Neap

HSC Trial Examination 2020

Mathematics Extension 2

General Instructions	• Reading time – 5 minutes • Working time – 3 hours • Write using black pen • Calculators approved by NESA may be used • A reference sheet is provided at the back of this paper • In Questions 11–16, show relevant mathematical reasoning and/or calculations
Total marks: 100	**Section I – 10 marks** (pages 2–5) • Attempt Questions 1–10 • Allow about 15 minutes for this section **Section II – 90 marks** (pages 6–12) • Attempt Questions 11–16 • Allow about 2 hour and 45 minutes for this section

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 following statement for $n \in Z$:

If $n^2 + 4n + 1$ is even, then n is odd.

Which of the following statements is the contrapositive of this statement for $n \in Z$?

(A) If n is even, then $n^2 + 4n + 1$ is odd.

(B) If $n^2 + 4n + 1$ is odd, then n is even.

(C) If n is odd, then $n^2 + 4n + 1$ is even.

(D) If $n^2 + 4n + 1$ is even, then n is even.

2. Which of the following expressions is equal to $\int x^2 e^{-x} dx$?

(A) $-x^2 e^{-x} + \int 2xe^{-x} dx$

(B) $-2xe^{-x} - \int 2xe^{-x} dx$

(C) $-x^2 e^{-x} - \int 2xe^{-x} dx$

(D) $-2xe^{-x} + \int 2xe^{-x} dx$

3. Which of the following expressions is the partial fraction form of the algebraic fraction $\frac{x-4}{(x-3)^2(x^2+2)}$?

(A) $\frac{A}{(x-3)^2} + \frac{B}{x^2+2}$

(B) $\frac{A}{(x-3)^2} + \frac{Bx+C}{x^2+2}$

(C) $\frac{A}{x-3} + \frac{B}{(x-3)^2} + \frac{C}{x^2+2}$

(D) $\frac{A}{x-3} + \frac{B}{(x-3)^2} + \frac{Cx+D}{x^2+2}$

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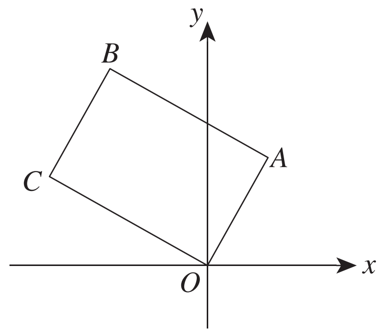
4. The Argand diagram shows the rectangle $OABC$ where $OC = 2OA$. Vertex A corresponds to the complex number w.



Which of the following complex numbers corresponds to vertex C?

(A) $-2iw$

(B) $2iw$

(C) $-2w$

(D) $2w$

5. If x, y and z are any real numbers and $x > y$, which of the following statements must be true?

(A) $x^2 > y^2$

(B) $\frac{1}{x} < \frac{1}{y}$

(C) $x + z > y + z$

(D) $xz > yz$

6. A particle moves in simple harmonic motion along the x-axis about the origin. Initially, the particle is at its extreme positive position. The amplitude of the motion is 12 metres and the particle returns to its initial position every 3 seconds.

What is the equation for the position of the particle at time t seconds?

(A) $x = 12\cos\frac{2\pi t}{3}$

(B) $x = 24\cos\frac{2\pi t}{3}$

(C) $x = 12\cos 3t$

(D) $x = 24\cos 3t$

7. What is the Cartesian equation of a sphere with centre $\underset{\sim}{c} = -3\underset{\sim}{i} + \underset{\sim}{j} - 2\underset{\sim}{k}$ that passes through $\underset{\sim}{a} = 3\underset{\sim}{i} + 3\underset{\sim}{j} + \underset{\sim}{k}$?

(A) $(x-3)^2 + (y+1)^2 + (z-2)^2 = 7$

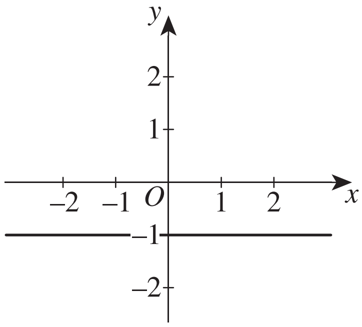
(B) $(x+3)^2 + (y-1)^2 + (z+2)^2 = 7$

(C) $(x-3)^2 + (y+1)^2 + (z-2)^2 = 49$

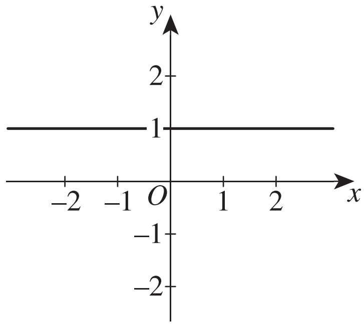
(D) $(x+3)^2 + (y-1)^2 + (z+2)^2 = 49$

8. Which of the following diagrams shows the subset of the complex plane satisfied by the relation $i\bar{z} - iz = 2$?

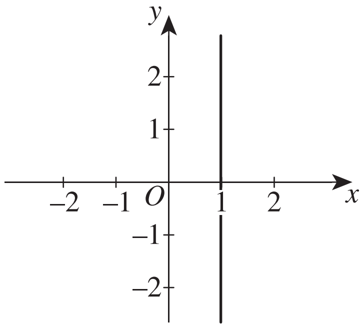
(A)



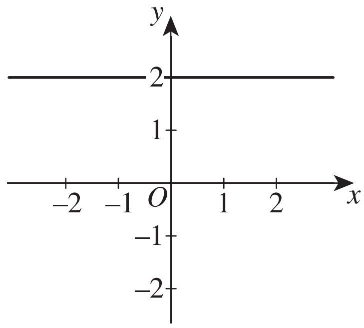
(B)



(C)



(D)



9. A particle is moving along a straight line. At time t, its velocity is v and its displacement from a fixed origin is x.

If $\dfrac{dv}{dx} = \dfrac{1}{2v}$, which of the following best describes the particle's acceleration and velocity?

(A) constant acceleration and constant velocity

(B) constant acceleration and decreasing velocity

(C) constant acceleration and increasing velocity

(D) increasing acceleration and increasing velocity

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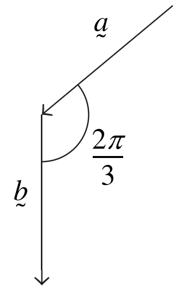
10. In the diagram, the vectors $\underset{\sim}{a}$ and $\underset{\sim}{b}$ are such that $|\underset{\sim}{a}| = |\underset{\sim}{b}|$.



Given that $|\underset{\sim}{a}| = a$, which of the following expressions is equal to $\underset{\sim}{a} \cdot \underset{\sim}{b}$?

(A) $-\frac{\sqrt{3}}{2}a^2$

(B) $-\frac{1}{2}a^2$

(C) $\frac{1}{2}a^2$

(D) $\frac{\sqrt{3}}{2}a^2$

Section II

90 marks
Attempt Questions 11–16
Allow about 2 hours and 45 minutes for this section

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

In Questions 11–16, your responses should include relevant mathematical reasoning and/or calculations.

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

(a) Find the value of b given that $-i$ is a root of the equation $z^2 + bz + (1 - i) = 0$. **2**

(b) Consider the vectors $\underset{\sim}{a} = 2\underset{\sim}{i} + 2\underset{\sim}{j} + \underset{\sim}{k}$, $\underset{\sim}{b} = 2\underset{\sim}{j} + 2\underset{\sim}{k}$ and $\underset{\sim}{c} = m\underset{\sim}{i} + n\underset{\sim}{j}$.

(i) Find the values of m and n such that $(\underset{\sim}{a} + \underset{\sim}{c})$ is parallel to $\underset{\sim}{b}$. **2**

(ii) Find the values of m and n such that $\underset{\sim}{c}$ is a unit vector perpendicular to $\underset{\sim}{a}$. **2**

(c) Using the substitution $u = 1 - \sin 2x$, evaluate $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \sqrt{1 - \sin 2x}(1 - 2\cos^2 x)dx$. **4**

(d) Let $z = \sqrt{3} + i$.

(i) Express z in modulus-argument form. **2**

(ii) Find the smallest positive integer n such that $z^n - \overline{z}^n = 0$. **3**

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

(a) Consider two complex numbers, u and v, such that $\text{Im}(u) = 2$ and $\text{Re}(v) = -1$. **2**

Given that $u + v = -uv$, find the values of u and v.

(b) Solve the equation $\left|e^{2i\theta} + e^{-2i\theta}\right| = 1$ where $-\pi < \theta \leq \pi$. **3**

(c) Given that $y = \dfrac{1}{1+x}$, prove by mathematical induction that $\dfrac{d^n y}{dx^n} = \dfrac{(-1)^n n!}{(1+x)^{n+1}}$ for all positive integers n. **3**

(d) A subset of the complex plane is described by the relation $\text{Arg}(z - 2i) = \dfrac{\pi}{6}$.

(i) Show that the Cartesian equation of this relation is $y = \dfrac{1}{\sqrt{3}}x + 2, x > 0$. **2**

(ii) Draw a sketch of this relation. **1**

(iii) Given that z is a complex number that satisfies the relation $\text{Arg}(z - 2i) = \dfrac{\pi}{6}$, find the least possible exact value of $|z - 3 + i|$. **4**

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

(a) Prove that $\log_2 5$ is an irrational number. **3**

(b) Relative to a fixed origin, O, a particle is moving in a straight line with simple harmonic motion of period $\frac{2\pi}{n}$ seconds and amplitude a metres. Initially, the particle is $\frac{a}{2}$ metres from O and is moving away from O.

(i) Find an expression for the particle's displacement, x, at time t. Give your answer in the form $x = a\sin(nt + \alpha)$. **1**

(ii) Find the time when the particle will first reach an extreme position. **1**

(iii) The particle has speed V m s^{-1} when it is $\frac{a}{3}$ metres from an extreme position. **2**

Find, in terms of V, the particle's maximum speed.

(c) Consider two lines, l_1 and l_2, with vector equations $\underset{\sim}{r}_1$ and $\underset{\sim}{r}_2$ respectively.

(i) Find $\underset{\sim}{r}_1$, the vector equation of l_1, in the direction of $\begin{pmatrix} 1 \\ -2 \\ 2 \end{pmatrix}$ and passing through the point $(-1, 2, -3)$. **1**

The line l_2 has the vector equation $\underset{\sim}{r}_2 = (-t + 1)\underset{\sim}{i} + (2t - 2)\underset{\sim}{j} + (3t + 6)\underset{\sim}{k}$ where $t \in R$.

(ii) Find a vector parallel to l_2. **1**

(iii) Find the point of intersection of l_1 and l_2. **3**

(iv) Find the acute angle between l_1 and l_2. Give your answer in degrees correct to one decimal place. **3**

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

(a) From an origin O, a parachutist of mass m kg falls vertically downwards. The forces acting on the parachutist are his weight and a force due to air resistance of magnitude mkv^2 newtons, where k is a constant and v m s^{-1} is the parachutist's velocity. Let x be the parachutist's displacement in metres below O.

(i) Show that the parachutist's equation of motion is $\ddot{x} = g - kv^2$ where g is the acceleration of gravity. **1**

(ii) Use integration to show that $v^2 = \frac{g}{k}(1 - e^{-2kx})$. **2**

(iii) Given that the parachutist's terminal velocity is $6g$ m s^{-1}, find the value of k. **1**

When the parachutist's velocity is $5g$ m s^{-1}, he opens his parachute. The motion is now modelled by assuming that the magnitude of the force due to air resistance instantaneously changes to $\frac{mgv}{10}$ newtons. The time from the parachute opening is t seconds.

(iv) Use integration to show that $v = 10 + 5(g - 2)e^{-\frac{gt}{10}}$. **3**

(v) It takes T seconds for the parachutist's velocity to decrease to $2g$ m s^{-1}. **1**

Show that $T = \frac{10}{g}\ln\left[\frac{5(g-2)}{2(g-5)}\right]$ seconds.

(b) Consider the equation $z^5 = (z + 1)^5$ where $z \in C$.

(i) Explain why this equation does NOT have five roots. **1**

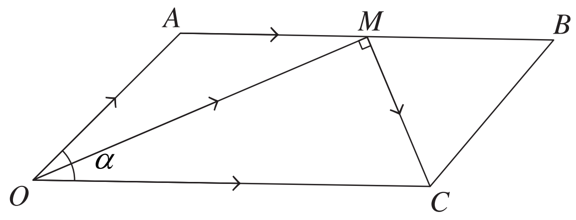
(ii) Solve $z^5 = (z + 1)^5$, giving your answer in the form $a + bi\cot\theta$. **4**

(iii) Describe the geometrical relationship between the roots of the equation $iz^5 = (iz + 1)^5$ and the roots of the equation $z^5 = (z + 1)^5$. **2**

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

(a) The diagram below shows parallelogram $OABC$ where $\overrightarrow{OA} = \underset{\sim}{a}$, $\overrightarrow{OC} = \underset{\sim}{b}$ and $\left|\overrightarrow{OC}\right| = 2\left|\overrightarrow{OA}\right|$. The angle between $\overrightarrow{OA}$ and $\overrightarrow{OC}$ is α.

M is a point on AB such that $\overrightarrow{AM} = k\overrightarrow{AB}$, $0 \leq k \leq 1$ and $\overrightarrow{OM} \cdot \overrightarrow{MC} = 0$.



(i) Use a vector method to show that $|\underset{\sim}{a}|^2(1-2k)(2\cos\alpha - (1-2k)) = 0$. **4**

(ii) Find the set of values for α such that there are two possible positions for M. **2**

(b) Let $I = \int_0^{\frac{\pi}{2}} \frac{2}{3+5\cos x}\,dx$.

(i) Using the substitution $t = \tan\frac{x}{2}$, show that $I = \int_0^1 \frac{2}{4-t^2}\,dt$. **2**

(ii) Hence find the value of I. Give your answer in the form $\ln\sqrt{k}$ where k is a positive integer. **2**

Question 15 continues on page 11

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Question 15 (continued)

(c) A particle is projected from a point O above horizontal ground. At time t seconds, the particle's position vector is $\underset{\sim}{r} = gt\cos\theta\,\underset{\sim}{i} + \left(\frac{g}{4} + gt\sin\theta - \frac{g}{2}t^2\right)\underset{\sim}{j}$ where θ is the angle of projection and g is the acceleration due to gravity.

(i) The particle's time of flight is T seconds. **3**

Show that $T = \frac{1}{\sqrt{2}}(\sqrt{1 - \cos 2\theta} + \sqrt{2 - \cos 2\theta})$.

(ii) The particle's range is R metres. **1**

Show that $R = \frac{g}{2}(\sqrt{1 - \cos^2 2\theta} + \sqrt{2 + \cos 2\theta - \cos^2 2\theta})$.

(iii) The particle's maximum range occurs when $\cos 2\theta = \frac{1}{5}$. (Do NOT prove this.) **1**

Find the extra distance attained by projecting the particle at this angle rather than at an angle of 45°. Give your answer in the form $\frac{g}{2}(\sqrt{a} - \sqrt{b} - c)$ where a, b and c are positive integers.

End of Question 15

Question 16 (15 marks) Use a SEPARATE writing booklet.

(a) Let $I_n = \int_0^1 x^n \tan^{-1} x dx$ where $n = 0, 1, 2, \ldots$.

(i) Show that $(n+1)I_n = \frac{\pi}{4} - \int_0^1 \frac{x^{n+1}}{1+x^2} dx$ for $n \geq 0$. **2**

(ii) Hence, or otherwise, find the value of I_0. **1**

(iii) Show that $(n+3)I_{n+2} + (n+1)I_n = \frac{\pi}{2} - \frac{1}{n+2}$. **2**

(iv) Hence find the value of I_4. **2**

(b) Consider two positive real numbers a_1 and a_2.

(i) Prove that $\frac{a_1 + a_2}{2} \geq \sqrt{a_1 a_2}$. **1**

Let $a_1, a_2, \ldots, a_n$ be n positive real numbers.

If $a_1 a_2 \ldots a_n = 1$ then $a_1 + a_2 + \ldots + a_n \geq n$. (Do NOT prove this.)

(ii) Prove that $\frac{a_1 + a_2 + \ldots + a_n}{n} \geq (a_1 a_2 \ldots a_n)^{\frac{1}{n}}$. **3**

(iii) Hence prove that $2^n - 1 > n\sqrt{2^{n-1}}$ for integers $n \geq 1$. **4**

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

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

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

Financial Mathematics

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

Sequences and series

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

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

$T_n = ar^{n - 1}$

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

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

Functions

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

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

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

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

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

Relations

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

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

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

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

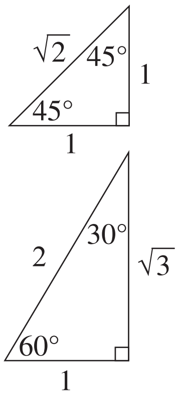
$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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

$l = r\theta$

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



Trigonometric identities

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

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

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

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

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

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

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

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

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

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

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

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

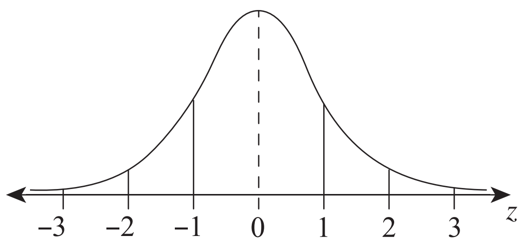
$\cos^2 nx = \frac{1}{2}(1 + \cos 2nx)$

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

$E(X) = \mu$

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

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

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

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

$\Rightarrow P(X = x)$

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

$E(X) = np$

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

Differential Calculus

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

Integral Calculus

$$\int f'(x)[f(x)]^n dx = \frac{1}{n+1}[f(x)]^{n+1} + c$$

where $n \neq -1$

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

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

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

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

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

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

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

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

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

$$\int_a^b f(x)dx$$

$$\approx \frac{b-a}{2n}\{f(a) + f(b) + 2[f(x_1) + \ldots + f(x_{n-1})]\}$$

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

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

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

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

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

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

Mechanics

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

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

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

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

Neap

HSC Trial Examination 2020

Mathematics Extension 2

Question Number

Section II – Writing Booklet

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 in black or blue pen (black is recommended).

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.

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

HSC Trial Examination 2020

Mathematics Extension 2

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 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