Neap

Trial Examination 2023

HSC Year 12 Mathematics Extension 1

General Instructions

- Reading time – 10 minutes
- Working time – 2 hours
- Write using black pen
- Draw diagrams using pencil
- Calculators approved by NESA may be used
- A reference sheet is provided at the back of this paper
- For questions in Section II, show relevant mathematical reasoning and/or calculations

Total Marks: 70

Section I – 10 marks (pages 2–5)

- Attempt Questions 1– 10
- Allow about 15 minutes for this section

Section II – 60 marks (pages 6–9)

- Attempt Questions 11– 14
- Allow about 1 hour and 45 minutes for this section

Students are advised that this is a trial examination only and cannot in any way guarantee the content or the format of the 2023 HSC Year 12 Mathematics Extension 1 examination.

SECTION I

10 marks
Attempt Questions 1–10
Allow about 15 minutes for this section

Use the multiple-choice answer sheet for Questions 1–10.

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1 Consider the function $f(x) = a\cos^{-1}(x-b)$ with the domain [2, 4] and range $[0, 8\pi]$.
What are the values of a and b?

A. $a = \frac{1}{8},\ b = -3$

B. $a = \frac{1}{8},\ b = 3$

C. $a = 8,\ b = -3$

D. $a = 8,\ b = 3$

2 The population, N, of wallabies at time t years is given by $N(t) = 155 + Ae^{kt}$, where A and k are positive constants.
Which of the following is the correct differential equation?

A. $\frac{dN}{dt} = -k(N - 155)$

B. $\frac{dN}{dt} = -k(N + 155)$

C. $\frac{dN}{dt} = k(N - 155)$

D. $\frac{dN}{dt} = k(N + 155)$

3 What is the angle between the vectors $\underset{\sim}{u} = 2\underset{\sim}{i} - 4\underset{\sim}{j}$ and $\underset{\sim}{v} = -6\underset{\sim}{i} + 2\underset{\sim}{j}$?

A. 45°

B. 82°

C. 98°

D. 135°

4 Mathematical induction is used to prove that $n(2n-1)(2n+1)$ is divisible by 3 for all integers $n \geq 1$. Which of the following is the inductive statement that needs to be proved?

A. $k(2k-1)(2k+1)$ is divisible by 3.

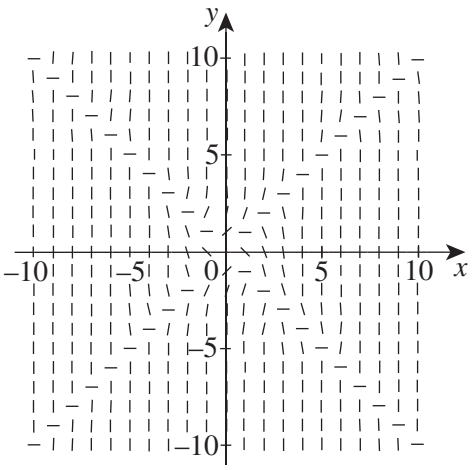
B. $(k+1)(2k)(2k+2)$ is divisible by 3.

C. $(k+1)(2k+1)(2k+2)$ is divisible by 3.

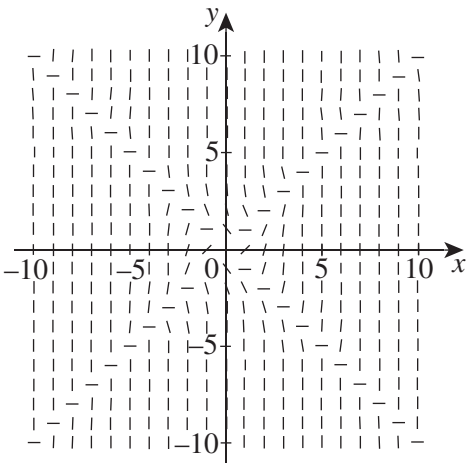
D. $(k+1)(2k+1)(2k+3)$ is divisible by 3.

5 Which of the following direction fields best represents the differential equation $\frac{dy}{dx} = y^2 - x^2$?

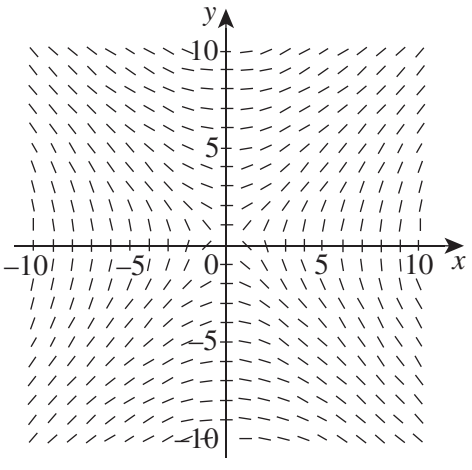
A.



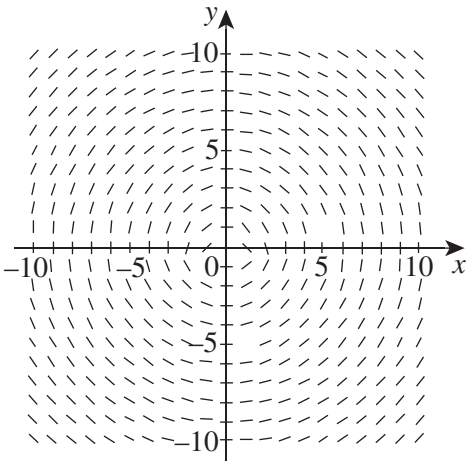
B.



C.



D.



6 Which of the following expressions is equal to $\cos x - \sin x$?

A. $\sqrt{2}\cos\left(x-\frac{\pi}{4}\right)$

B. $\sqrt{2}\cos\left(x+\frac{\pi}{4}\right)$

C. $2\cos\left(x-\frac{\pi}{4}\right)$

D. $2\cos\left(x+\frac{\pi}{4}\right)$

7 What is the value of $\int_0^{\frac{\pi}{12}} \sin^2 x\,dx$?

A. $\frac{\pi-6}{24}$

B. $\frac{\pi-3}{24}$

C. $\frac{\pi-6}{12}$

D. $\frac{\pi-3}{12}$

8 A, B and C are collinear points with position vectors $\underset{\sim}{a}$, $\underset{\sim}{b}$ and $\underset{\sim}{c}$ respectively. B lies between A and C. Given that $|\overrightarrow{BC}| = \frac{1}{2}|\overrightarrow{AB}|$, which of the following expressions is equal to $\underset{\sim}{c}$?

A. $\frac{1}{2}\underset{\sim}{a} - \frac{3}{2}\underset{\sim}{b}$

B. $\frac{3}{2}\underset{\sim}{a} - \frac{1}{2}\underset{\sim}{b}$

C. $\frac{3}{2}\underset{\sim}{b} - \frac{1}{2}\underset{\sim}{a}$

D. $\frac{3}{2}\underset{\sim}{b} - \frac{3}{2}\underset{\sim}{a}$

9 Given that $\frac{dy}{dx} = \frac{1}{4}(y-1)^2$ and $y(0) = 0,$ what is the value of x when $y = 2$?

A. –8

B. $\frac{1}{6}$

C. $\frac{1}{4}$

D. 7

10 A container with a height of 40 cm is filled with water. Water is leaking from the container at a rate of $\frac{5\sqrt{h}}{2h+45}$ cm^3 min^{-1}, where h cm is the depth of water. The volume, V cm^3, can be given by $V = \pi(5h^2 + 225h),$ where t is the time in minutes.

What is the rate of change of the depth of water?

A. $-\frac{1}{5\pi(2h+45)}$ cm min^{-1}

B. $\frac{1}{5\pi(2h+45)}$ cm min^{-1}

C. $-\frac{\sqrt{h}}{\pi(2h+45)^2}$ cm min^{-1}

D. $\frac{\sqrt{h}}{\pi(2h+45)^2}$ cm min^{-1}

SECTION II

60 marks
Attempt Questions 11–14
Allow about 1 hour and 45 minutes for this section

Answer each question in a SEPARATE writing booklet. Extra writing booklets are available.

For questions in Section II, your responses should include relevant mathematical reasoning and/or calculations.

Question 11 (15 marks) Use a SEPARATE writing booklet.

(a) Let $P(x) = 2x^4 - 15x^3 + 2x^2 + ax + b,$ where a and b are real numbers. **3**
Find the values of a and b given that $(x-5)^2$ is a factor of $P(x)$.

(b) Use the substitution $u = \cos x$ to find $\int_0^{\frac{\pi}{2}} \frac{\sin^3 x}{\sqrt{\cos x}}\,dx.$ **3**

(c) Lily and Ben are lining up in a queue consisting of eight people in total. **2**
Find the number of ways in which the eight people can line up if Ben arrives after Lily.

(d) Use the t-formula to solve $\sec\theta - 2\tan\theta = 1$ for $0 \le \theta \le 2\pi$. **3**

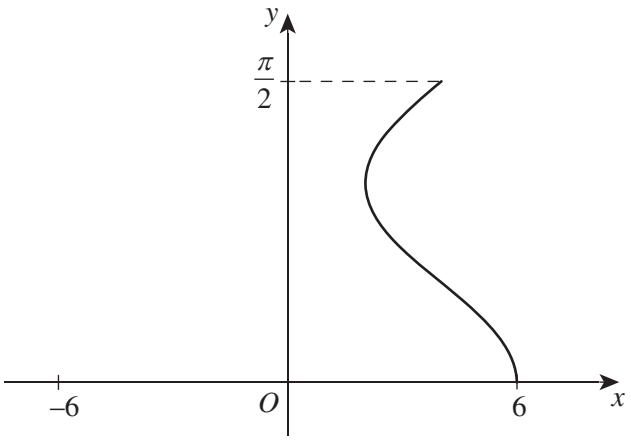
(e) Consider the function $f(x) = \frac{4 - x^2}{2}$.

(i) Find the domain of $y = \sqrt{f(x)}$. **1**

(ii) Hence, sketch the graph of $y^2 = f(x),$ showing any intercepts with the axes. **3**

Question 12 (15 marks) Use a SEPARATE writing booklet.

(a) The diagram shows the region bounded by the y-axis and $x = 2\cos 3y + 4$, where $0 \le y \le \frac{\pi}{2}$. **3**
The region is rotated about the y-axis to form a solid.



Find the exact volume, V, of the solid formed.

(b) A rabbit population grows according to the logistic equation $\frac{dP}{dt} = 0.1P\left(1 - \frac{P}{20\,000}\right)$,
where P is the number of rabbits after t months. The initial population is 1000.

(i) Show that $\frac{20\,000}{P(20\,000 - P)} = \frac{1}{P} + \frac{1}{20\,000 - P}$. **1**

(ii) Find the population of rabbits after seven months. **4**

(c) A box contains 3 blue marbles, 5 green marbles and k yellow marbles. A marble is chosen at random and then placed back into the box. This is repeated four times.

(i) What is the probability, P, that the first marble chosen is blue? **1**

(ii) Let X be the number of blue marbles chosen. **3**
What is the smallest value of k for which $\text{Var}(X) < 0.8$?

(d) Consider $y = \sin^{-1}(x+1) + p\sin\left(\frac{\pi}{12}\right)$, where $p \in \mathbb{R}$ and $\sin\left(\frac{\pi}{12}\right) = \frac{\sqrt{6} - \sqrt{2}}{4}$. **3**

(Do NOT prove this.)
Find the minimum value of p for which $y \ge 0$ for all x.

Question 13 (15 marks) Use a SEPARATE writing booklet.

(a) Consider the vectors $\underset{\sim}{p}$ and $\underset{\sim}{q}$, where $\underset{\sim}{p} = \begin{pmatrix} 15 \\ -8 \end{pmatrix}$ and $\left|\underset{\sim}{q}\right| = 20$.

(i) Find the possible ranges of values for $\left|\underset{\sim}{p} + \underset{\sim}{q}\right|$. **1**

(ii) Given that $\left|\underset{\sim}{p} + \underset{\sim}{q}\right|$ is a minimum, find $\underset{\sim}{a}$ where $\underset{\sim}{a} = \underset{\sim}{p} + \underset{\sim}{q}$. **2**

(iii) Consider the vector $\underset{\sim}{b} = \begin{pmatrix} x \\ y \end{pmatrix}$ where $x, y \in \mathbb{R}^+$. **2**

Find $\underset{\sim}{b}$ such that $\left|\underset{\sim}{b}\right| = \left|\underset{\sim}{q}\right|$ and $\underset{\sim}{b}$ is perpendicular to $\underset{\sim}{p}$.

(b) Consider the function $f(x) = \sin^{-1}(\cos x)$ where $0 \le x < \pi$.

(i) Prove that $f(x)$ is a linear function. **2**

(ii) Express $f(x)$ in the form $ax + b$ where $a, b \in \mathbb{R}$. **2**

(c) A particle, A, is projected from the origin with an initial velocity of $16\underset{\sim}{i} + 30\underset{\sim}{j}$ m s^{-1}. At the same time, particle B is projected from a point that is 60 m to the right of the origin and 25 m above the origin with an initial velocity of $-8\underset{\sim}{i} + 20\underset{\sim}{j}$ m s^{-1}. Let the acceleration due to gravity be 9.8 m s^{-2}. The position vector of particle A at time t seconds is given by $16t\underset{\sim}{i} + \left(30t - 4.9t^2\right)\underset{\sim}{j}$.
(Do NOT prove this.)

(i) Find the position vector of particle B at time t seconds. **3**

(ii) Find the time and point at which the two particles collide. **3**

Question 14 (15 marks) Use a SEPARATE writing booklet.

(a) (i) Show that $\sin(A+B)-\sin(A-B)=2\cos A\sin B$. **1**

(ii) Use mathematical induction to prove that **3**

$$\cos\theta+\cos 3\theta+\cos 5\theta+\ldots+\cos(2n-1)\theta=\frac{\sin 2n\theta}{2\sin\theta} \text{ for integers } n\geq 1.$$

(iii) Hence, or otherwise, solve $\cos\theta+\cos 3\theta=\frac{\operatorname{cosec}\theta}{2}-\sin\theta$ for $0<\theta<\pi$. **3**

(b) Fastway Airlines flies from City *A* to City *B*. The flight time is normally distributed with a mean of 240 minutes and a standard deviation of 15 minutes. A flight is considered late if it takes longer than 255 minutes. A flight is considered on time if it takes between *p* and 255 minutes. The probability that a flight will be on time is 0.91.

(i) Calculate the probability that a flight is not late. **1**

Part of a table of $P(Z\leq z)$ values, where *Z* is a standard normal variable, is shown.

Z	*0.00*	*0.01*	*0.02*	*0.03*	*0.04*
–1.7	0.04457	0.04363	0.04272	0.04182	0.04093
–1.6	0.05480	0.05370	0.05262	0.05155	0.05050
–1.5	0.06681	0.06552	0.06426	0.06301	0.06178
–1.4	0.08076	0.07927	0.07780	0.07636	0.07493
–1.3	0.09680	0.09510	0.09342	0.09176	0.09012
–1.2	0.11507	0.11314	0.11123	0.10935	0.10749

Z	*0.05*	*0.06*	*0.07*	*0.08*	*0.09*
–1.7	0.04006	0.03920	0.03836	0.03754	0.03673
–1.6	0.04947	0.04846	0.04746	0.04648	0.04551
–1.5	0.06057	0.05938	0.05821	0.05705	0.05592
–1.4	0.07353	0.07215	0.07078	0.06944	0.06811
–1.3	0.08851	0.08691	0.08534	0.08379	0.08226
–1.2	0.10565	0.10383	0.10204	0.10027	0.09853

(ii) Find the value of *p*. **3**

During a week, Fastway Airlines has 15 flights from City *A* to City *B*. The time taken for any flight is independent of the time taken by any other flight.

(iii) Calculate the probability that at least 12 of these flights are on time, correct to two decimal places. **2**

(iv) Given that at least 12 of these flights are on time, find the probability that exactly 14 flights are on time, correct to two decimal places. **2**

End of paper

MATHEMATICS ADVANCED
MATHEMATICS EXTENSION 1
MATHEMATICS EXTENSION 2
REFERENCE SHEET

Measurement

Length

$$l = \frac{\theta}{360} \times 2\pi r$$

Area

$$A = \frac{\theta}{360} \times \pi r^2$$

$$A = \frac{h}{2}(a + b)$$

Surface area

$$A = 2\pi r^2 + 2\pi rh$$

$$A = 4\pi r^2$$

Volume

$$V = \frac{1}{3}Ah$$

$$V = \frac{4}{3}\pi r^3$$

Functions

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

For $ax^3 + bx^2 + cx + d = 0$:

$$\alpha + \beta + \gamma = -\frac{b}{a}$$

$$\alpha\beta + \alpha\gamma + \beta\gamma = \frac{c}{a}$$

$$\text{and } \alpha\beta\gamma = -\frac{d}{a}$$

Relations

$$(x - h)^2 + (y - k)^2 = r^2$$

Financial Mathematics

$$A = P(1 + r)^n$$

Sequences and series

$$T_n = a + (n - 1)d$$

$$S_n = \frac{n}{2}[2a + (n - 1)d] = \frac{n}{2}(a + l)$$

$$T_n = ar^{n-1}$$

$$S_n = \frac{a(1 - r^n)}{1 - r} = \frac{a(r^n - 1)}{r - 1}, \; r \neq 1$$

$$S = \frac{a}{1 - r}, \; |r| < 1$$

Logarithmic and Exponential Functions

$$\log_a a^x = x = a^{\log_a x}$$

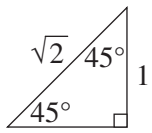
$$\log_a x = \frac{\log_b x}{\log_b a}$$

$$a^x = e^{x \ln a}$$

Trigonometric Functions

$$\sin A = \frac{\text{opp}}{\text{hyp}},\ \cos A = \frac{\text{adj}}{\text{hyp}},\ \tan A = \frac{\text{opp}}{\text{adj}}$$

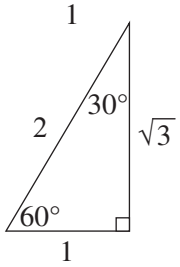
$$A = \frac{1}{2}ab\sin C$$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$c^2 = a^2 + b^2 - 2ab\cos C$$

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$



$$l = r\theta$$

$$A = \frac{1}{2}r^2\theta$$

Trigonometric identities

$$\sec A = \frac{1}{\cos A},\ \cos A \neq 0$$

$$\text{cosec} A = \frac{1}{\sin A},\ \sin A \neq 0$$

$$\cot A = \frac{\cos A}{\sin A},\ \sin A \neq 0$$

$$\cos^2 x + \sin^2 x = 1$$

Compound angles

$$\sin(A + B) = \sin A\cos B + \cos A\sin B$$

$$\cos(A + B) = \cos A\cos B - \sin A\sin B$$

$$\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A\tan B}$$

If $t = \tan\frac{A}{2}$ then $\sin A = \frac{2t}{1+t^2}$

$$\cos A = \frac{1-t^2}{1+t^2}$$

$$\tan A = \frac{2t}{1-t^2}$$

$$\cos A\cos B = \frac{1}{2}\left[\cos(A-B) + \cos(A+B)\right]$$

$$\sin A\sin B = \frac{1}{2}\left[\cos(A-B) - \cos(A+B)\right]$$

$$\sin A\cos B = \frac{1}{2}\left[\sin(A+B) + \sin(A-B)\right]$$

$$\cos A\sin B = \frac{1}{2}\left[\sin(A+B) - \sin(A-B)\right]$$

$$\sin^2 nx = \frac{1}{2}(1 - \cos 2nx)$$

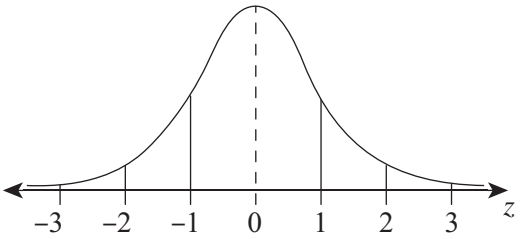
$$\cos^2 nx = \frac{1}{2}(1 + \cos 2nx)$$

Statistical Analysis

$$z = \frac{x - \mu}{\sigma}$$

An outlier is a score
less than $Q_1 - 1.5 \times IQR$
or
more than $Q_3 + 1.5 \times IQR$

Normal distribution



- approximately 68% of scores have z-scores between –1 and 1
- approximately 95% of scores have z-scores between –2 and 2
- approximately 99.7% of scores have z-scores between –3 and 3

$$E(X) = \mu$$

$$\text{Var}(X) = E\left[(X-\mu)^2\right] = E\left(X^2\right) - \mu^2$$

Probability

$$P(A \cap B) = P(A)P(B)$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A|B) = \frac{P(A \cap B)}{P(B)},\ P(B) \neq 0$$

Continuous random variables

$$P(X \leq r) = \int_a^r f(x)dx$$

$$P(a < X < b) = \int_a^b f(x)dx$$

Binomial distribution

$$P(X = r) = {}^nC_r\, p^r (1-p)^{n-r}$$

$$X \sim \text{Bin}(n, p)$$

$$\Rightarrow P(X = x)$$

$$= \binom{n}{x} p^x (1-p)^{n-x},\ x = 0, 1, \ldots, n$$

$$E(X) = np$$

$$\text{Var}(X) = np(1-p)$$

Differential Calculus

Function	Derivative
$y = f(x)^n$	$\frac{dy}{dx} = nf'(x)\left[f(x)\right]^{n-1}$
$y = uv$	$\frac{dy}{dx} = u\frac{dv}{dx} + v\frac{du}{dx}$
$y = g(u)$ where $u = f(x)$	$\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$
$y = \frac{u}{v}$	$\frac{dy}{dx} = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$
$y = \sin f(x)$	$\frac{dy}{dx} = f'(x)\cos f(x)$
$y = \cos f(x)$	$\frac{dy}{dx} = -f'(x)\sin f(x)$
$y = \tan f(x)$	$\frac{dy}{dx} = f'(x)\sec^2 f(x)$
$y = e^{f(x)}$	$\frac{dy}{dx} = f'(x)e^{f(x)}$
$y = \ln f(x)$	$\frac{dy}{dx} = \frac{f'(x)}{f(x)}$
$y = a^{f(x)}$	$\frac{dy}{dx} = (\ln a)f'(x)a^{f(x)}$
$y = \log_a f(x)$	$\frac{dy}{dx} = \frac{f'(x)}{(\ln a)f(x)}$
$y = \sin^{-1} f(x)$	$\frac{dy}{dx} = \frac{f'(x)}{\sqrt{1-\left[f(x)\right]^2}}$
$y = \cos^{-1} f(x)$	$\frac{dy}{dx} = -\frac{f'(x)}{\sqrt{1-\left[f(x)\right]^2}}$
$y = \tan^{-1} f(x)$	$\frac{dy}{dx} = \frac{f'(x)}{1+\left[f(x)\right]^2}$

Integral Calculus

$$\int f'(x)\left[f(x)\right]^n dx = \frac{1}{n+1}\left[f(x)\right]^{n+1} + c \quad \text{where } n \neq -1$$

$$\int f'(x)\sin f(x)dx = -\cos f(x) + c$$

$$\int f'(x)\cos f(x)dx = \sin f(x) + c$$

$$\int f'(x)\sec^2 f(x)dx = \tan f(x) + c$$

$$\int f'(x)e^{f(x)}dx = e^{f(x)} + c$$

$$\int \frac{f'(x)}{f(x)}dx = \ln\left|f(x)\right| + c$$

$$\int f'(x)a^{f(x)}dx = \frac{a^{f(x)}}{\ln a} + c$$

$$\int \frac{f'(x)}{\sqrt{a^2 - \left[f(x)\right]^2}}dx = \sin^{-1}\frac{f(x)}{a} + c$$

$$\int \frac{f'(x)}{a^2 + \left[f(x)\right]^2}dx = \frac{1}{a}\tan^{-1}\frac{f(x)}{a} + c$$

$$\int u\frac{dv}{dx}dx = uv - \int v\frac{du}{dx}dx$$

$$\int_a^b f(x)dx \approx \frac{b-a}{2n}\left\{f(a) + f(b) + 2\left[f\left(x_1\right) + \ldots + f\left(x_{n-1}\right)\right]\right\}$$

where $a = x_0$ and $b = x_n$

Combinatorics

$${}^{n}P_{r} = \frac{n!}{(n-r)!}$$

$$\binom{n}{r} = {}^{n}C_{r} = \frac{n!}{r!(n-r)!}$$

$$(x+a)^{n} = x^{n} + \binom{n}{1}x^{n-1}a + \ldots + \binom{n}{r}x^{n-r}a^{r} + \ldots + a^{n}$$

Vectors

$$\left|\underset{\sim}{u}\right| = \left|x\underset{\sim}{i} + y\underset{\sim}{j}\right| = \sqrt{x^{2}+y^{2}}$$

$$\underset{\sim}{u}\cdot\underset{\sim}{v} = \left|\underset{\sim}{u}\right|\left|\underset{\sim}{v}\right|\cos\theta = x_{1}x_{2} + y_{1}y_{2},$$

where $\underset{\sim}{u} = x_{1}\underset{\sim}{i} + y_{1}\underset{\sim}{j}$

and $\underset{\sim}{v} = x_{2}\underset{\sim}{i} + y_{2}\underset{\sim}{j}$

$$\underset{\sim}{r} = \underset{\sim}{a} + \lambda\underset{\sim}{b}$$

Complex Numbers

$$z = a + ib = r\left(\cos\theta + i\sin\theta\right)$$
$$= re^{i\theta}$$

$$\left[r\left(\cos\theta + i\sin\theta\right)\right]^{n} = r^{n}(\cos n\theta + i\sin n\theta)$$
$$= r^{n}e^{in\theta}$$

Mechanics

$$\frac{d^{2}x}{dt^{2}} = \frac{dv}{dt} = v\frac{dv}{dx} = \frac{d}{dx}\left(\frac{1}{2}v^{2}\right)$$

$$x = a\cos(nt+\alpha) + c$$

$$x = a\sin(nt+\alpha) + c$$

$$\ddot{x} = -n^{2}(x-c)$$

Trial Examination 2023

Neap HSC Year 12 Mathematics Extension 1

DIRECTIONS:

Write your name in the space provided.
Write your student number in the boxes provided below. Then, in the columns of digits below each box, fill in the oval which has the same number as you have written in the box. Fill in **one** oval only in each column.
Read each question and its suggested answers. Select the alternative A, B, C, or D that best answers the question. Fill in the response oval completely, using blue or black pen. Mark only **one** oval per question.

A ○ B ● C ○ D ○

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A ● B ⊗ C ○ D ○

If you change your mind and have crossed out what you consider to be the correct answer, then indicate this by writing the word *correct* and draw an arrow as follows.

correct ↓

A ⊗ B ⊗ C ○ D ○

STUDENT NAME: _____

STUDENT NUMBER:

1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9
0	0	0	0	0	0	0	0	0

SECTION I
MULTIPLE-CHOICE ANSWER SHEET

1.	A ○	B ○	C ○	D ○
2.	A ○	B ○	C ○	D ○
3.	A ○	B ○	C ○	D ○
4.	A ○	B ○	C ○	D ○
5.	A ○	B ○	C ○	D ○
6.	A ○	B ○	C ○	D ○
7.	A ○	B ○	C ○	D ○
8.	A ○	B ○	C ○	D ○
9.	A ○	B ○	C ○	D ○
10.	A ○	B ○	C ○	D ○

STUDENTS SHOULD NOW CONTINUE WITH SECTION II

Neap

Trial Examination 2023

HSC Year 12 Mathematics Extension 1

Section II Writing Booklet

Question Number

Student Name/Number: _____

Instructions

Use a separate writing booklet for each question in Section II.

Write the number of this booklet and the total number of booklets that you have used for this question (e.g. 1 of 3)

⇒ [ ] of [ ]

this booklet

number of booklets for this question

Write using black pen.

You may ask for an extra writing booklet if you need more space.

If you have not attempted the question(s), you must still hand in a writing booklet, with 'NOT ATTEMPTED' written clearly on the front cover.

You may NOT take any writing booklets, used or unused, from the examination room.

Students are advised that this is a trial examination only and cannot in any way guarantee the content or the format of the 2023 HSC Year 12 Mathematics Extension 1 examination.

Tick this box if you have continued this answer in another writing booklet. ☐