Name and Surname : ..... SLT file .....

Grade/Class : 10/..... **Mathematics Teacher** : .....

Hudson Park High School

GRADE 10

MATHEMATICS

NOVEMBER 2021

FINAL ASSESMENT PAPER I

Marks : _____ 100

Time : 2 hours Date : 19 November 2021

Exam : GWS Moderator(s) : SLT, PHL, CYT

INSTRUCTIONS

1. Illegible work, in the opinion of the marker, will earn zero marks.
2. Number your answers clearly and accurately, exactly as they appear on the question paper.
3. **NB**
   - **LEAVE *2 LINES OPEN BETWEEN* EACH OF YOUR *ANSWERS*.**
   - **Start each NEW QUESTION at the top of a page.**
4. **NB**
   - **Fill in the details requested on the front of the question paper and submit your submission in the following manner :**
     - **Question paper (on top)**
     - **Answer pages in order (below).**
     - **DO NOT staple the QUESTION PAPER and the ANSWER PAPER together.s**
5. Show all working out. Answers alone may not be awarded full marks.
6. (Non-programmable and non-graphical) Calculators may be used, unless their usage is specifically prohibited.
7. Round off answers to 2 decimal places, where necessary, unless instructed otherwise.

QUESTION 1

CALCULATORS MAY NOT BE USED IN THIS QUESTION

1.1 Given $x \in \{4; 5; 6; 7\}$

For which value(s) of x will $\sqrt{\frac{8}{x-5}}$ be:

1.1.1 Undefined? (1)

1.1.2 An irrational number? (1)

1.1.3 A rational number? (1)

1.2 For which values of x will

$$\sqrt{18-4x}$$

be non-real? (2)

1.3 Write $0,\dot{1}\dot{2}$ as a common fraction. Show all your working out. (3)

1.4 Given: $3x - \frac{3}{x} = 5$. Determine the value of $9x^2 + \frac{9}{x^2}$. (2)

[10]

QUESTION 2

2.1 Factorise the following expression fully:

2.1.1 $3x^2(a-1) + 10(1-a)xy - 8(a-1)y^2$ (3)

2.1.2 $3x^2 + 3xy - 2xz - 2yz$ (2)

2.2 Simplify the following

2.2.1 $(3x-y)(9x^2+3xy+y^2)$ (1)

2.2.2 $\frac{2^x}{2^x - 3.2^{x-1}}$ (2)

2.2.3 $\frac{x-3}{x-1} - 2$ (3)

[11]

QUESTION 3

3.1 Solve for x:

3.1.1 $4.3^{2x-1} - 8 = 0$ (3)

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

3.2 Given: $-4 \leq \frac{1}{2}m + 1 < 5$

3.2.1 Solve for m. (2)

3.2.2 Represent the answer found in (3.2.1) in interval notation. (1)

3.3 Solve for x and y:

$$3x - 2y = -27$$

$$-y + 2x = 9$$ (4)

[13]

QUESTION 4

4.1 Given: $8; 2; -4; ...$

4.1.1 Determine an expression for the general term of the sequence Tn, in terms of n. Simplify your answer. (3)

4.1.2 Hence, determine the 13^{th} term in the sequence. (1)

4.1.3 Will $-5\,242$ be a term in the patern? Justify your answer. (2)

4.2 If the following pattern is linear (arithmetic):

$$x - 3\,;\, 7\,;\, 3x - 1$$

Calculate the value of x. (2)

4.3 Given: $\sqrt{2};\ \pi;\ -8;\ -1; 6; 13; ...; 643$

How many terms are there in the given sequence? (4)

[12]

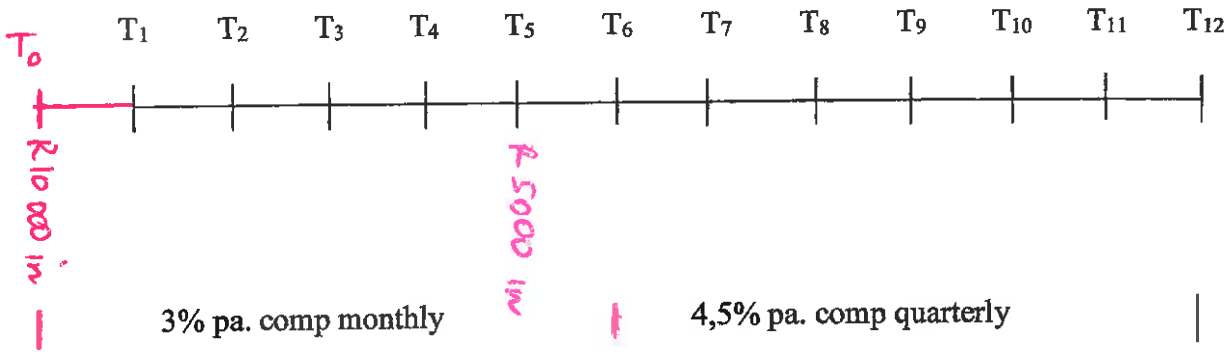
QUESTION 5

5.1 Mr Clayton buys a fishing rod using a hire purchace loan from a bank that offers 9% interest per annum over 3 years. The fishing rod costs R15 000. He pays a 15% cash deposit and the bank charges R6,75 per month for insurance.

5.1.1 Calculate how much Mr Clayton paid as his deposit. (1)

5.1.2 Calculate his monthly repayment, including the insurance premium. (4)

5.2 Mr Gouws opens a new savings account at a bank on 1 January 2021 with an initial deposit of R10 000. The bank offers an interest rate of 3% compounded monthly for the first 6 months, and 4,5% compounded quarterly after that. On 31 May, an additional R5 000 is deposited. Calculate the total value of the investment at 31 December 2021.



(5)

[10]

QUESTION 6

Given: $f(x) = 2^x - 8$

6.1 Write the equation of the horizontal asymptote. (1)

6.2 Calculate the

6.2.1 x-intercept. (2)

6.2.2 y-intercept. (1)

6.3 Sketch a rough graph f. Clearly label all intercept(s) and asymptote(s). (1)

6.4 If f is

- reflected in the x-axis, and then
- translated 2 units vertically downward to become g,

write down the equation of g,in the form $y = \cdots$ (2)

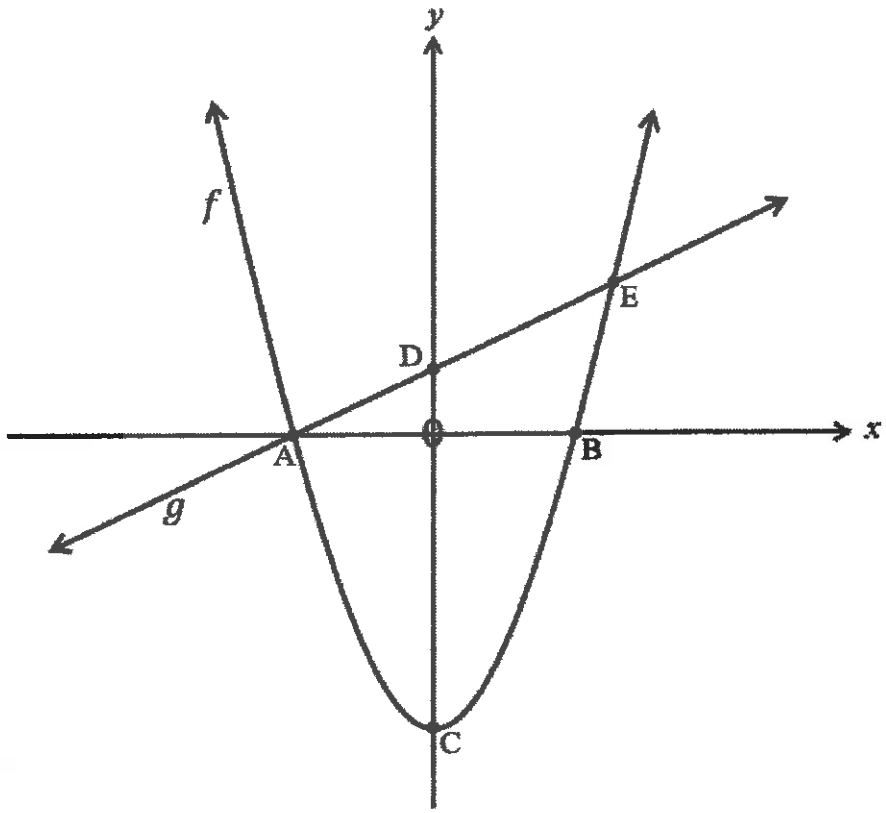
[7]

QUESTION 7

Given below are the graphs of $f(x) = a(x-2)(x+2)$ and $g(x) = mx + c$.

A and B are x-intercepts. C and D are y-intercepts.

The graphs of f and g intersect at points A and E(3; 10).



7.1 Write down the coordinates of A and B. (2)

7.2 Calculate the value of:

7.2.1 a. (2)

7.2.2 m. (2)

7.2.3 c. (2)

7.3 Find the length of DC (3)

7.4 For which value(s) of x will

7.4.1 $f(x)$ be increasing? (1)

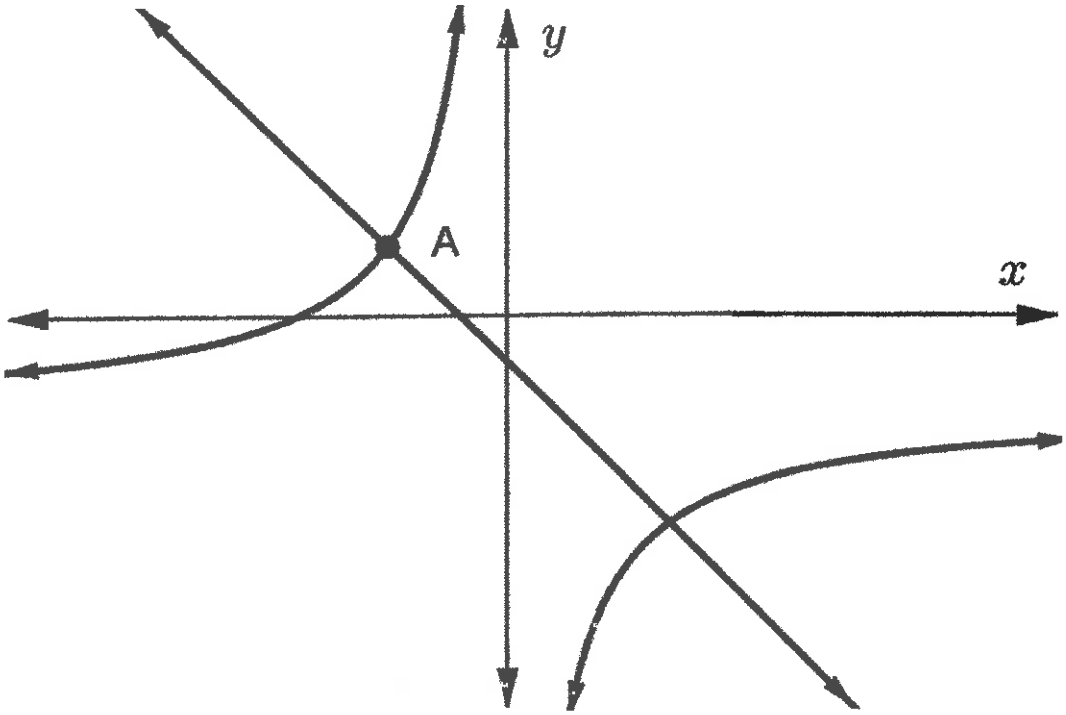
7.4.2 $f(x) - g(x) < 0$? (1)

7.4.3 $f(x) \times g(x) \geq 0$ (2)

[15]

QUESTION 8

The sketch below shows the graph of $h(x) = \frac{k}{x} - 1$ and $p(x) = -x + c$.



The graph p is an axis of symmetry for h. The graphs h and p intersect at A and B.

8.1 Write down the value of c. (1)

8.2 If $(-1; 8)$ is a point on the graph h, calculate the value of k. (2)

8.3 Calculate the coordinates of A. (5)

8.4 State the range of h (1)

[10]

QUESTION 9

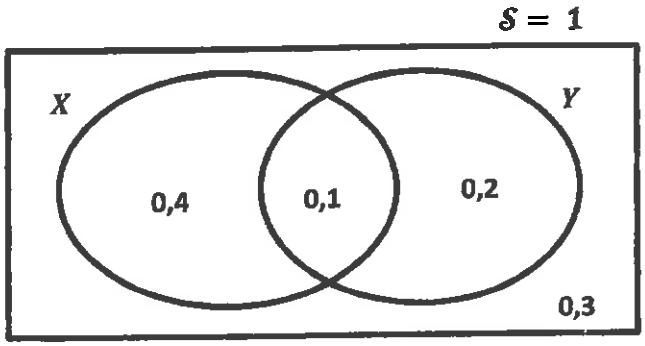
9.1 Given: $P(A) = 0{,}5$; $P(B') = 0{,}7$; and $P(A \text{ or } B) = 0{,}6$

9.1.1 Calculate

(a) $P(B)$ (1)

(b) $P(A \text{ and } B)$ (2)

9.2 Given:



9.2.1 Determine

(a) $P(X)$ (1)

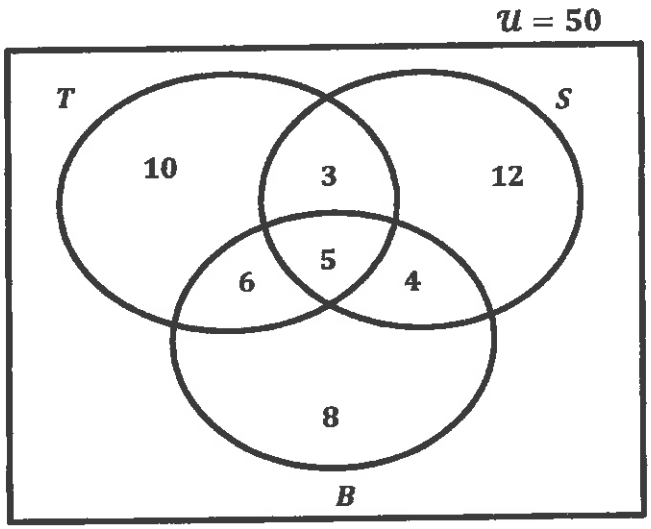
(b) $P(Y\ only)$ (1)

(c) $P(X \cap Y')$ (1)

(d) $P(X \cup Y')$ (1)

9.2.2 Are X and Y mutually exclusive events? Justify your answer. (2)

9.3 A group of Gr 10 learners were surveyed about their sporting involvement in Tennis (T), Squash (S) and Badminton (B). The survey revealed:



How many learners

9.3.1 did not play any of the 3 sports? (1)

9.3.2 played only 1 sport? (1)

9.3.3 played at least 2 sports? (1)

9.3.4 played Tennis and Squash, but not Badminton? (1)

[13]

TOTAL 100