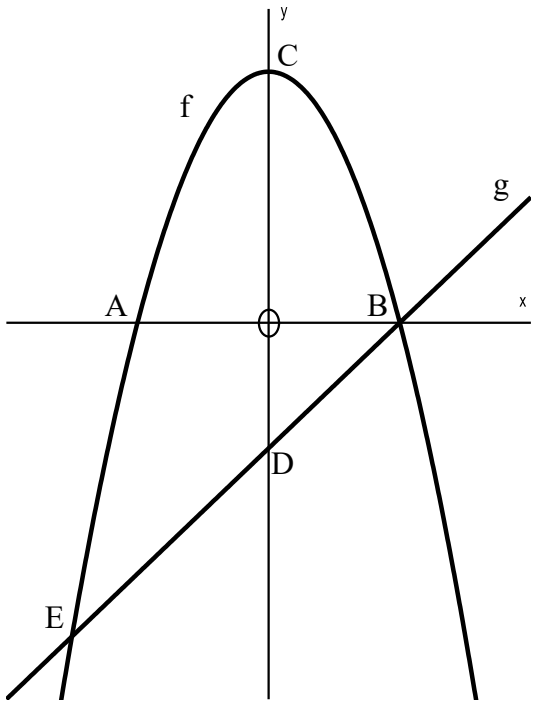
[7]

QUESTION 6

The graphs $f(x) = -x^2 + 4$ and $g(x) = x - 2$ are given below.

A and B are the *x*-intercepts of f and C and D are the y-intercepts of f and g respectively.

E and B are also the points of intersection of the two graphs.



6.1 What is the equation of the axis of symmetry of the parabola? (2)

6.2 Give the co-ordinates of point C. (2)

6.3 Write down the co-ordinates of D. (2)

6.4 What is the equation of a new graph $h(x)$ if $f(x)$ is reflected in the *x* axis? (2)

6.5 For which values of *x* is *f(x)* decreasing? (2)

6.6 What is the range of *f(x)*? (2)

[12]

QUESTION 7

7.1 Given: $y = 2^x + 2$

7.1.1 Sketch the graph on the DIAGRAM SHEET provided. (3)

7.1.2 How does $y = 2^x$ differ from the graph above (7.1.1)? (2)

7.2 Given: $f(x) = -\frac{4}{x} + 2$

7.2.1 Determine the intercepts of the graph algebraically. (3)

7.2.2 Write down the equations of the asymptotes. (2)

7.2.3 Draw the graph on the DIAGRAM SHEET provided. Show all labels clearly. (3)

[13]

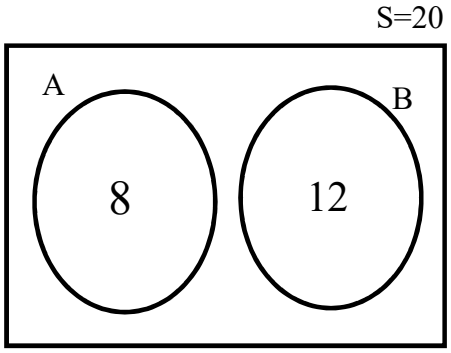
QUESTION 8

[11]

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QUESTION 9

9.1 Given the following Venn diagram with event A and event B:



9.1.1 Use the Venn diagram below to show that $P(\text{A and B}) = 0$. (3)

9.1.2 Are events A and B exhaustive or not? Give a reason for your answer. (2)

9.2 Bergvliet High School conducted a survey at the tuck shop one break and noted the following:

- 650 learners went to the tuck shop
- 50 did not buy anything
- 400 learners bought a doughnut
- 300 learners bought a muffin
- 100 learners bought both a doughnut and a muffin

9.2.1 Represent the information on a Venn diagram. (3)

9.2.2 What is the probability that a learner chosen at random bought a doughnut and a muffin? (2)

9.2.3 What is the probability that a learner chosen at random did not buy a doughnut? (2)

[12]

NAME: _____ **TEACHER:** _____

DIAGRAM SHEET FOR QUESTION 7.1.1

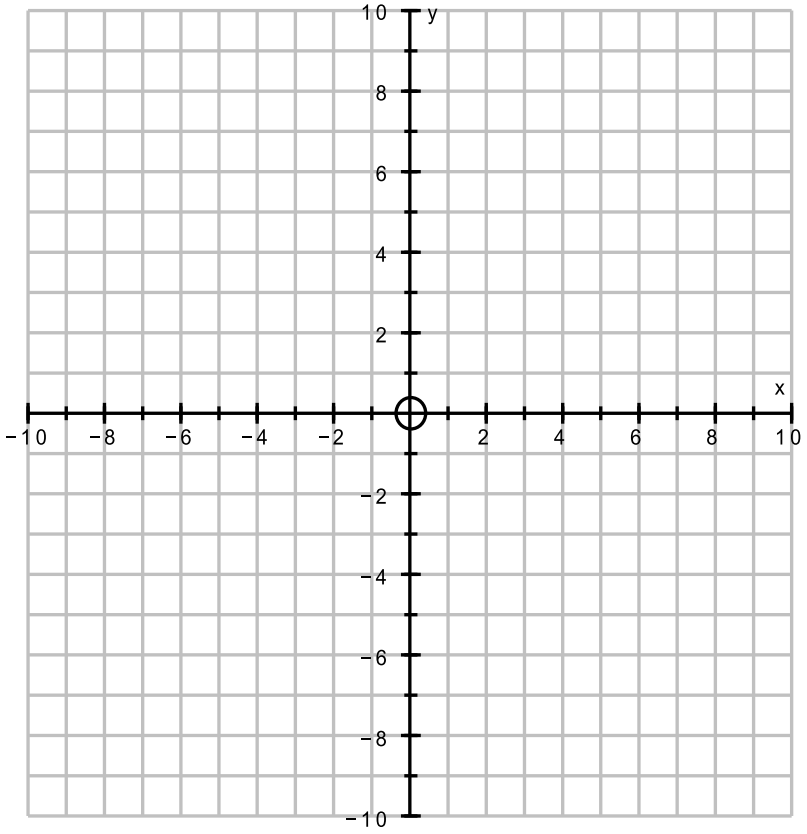


DIAGRAM SHEET FOR QUESTION 7.2.3

