PROVINCIAL EXAMINATION

JUNE 2022

GRADE 10

MATHEMATICS

PAPER 1

TIME: **1 hour**

MARKS: **50**

5 pages

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. This question paper consists of 4 questions.
3. Present your answers according to the instructions of each question.
4. Show ALL calculations, diagrams, graphs et cetera, which were used in determining the answers, clearly.
5. Answers only will NOT necessarily be awarded full marks.
6. Use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. Where necessary, answers should be rounded-off to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. Number the questions according to the numbering system used in the question paper.
10. Write neatly and legibly.

QUESTION 1

1.1 Given: $A = \frac{1}{\sqrt{3+x}}$ $x \in \{0; 1; 2; 3\}$

For which value(s) of x will the expression A be rational. (1)

1.2 Factorise the following expressions fully:

1.2.1 $2x^2 - 32$ (2)

1.2.2 $6a^2 - b + a(2 - 3b)$ (3)

1.3 Simplify the following completely:

1.3.1 $(x-1)(x^2 + x + 1)$ (2)

1.3.2 $\frac{x+7}{x^2 - x - 6} - \frac{3}{x-3} + \frac{2}{2x+4}$ (5)

1.3.3 $\frac{4^{x+1}.9^x}{6^{2x-1}}$ (3)

1.4 If x is an even integer and $x > 1$, arrange the following in ascending order:

$-2^x,\ 2^x,\ 2^{-x},\ 2^{x^0},\ 2^{x^2}$ (2)

[18]

QUESTION 2

2.1 Solve for x:

2.1.1 $\sqrt{ax} = b$ (2)

2.1.2 $3^x + 3^{x-1} = 36$ (3)

2.2 Given: $\frac{x}{3} > \frac{x}{2} + 1$

2.2.1 Solve for x in the inequality. (2)

2.2.2 If $x \in Z$, write down the first two digit number that satisfies the inequality. (1)

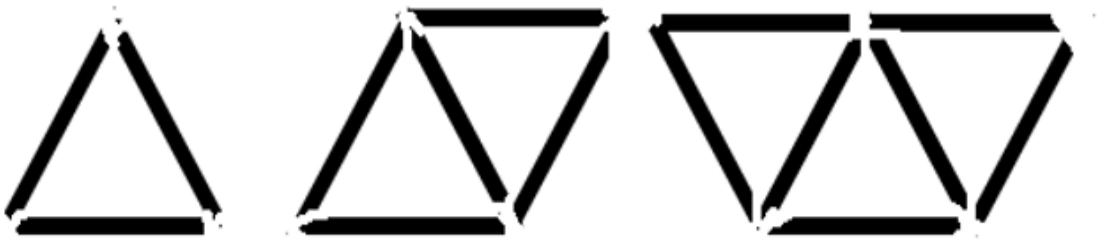
2.3 Solve for x and y simultaneously:

$2x + y = 4$ and $3x - y = 11$ (4)

[12]

QUESTION 3

Study the patterns below and answer the questions that follow.



Pattern 1 Pattern 2 Pattern 3

The patterns are the first three terms of a sequence for which the value of the term is given by the number of sticks in the pattern.

3.1 Write down the number of sticks in each of the first five terms of the sequence. (2)

3.2 Write down the general term, T_n of the sequence. (2)

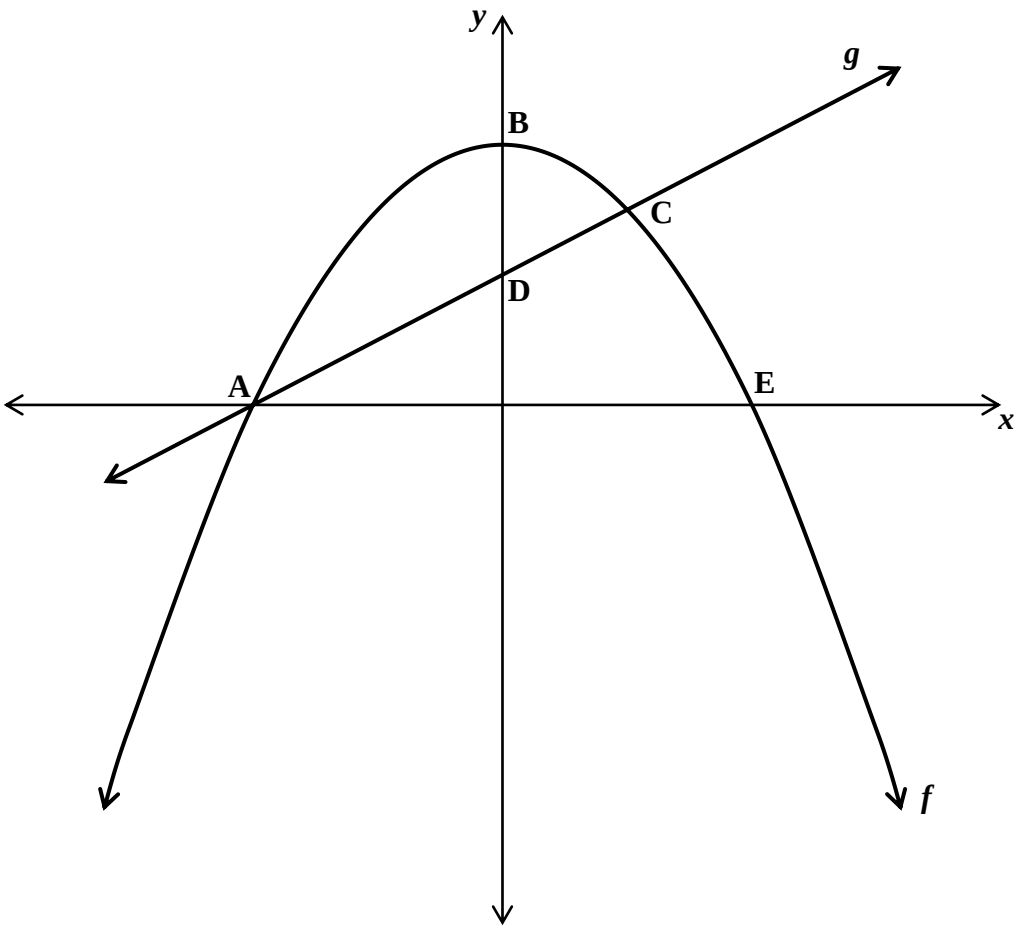
3.3 Solve for T_{131} (2)

[6]

QUESTION 4

The graphs of $f(x) = -x^2 + 4$ and $g(x) = mx + 2$ are sketched. A and E are the x-intercepts of f.

B and D are the y-intercepts of f and g respectively. f and g intersect at A and C.



4.1 Determine the coordinates of points B and D. (2)

4.2 Write down the range of *f*. (1)

4.3 Determine the length of AE. (4)

4.4 Calculate the value of *m*. (2)

4.5 Determine the coordinates of A and C, the points of intersection of *f* and *g*. (3)

4.6 If $k(x) = g(-x)$, determine the values of *x* such that $f(x) \geq k(x)$. (2)

[14]

TOTAL: 50

END