Student Number_____

Teacher: JNI DMH JNO AMM
GVA GLO KST

Newington College

Year 11 Mathematics Advanced

2023 Assessment point 1

General Instructions

- Reading time: 5 minutes
- Working time: 80 Minutes
- Write using black or blue pen only. **Erasable ink is not allowed**
- Calculators approved by NESA may be used
- Attempt ALL questions, clearly showing ALL working out.
- A reference sheet is provided

Section I (23 Marks)

Section II (25 Marks)

Section III (12 Marks)

Results

Outcome / Section	Section I	Section II	Section III	Total
MA F1.1 Algebraic Techniques	**12**	**9**	**9**	**30**
MA F1.2 – 1.4 Working with Functions	**11**	**16**	**3**	**30**
Total	**23**	**25**	**12**	**60**

Section I

Student number_____

23 marks

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Attempt all questions

Write your answers in the space provided. Clearly showing all of your working.

Question 1

Simplify

(a) $3\sqrt{45} - 2\sqrt{80} + \sqrt{245}$ **2**

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(b) $\frac{x^2-9}{4x+12}$ **2**

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(c) Simplify by first rationalising the denominator.

$\frac{4\sqrt{3}}{7+2\sqrt{3}}$ **2**

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Section I continues over the page

Question 2

Solve $\frac{8x-4}{3} = \frac{7x}{5}$ **2**

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Question 3

Find the values of a and b if $\left(4 - 3\sqrt{7}\right)^2 = a + b\sqrt{7}$ **2**

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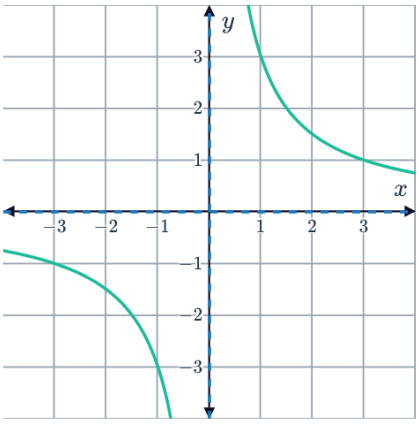
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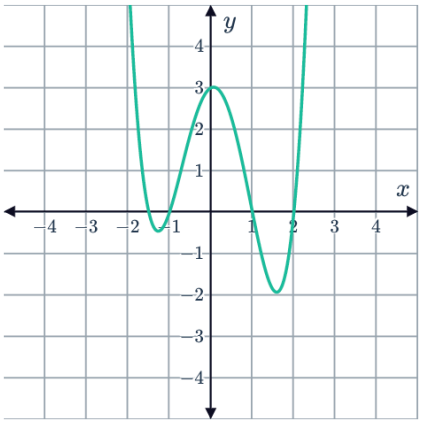
Question 4

State if the following is either one-to-one, one-to-many, many-to-one or many-to-many. **2**

a)



b)



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Section I continues over the page

Question 5

Given $f(x) = \frac{2x-3}{5}$

a) find $f(-1)$ **1**

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b) find $\frac{1}{3}\left[2f(-1) - \frac{1}{2}f(0)\right]$ **2**

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c) find the value of x if $f(x) = 9$ **2**

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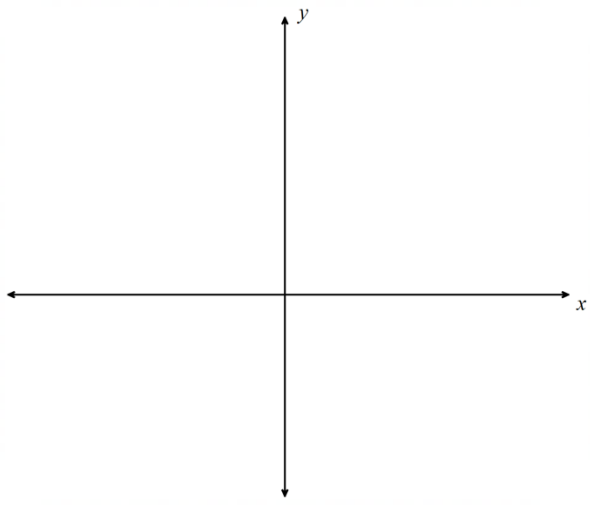
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Question 6

Sketch the line $3x - 2y - 6 = 0$. Clearly show the x and y intercepts. **2**

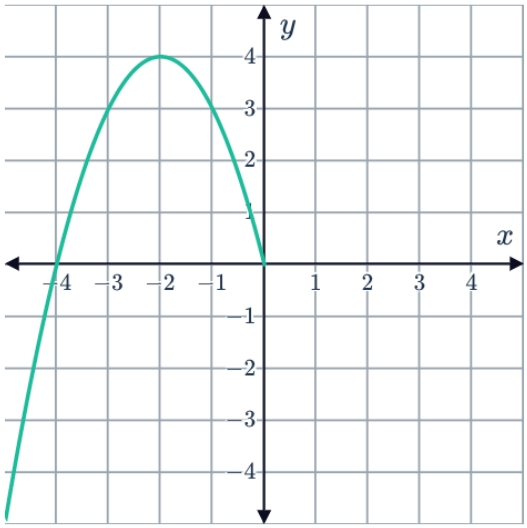


Question 7

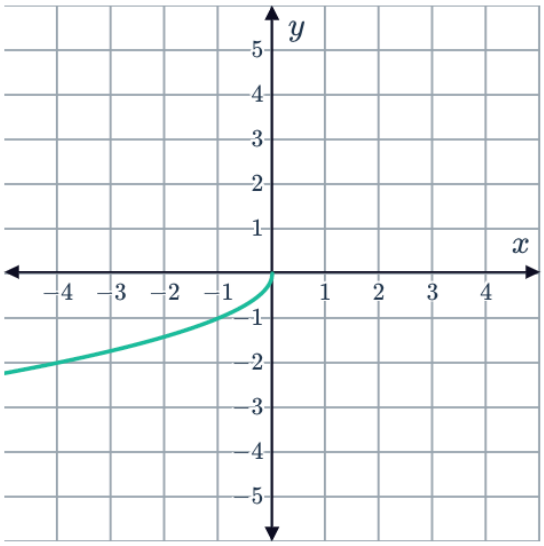
A part of the graph of $y = f(x)$ is shown below.

Complete the following diagrams to represent the function as **2**

a) even



b) odd



Question 8

Simplify $\frac{x+4}{x-5} \div \frac{x^2+x-12}{x^2-12x+35}$ **2**

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END OF SECTION I

Section II

Student number_____

25 marks

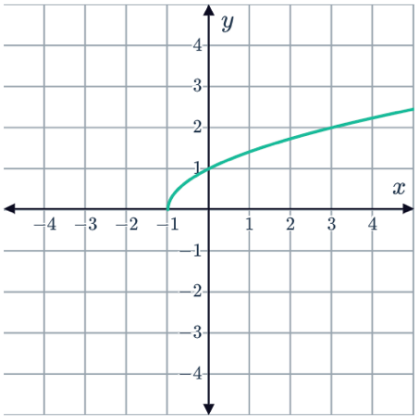
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Attempt all questions

Write your answers in the space provided. Clearly showing all of your working.

Question 1

State the domain and range of $f(x) = \sqrt{x+1}$. Express your answer in interval notation.
You may find the sketch of $y = \sqrt{x+1}$ shown below useful. **2**



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Question 2

For the function $f(x) = 8x - \frac{5}{x}$, determine if it is even, odd or neither. **2**

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Section II continues over the page

Question 3

Given $f(x) = x^2 - 9$ and $g(x) = \sqrt{x}$

(a) find $f\big(g(x)\big)$ **1**

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(b) Evaluate $f\big(g(5)\big)$ **1**

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(c) State the domain and range of $f\big(g(x)\big)$. Express your answer in interval notation. **2**

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Question 4

Simplify $\frac{5}{x^2-16} - \frac{1}{x+4}$ **3**

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Section II continues over the page

Question 5

Solve

a) $3x^2 - 17x - 6 = 0$ **2**

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b) $3^{2x} - 10\,(3)^x + 9 = 0$ **2**

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Question 6

Given $\frac{x^{-\frac{4}{3}}}{x^{-2}\ \sqrt[3]{x^{18}}} = x^m$ find the value of m. **2**

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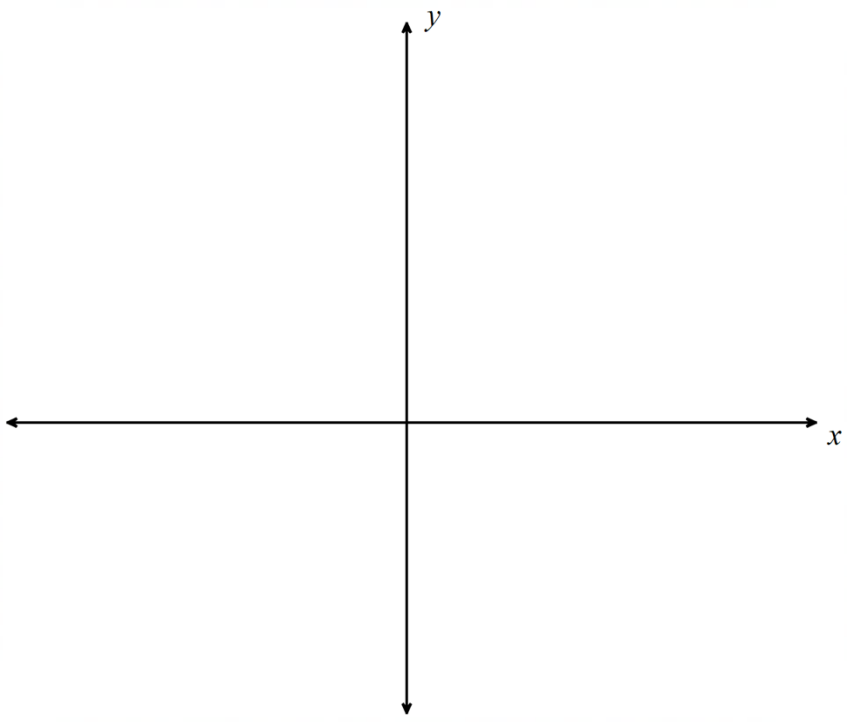
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Section II continues over the page

Question 7

a) Sketch the graph of $y = x^2 - 2x - 15$ **3**

Clearly show the x and y intercepts and the vertex.



b) State the domain and range of the function $y = x^2 - 2x - 15$.

Express your answer in interval notation. **2**

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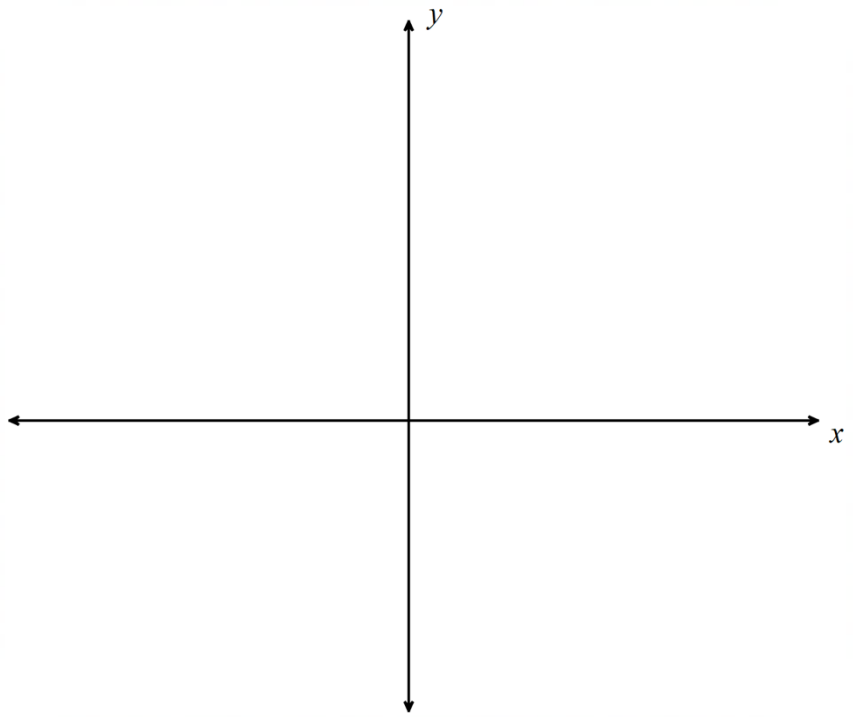
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Question 8

Sketch the graph of $y = (x + 2)(x - 3)^2$

Clearly show all the x and y intercepts. **3**



END OF SECTION II

Section III

Student number_____

12 marks

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Attempt all questions

Write your answers in the space provided. Clearly showing all of your working.

Question 1

Solve $\frac{1}{32} = 4^{3x-2}$ **3**

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Question 2

Solve by completing the square

$$4x^2 - 8x - 1 = 0$$ **3**

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Section III continues over the page

Question 3

Simplify $\dfrac{\frac{3}{x}+\frac{2}{x+1}}{\frac{4}{x}-\frac{1}{x+1}}$ **3**

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Question 4

State the domain of the following function. **3**

$$f(x)=\frac{1}{2+\frac{3}{4-\sqrt{x+5}}}$$

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END OF ASSESSMENT