# PRACTICE Semester Two Examination, 2021
# Question/Answer Booklet

## Year 10 Pre-Methods Unit 1
## Section One: Calculator-free

**Student Number**

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### Time allowed for this section

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|---|---|
| Reading time before commencing work: | five minutes |
| Working time: | thirty minutes |

### Materials required/recommended for this section

***To be provided by the supervisor*:**
This Question/Answer booklet
Formula sheet

### To be provided by the candidate

**Standard items:** pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

**Special items:** nil

### Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorized material. If you have any unauthorized material with you, hand it to the supervisor **before** reading any further.

## Section One: Calculator-free (35 Marks)

This section has **five (5)** questions. Answer **all** questions. Write your answers in the spaces provided. Give all answers in **exact** form**.**

Working time: 30 minutes.

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### Question 1 (6 marks)

Evaluate the following

(a) $4! + 3!$ (1 marks)

(b) $\frac{8!}{5!2!}$ (2 marks)

(c) ${}^{7}C_{3}$ (3 marks)

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Question number: ____

**Extra Working Pages**

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Question number: ____

**Extra Working Pages**





**Question 2** **(10 marks)**

Four matrices $A$, $B$ and $C$ are shown below.

$$A = \begin{bmatrix} 4 & -2 \\ -3 & 1 \end{bmatrix}, \quad B = \begin{bmatrix} -3 \\ 2 \end{bmatrix}, \quad C = \begin{bmatrix} 2 & 0 \\ -1 & 1 \\ 3 & -2 \end{bmatrix}$$

(a) State the dimensions of the square matrix. (1 mark)

(b) Calculate $3A - 2I$, where $I$ is an identify matrix. (3 marks)

(c) Calculate $C \times B$. (2 marks)

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**Question 2 continued**

(d) Consider the sum of the two matrices shown below. Solve for $x$ and $y$. (2 marks)

$$\begin{bmatrix} 2 & -3 & 4 \\ x & 2 & 2 \end{bmatrix} + \begin{bmatrix} 3 & 6 & 8 \\ 2 & y & 2 \end{bmatrix} = \begin{bmatrix} 5 & 3 & 12 \\ 7 & -3 & 4 \end{bmatrix}$$

(e) Let $D = \begin{bmatrix} 3 & 2 & -1 \\ 6 & 0 & 4 \\ 0 & 4 & 2 \end{bmatrix}$. Consider $F = D \times C$, determine the value of $e_{32}$. (2 marks)

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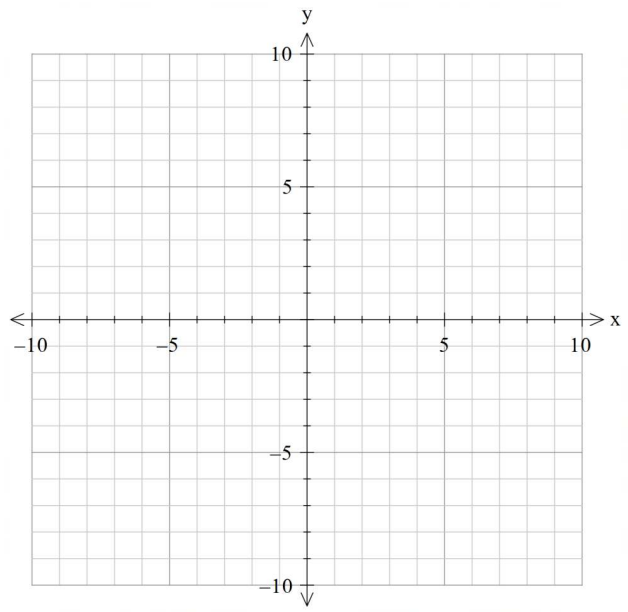
**Question 3** **(6 marks)**

A function is defined by $f(x) = \dfrac{2}{x-1}$

(a) Calculate $f(3)$. (1 marks)

(b) State the domain and range of $f(x)$ (2 marks)

(c) Sketch the graph of $y = f(x) - 2$ on the axes below, labelling all key features. (3 marks)

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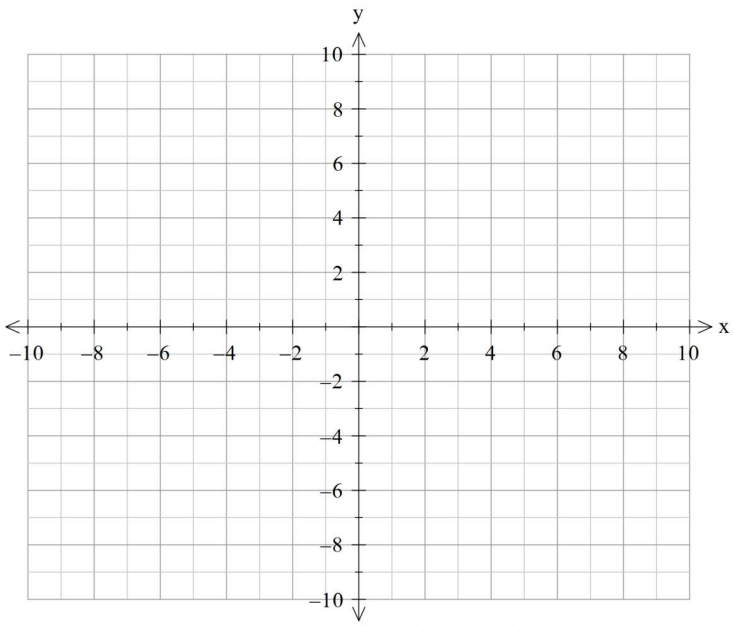
**Question 4** **(7 marks)**

(a) Determine the roots of the equation $y = 2x^3 - 8x^2 + 2x + 12$. (4 marks)

(b) Sketch the graph $y = 2x^3 - 8x^2 + 2x + 12$ labelling key features. (3 marks)

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**Question 5** **(6 marks)**

(a) Determine the centre and the radius of the circle with equation $x^2 + y^2 - 8x + 22y + 37 = 0$. (2 marks)

(b) Determine the vertex of the equation $y^2 + 4y = 2x + 4$ (2 marks)

(c) Determine the asymptotes of the equation $y = \frac{1}{3x+1} - 1$. (2 marks)

**End of questions**