



**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2022

**MATHEMATICS P1
(DEAF)**

MARKS: 150

TIME: 3 hours

This question paper has 8 pages.

INSTRUCTIONS

Read the following instructions carefully before answering the questions.

1. This question paper TEN questions. Answer ALL the questions.
2. Show ALL calculations, diagrams, graphs, et cetera that you have used in determining your answers.
3. Use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
4. Answers only will not necessarily be awarded full marks.
5. Round off answers to TWO decimal places, unless stated otherwise.
6. Diagrams are NOT necessarily drawn to scale.
7. Number the answers correctly.
8. Write neatly.

QUESTION 1

1.1 Solve for x :

1.1.1 $x^2 + 5x - 6 = 0$ (3)

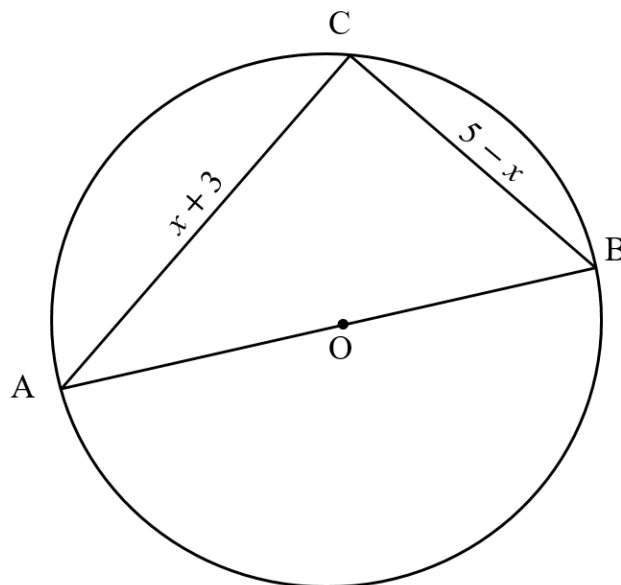
1.1.2 $5x^2 + x - 3 = 0$ (correct to 2 decimal places) (3)

1.1.3 $(2x - 1)(x + 3) \geq -3$ (5)

1.1.4 $\sqrt{x} - \sqrt{x - 5} = 1$ (4)

1.2 Solve for x and y simultaneously if:

$$2x - y = 1 \quad \text{and} \quad y^2 - xy = x + 7$$
 (6)

1.3 The diagram below shows a circle with centre O , that **passes through the vertices** of $\triangle ABC$. AB is the diameter, $AC = (x + 3)$ units and $BC = (5 - x)$ units.

Calculate the value of x that will make AB , the diameter, a minimum length. (5)
[26]

QUESTION 2

2.1 Simplify:

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

2.2 Solve for x :

$$2.2.1 \quad 3x^{\frac{3}{2}} = 81 \quad (3)$$

$$2.2.2 \quad 2^x + 5 = 3 \cdot 2^{1-x} \quad (5)$$

$$2.3 \quad \text{Given: } \frac{1 + \sqrt{2}}{3 + 2\sqrt{2}} = \sqrt{a} + b.$$

Determine (find out) the values of a and b , WITHOUT using a calculator. (5)

[17]**QUESTION 3**3.1 Given the linear pattern: $-2 ; 3 ; 8 ; \dots$ 3.1.1 Determine (find out) the formula for the n^{th} term of the pattern. (2)3.1.2 Calculate the value of T_{18} . (2)3.1.3 Which term in the pattern has a value of 473? (2)3.2 In a linear pattern, $T_{11} = -19$ and $T_{23} = 65$. **Determine** (find out) the number of negative terms in the pattern. (5)**[11]****QUESTION 4**Given the quadratic pattern: $204 ; 176 ; 150 ; 126 ; \dots$ 4.1 **Determine** (find out) the next two terms of the pattern. (2)4.2 **Determine** (find out) T_n , the general term of the pattern, in the form $T_n = an^2 + bn + c$. (4)4.3 **Determine** (calculate) the value(s) of n if $T_n = 36$. (4)4.4 **Calculate ALL the negative terms in the pattern.** (5)**[15]**

QUESTION 5

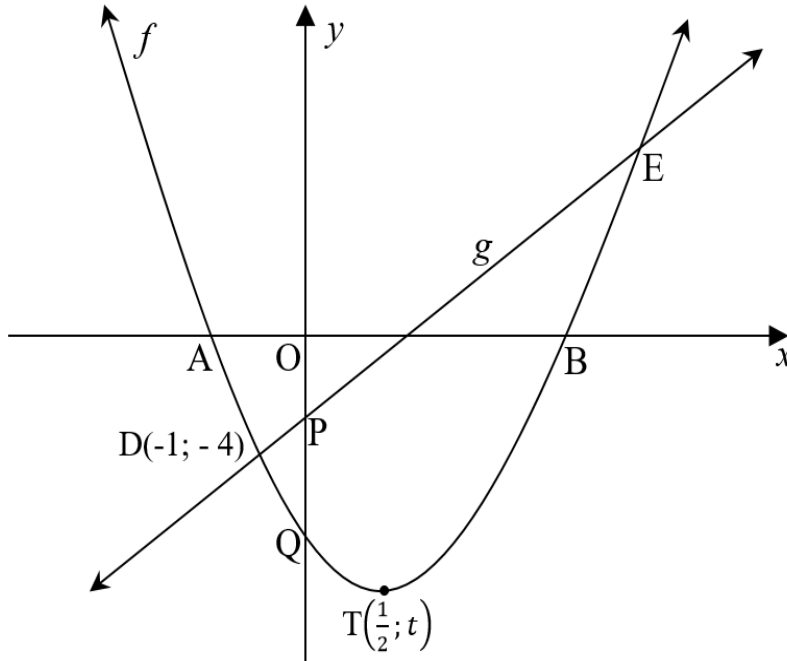
Given: $f(x) = \frac{-2}{x-1} + 3$.

- 5.1 Write down the **equations** of the **asymptotes** of f . (2)
- 5.2 **Determine**_(find out) the coordinates of the x - and y -intercepts of f . (3)
- 5.3 Draw a neat sketch of f , clearly **indicating** _(showing) all intercepts with the axes and any asymptotes. (4)
- 5.4 Write down the equation of the axis of symmetry of f that has a negative gradient. (2)
- 5.5 The graph of $g(x) = ax + b$ is drawn parallel to the line of symmetry of f with a negative gradient. **Determine**_(find out) the values of a and b given that g passes through the point $(5; -2)$. (3)
- 5.6 **Determine**_(find out) the distance between the points of intersection of f and g . Leave your answer in surd form. (5)
- 5.7 **Determine**_(calculate) the equation of h , if $h(x) = -f(x+3)$. (2)

[21]

QUESTION 6

The diagram below shows the graphs of $f(x) = ax^2 + bx + c$ and $g(x) = 2x - 2$. The graphs intersect at $D(-1; -4)$ and E . f cuts the x -axis at A and B , the y -axis at Q and has a turning point at $T(\frac{1}{2}; t)$. g cuts the y -axis at P .



- 6.1 Given that $PQ = 4$ units, show that $a = 1$, $b = -1$ and $c = -6$. (5)
- 6.2 **Determine**_(find out) the value of t . (3)
- 6.3 **Determine**_(find out) the coordinates of A and B . (3)
- 6.4 **Determine**_(find out) the coordinates of E , the other point of intersection of f and g . (4)
- 6.5 Write down the range of f . (2)
- 6.6 **Determine**_(find out) the values of x for which $f(x) \cdot g(x) \leq 0$. (2)

[19]

QUESTION 7

The point $R(-3; 9)$ lies on the graph of $f(x) = a^x + 1$.

- 7.1 **Determine**_(calculate) the value of a . (3)
- 7.2 A new function g is **obtained**_(got) when f is reflected about its asymptote. Write down the equation of g . (2)

[5]

QUESTION 8

- 8.1 The **interest rate** on an investment is x % per annum **compounded monthly**.
Calculate the value of x given that the corresponding effective interest rate is 9,92%. (3)
- 8.2 A printer's value depreciates(*goes down*) according to the reducing balance method, over a period of 7 years at a rate of 12% p.a., to R28 607,30. Calculate, to the nearest rand, the original price for the printer. (3)
- 8.3 Pratham made an **initial**(*first*) deposit of R32 000 into an investment account that paid interest at 8,6% p.a. compounded monthly. Another deposit of R23 000 was made 3 years later. The interest rate changed to 10,5% p.a. compounded quarterly 4 years after the initial deposit.
- 8.3.1 How much was in Pratham's investment account at the end of 4 years? (5)
- 8.3.2 At the end of 6 years since he started his investment, Pratham decided to use all his balance as a deposit for a car that cost R220 000 and borrow the rest from a bank.
- How **much** did he need to **borrow**? (4)

[15]

QUESTION 9

9.1 Two events A and B are such that:

- $P(A) = 0,35$
- $P(A \text{ or } B) = 0,75$

Determine_(find out) $P(B)$ if:

9.1.1 A and B are mutually exclusive (3)

9.1.2 A and B are independent (4)

9.2 130 learners were asked about their favourite social media platforms. They chose from Facebook (F), WhatsApp (W) and Instagram (I). The results are shown below:

- 63 learners like Facebook
- 81 learners like WhatsApp
- 37 learners like Instagram
- 18 learners like Facebook and WhatsApp but not Instagram
- 12 learners like WhatsApp and Instagram but not Facebook
- x learners like Instagram and Facebook but not WhatsApp
- x learners like Instagram only
- y learners like WhatsApp only
- 11 learners like all three
- 8 learners did not like any of the social media platforms

9.2.1 **Represent** the above information on a **Venn diagram**. (4)

9.2.2 Determine_(calculate) the values of x and y . (3)

9.2.3 **Calculate** the **probability** that a learner chosen at random likes only ONE social medium platform from the three mentioned above. (2)

[16]

QUESTION 10

The probability that Lwandi chooses to do Mathematics in Grade 10 is 65%. If he does not choose Mathematics, the probability that he attains a distinction in Accounting is 20% but if he chooses Mathematics, the probability of achieving a distinction in Accounting is 60%.

Calculate the probability that Lwandi **attains**_(gets) a distinction in Accounting. [5]

TOTAL: 150