THE HEFFERNAN GROUP
P.O. Box 1180
Surrey Hills North VIC 3127
ABN 20 607 374 020
Phone 9836 5021
Fax 9836 5025

Student Name:………………………………………

SPECIALIST MATHEMATICS

TRIAL EXAMINATION 1

(FACTS, SKILLS AND APPLICATIONS TASK)

2005

Reading Time: 15 minutes
Writing time: 90 minutes

Instructions to students

This exam consists of Part I and Part II.
Part I consists of 30 multiple-choice questions and should be answered on the detachable answer sheet on page 24 of this exam. This section of the paper is worth 30 marks.
Part II consists of 6 short-answer questions, all of which should be answered in the spaces provided. Part II begins on page 15 of this exam. This section of the paper is worth 20 marks.
There is a total of 50 marks available.
The acceleration due to gravity should be taken to have magnitude g m/s^2 where $g = 9.8$
Students may bring up to two A4 pages of pre-written notes into the exam.
Formula sheets can be found on pages 21-23 of this exam.

PART I

Question 1

If $f(x)=2x^2-5x+3$, then the graph of $y=\dfrac{1}{f(x)}$ has

A. two x-intercepts
B. only one straight line asymptote
C. one asymptote that is not a straight line asymptote
D. asymptotes at $x=\dfrac{2}{3}$ and at $x=1$
E. asymptotes at $x=\dfrac{3}{2}$ and at $x=1$

Question 2

The ellipse with equation $\dfrac{\left(x+\sqrt{2}\right)^2}{2}+\dfrac{y^2}{9}=1$ has tangents to it with the equations

A. $x=0,\ y=\sqrt{2}$
B. $x=3,\ y=0$
C. $x=-2\sqrt{2},\ y=3$
D. $x=2\sqrt{2},\ y=-3$
E. $x=-\sqrt{2},\ y=3$

Question 3

The implied or maximal domain of the function with rule $y=2+\mathrm{Tan}^{-1}(2x)$ is

A. $[-\pi,\pi]$
B. $[-2,2]$
C. $\left[\dfrac{-\pi}{2},\dfrac{\pi}{2}\right]$
D. $[0,\ 4]$
E. R

Question 4

The graph of $y = \text{cosec}^2\left(\frac{x}{2}\right)$, from $x = -\pi$ to $x = \pi$, has vertical asymptotes only at

A. $x = 0$
B. $x = \pm\pi$
C. $x = 0,\ x = \pm\pi$
D. $x = 0,\ x = \pm\sqrt{\pi}$
E. $x = 0,\ x = \pm\frac{\pi}{2},\ x = \pm\pi^2$

Question 5

If $z = 3 + 2i$ then $\frac{1}{1+\bar{z}}$ is equal to

A. $\frac{1}{5} - \frac{1}{10}i$
B. $\frac{1}{5} + \frac{1}{10}i$
C. $\frac{4}{3} - \frac{1}{2}i$
D. $\frac{4}{3} + \frac{1}{2}i$
E. $2 - 3i$

Question 6

If $z = 3i$ then $|iz|$ and $\text{Arg}(iz)$ are respectively

A. -3 and $-\pi$
B. -3 and π
C. 3 and $-\pi$
D. 3 and 0
E. 3 and π

Question 7

Let $P(z) = z^4 + 2z^3 + 3z^2 + 2z + 2$.
One root of the polynomial equation $P(z) = 0$ is i.
All the roots of $P(z) = 0$ are given by

A. $\pm i$
B. $\pm i,\ -1 \pm i$
C. $\pm i,\ 1 \pm i$
D. $\pm i,\ 1 \pm \sqrt{2}i$
E. $\pm i, -1 \pm \sqrt{2}i$

Question 8

The complete set of cube roots of $8\text{cis}\left(\frac{3\pi}{2}\right)$ is given by

A. $2\text{cis}\left(\frac{\pi}{2}\right)$

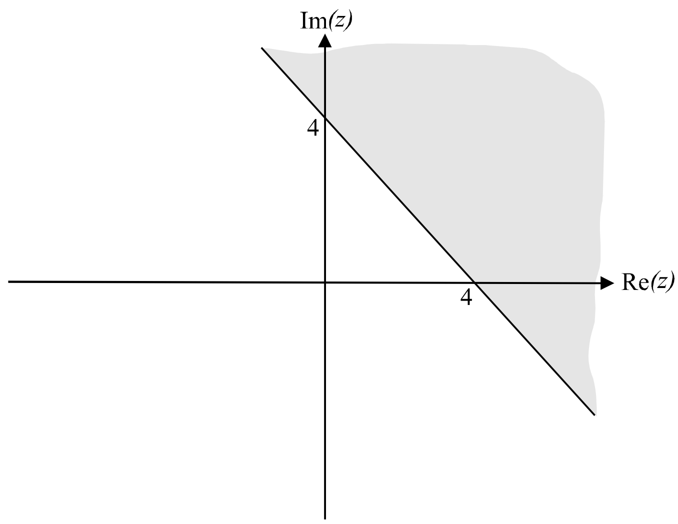
B. $\frac{8}{3}\text{cis}\left(\sqrt{\frac{3}{2}}\pi\right)$

C. $2\text{cis}\left(\frac{\pi}{2}\right)$ or $2\text{cis}\left(\frac{7\pi}{6}\right)$

D. $2\text{cis}\left(\frac{\pi}{2}\right)$ or $2\text{cis}\left(\frac{7\pi}{6}\right)$ or $2\text{cis}\left(\frac{11\pi}{6}\right)$

E. $\frac{8}{3}\text{cis}\left(\frac{\pi}{2}\right)$ or $\frac{8}{3}\text{cis}\left(\frac{7\pi}{6}\right)$ or $\frac{8}{3}\text{cis}\left(\frac{11\pi}{6}\right)$

Question 9



Given that $z \in C$, the shaded region in the diagram above is best described by

A. $\{z : \text{Re}(\bar{z}) + \text{Im}(z) \geq 4\}$
B. $\{z : \text{Re}(\bar{z}) + \text{Im}(z) \leq 4\}$
C. $\{z : \text{Re}(z) - \text{Im}(\bar{z}) \leq 4\}$
D. $\{z : \text{Re}(z) + \text{Im}(\bar{z}) \geq 4\}$
E. $\{z : \text{Re}(z) - \text{Im}(z) \geq 4\}$

Question 10

An antiderivative of $\sin^4\left(\frac{x}{2}\right)\cos\left(\frac{x}{2}\right)$ is

A. $-\sin^5\left(\frac{x}{2}\right)$

B. $-\frac{2}{5}\sin^5\left(\frac{x}{2}\right)$

C. $-\frac{1}{5}\sin^5\left(\frac{x}{2}\right)$

D. $\frac{2}{5}\sin^5\left(\frac{x}{2}\right)$

E. $2\sin^5\left(\frac{x}{2}\right)$

Question 11

Using a suitable substitution, $\int_0^3 2x\sqrt{1+x}\,dx$ becomes

A. $-\int_0^3\left(u^{\frac{1}{2}}+u^{\frac{3}{2}}\right)du$

B. $2\int_0^3\left(u^{\frac{3}{2}}-u^{\frac{1}{2}}\right)du$

C. $-\int_1^4\left(u^{\frac{5}{2}}-u^{\frac{3}{2}}\right)du$

D. $2\int_1^4\left(u^{\frac{3}{2}}-u^{\frac{1}{2}}\right)du$

E. $\int_1^4\left(u^{\frac{3}{2}}+u^{\frac{1}{2}}\right)du$

Question 12

$\int \frac{dx}{2x\sqrt{\log_e(x)}}$, $x > 0$, is equal to

A. $-\sqrt{\log_e(x)} + c$

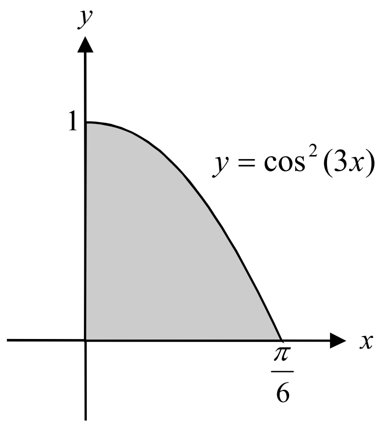
B. $\frac{1}{2}\sqrt{\log_e(x)} + c$

C. $\sqrt{\log_e(x)} + c$

D. $\log_e\left(2x\sqrt{\log_e(x)}\right) + c$

E. $\frac{2}{\log_e(x)} + c$

Question 13



The shaded region above is the region enclosed by the graph of $y = \cos^2(3x)$ and the positive x and y axes. It has an area of

A. $\frac{\pi}{12}$ units^2

B. $\frac{\pi}{6}$ units^2

C. $\left(\frac{\pi}{12} + \frac{1}{12}\right)$ units^2

D. $\left(\frac{\pi}{6} - \frac{1}{6}\right)$ units^2

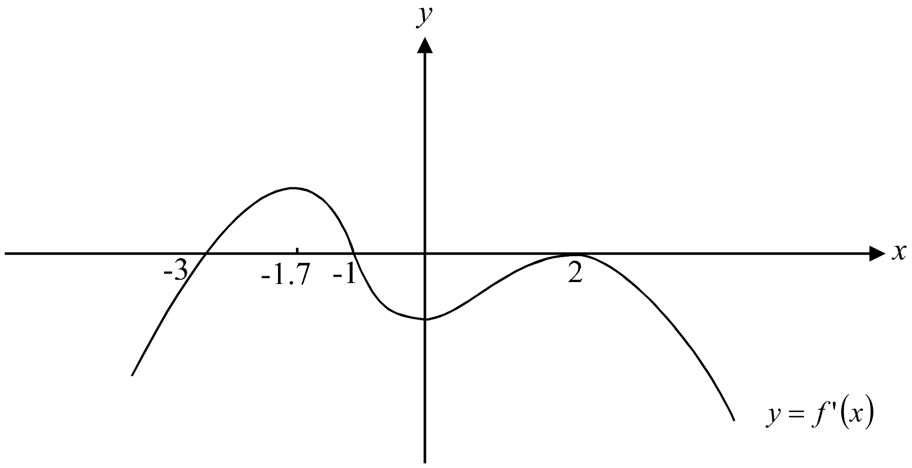
E. $\left(\frac{\pi}{12} + \frac{1}{6}\right)$ units^2

Question 14

The value of $\int_1^3 2x\log_e(x)dx$, correct to 4 decimal places, is

A. 3.0500
B. 3.7921
C. 4.2369
D. 5.2579
E. 5.8875

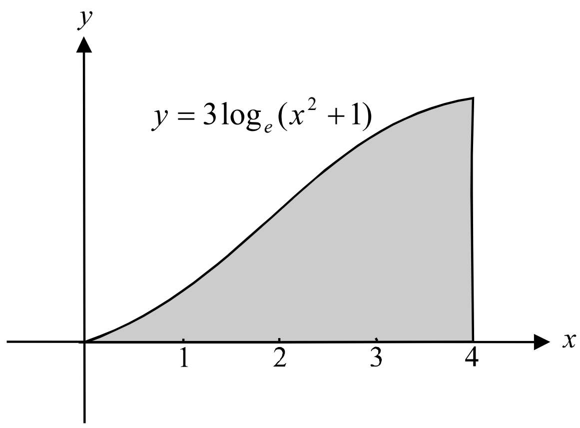
Question 15



The graph of $y = f'(x)$ is shown above.
Which one of the following statements is true for the graph of $y = f(x)$.

A. The graph of $y = f(x)$ has stationary points at $x = -1\cdot7$, and at $x = 2$ only.
B. The graph of $y = f(x)$ has stationary points at $x = -1\cdot7$, at $x = 2$ and at $x = 0$.
C. The graph of $y = f(x)$ has a local maximum at $x = -1$.
D. The graph of $y = f(x)$ has a local maximum at $x = 2$.
E. The graph of $y = f(x)$ has a local maximum at $x = -3$.

Question 16



The shaded region shown in the diagram above is the region enclosed by the function with rule $y = 3\log_e\left(x^2+1\right)$, the x-axis and the line $x = 4$.
An approximation for the area of this shaded region using the trapezoidal rule with two equal intervals is

A. $3\log_e(85)$

B. $3\log_e\left(\dfrac{1}{425}\right)$

C. $6\log_e(5\times 17)$

D. $\log_e\left(5^6\times 17^3\right)$

E. $\log_e(5\times 17)^3$

Question 17

Euler's method with a step size of 0.1 is used to solve the differential equation
$\sqrt{x^2+2}\,\dfrac{dy}{dx} = 2x$ with $y = 3$ when $x = 1$.
The approximation found for y when $x = 1\cdot 2$ is closest to

A. 3.1155
B. 3.2383
C. 3.519
D. 3.705
E. 6.237

Question 18

A water container has a particular shape such that when the depth of the water in it is x cm, the volume of the water is $V\text{cm}^3$, where $V = 500\text{Sin}^{-1}\left(\frac{x}{10}\right)$. Water is added to the container at the rate of 10cm^3/second .
At what rate, in cm/sec, is the depth of the water rising when the depth is 5cm?

A. $\frac{\sqrt{65}}{50}$

B. $\frac{\sqrt{3}}{10}$

C. $\frac{2\sqrt{10}}{13}$

D. $\frac{5\sqrt{3}}{2}$

E. $\frac{1000}{\sqrt{3}}$

Question 19

A vector that has a magnitude of 2 and that is perpendicular to $\underset{\sim}{i} + 2\underset{\sim}{j} - 2\sqrt{5}\underset{\sim}{k}$ is

A. $\underset{\sim}{i} + \sqrt{2}\underset{\sim}{j} + \underset{\sim}{k}$

B. $\underset{\sim}{i} + 2\underset{\sim}{j} - \underset{\sim}{k}$

C. $\frac{2}{5}\left(2\underset{\sim}{i} + 4\underset{\sim}{j} + \sqrt{5}\underset{\sim}{k}\right)$

D. $\frac{2}{25}\left(2\underset{\sim}{i} + 4\underset{\sim}{j} + \sqrt{5}\underset{\sim}{k}\right)$

E. $\frac{2}{25}\left(4\underset{\sim}{i} + 2\underset{\sim}{j} - \sqrt{5}\underset{\sim}{k}\right)$

Question 20

In a rhombus *WXYZ*, *WX* is parallel to *ZY*. If $\overrightarrow{WX} = \underset{\sim}{a}$ and $\overrightarrow{XY} = \underset{\sim}{b}$ then which one of the following statements is true?

A. $\left|\overrightarrow{WY}\right| = \left|\underset{\sim}{a} + \underset{\sim}{b}\right|$

B. $\left|\overrightarrow{WY}\right| = \left|\underset{\sim}{a}\right| + \left|\underset{\sim}{b}\right|$

C. $\overrightarrow{WY} = \underset{\sim}{a} - \underset{\sim}{b}$

D. $\overrightarrow{WY} = 2\underset{\sim}{a} + \underset{\sim}{b}$

E. $\overrightarrow{WY} = \underset{\sim}{a} - \left|\underset{\sim}{b}\right|$

Question 21

The scalar resolute of $2\underset{\sim}{i} + \underset{\sim}{j} - \underset{\sim}{k}$ in the direction of $\underset{\sim}{i} - \underset{\sim}{j} + 3\underset{\sim}{k}$ is

A. $-\dfrac{2}{\sqrt{11}}$

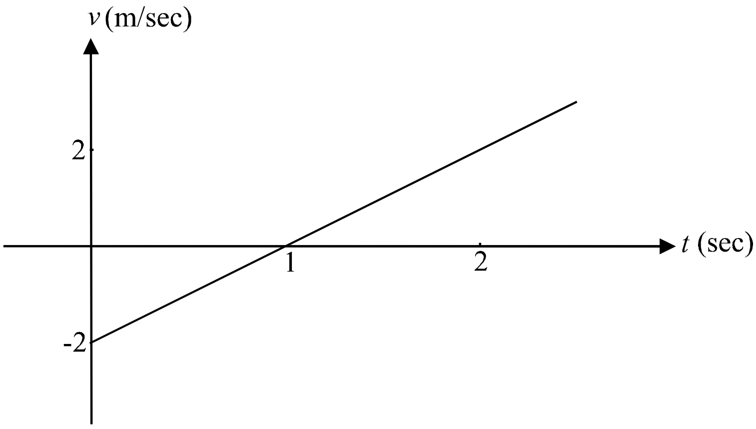
B. $-\dfrac{2}{\sqrt{5}}$

C. $\dfrac{2}{\sqrt{11}}$

D. $-\dfrac{2}{11}\left(\underset{\sim}{i} - \underset{\sim}{j} + 3\underset{\sim}{k}\right)$

E. $\dfrac{2}{5}\left(\underset{\sim}{i} - \underset{\sim}{j} + 3\underset{\sim}{k}\right)$

Question 22



The velocity-time graph represents the motion of a rubber ball that is bounced by a child. The height, in metres, above the ground at which the child releases the ball is

A. $\frac{1}{2}$
B. 1
C. 2
D. 4
E. 6

Question 23

The position vector of a particle at time t is given by

$$\underset{\sim}{r}(t) = \sin(t)\underset{\sim}{i} + \cos(2t)\underset{\sim}{j}, \quad 0 \le t \le \frac{\pi}{2}$$

The Cartesian equation of the path of the particle is

A. $y = 1 - 2x, \quad 0 \le x \le 1$
B. $y = 2x^2 - 1, \quad -1 \le x \le 1$
C. $y = 1 - 2x^2, \quad 0 \le x \le 1$
D. $x^2 + 2y^2 = 1, \quad -1 \le x \le 1$
E. $2x^2 + y^2 = 1, \quad 0 \le x \le 1$

Question 24

A particle is subjected to a force of 2 newtons acting due south and a force of 5 newtons acting at a bearing of S60°W.
The resultant force, in newtons, acting on the particle has a magnitude of

A. $\sqrt{19}$
B. $\sqrt{39}$
C. 19
D. 39
E. $29 + 10\sqrt{3}$

Question 25

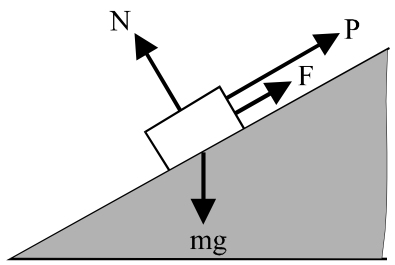
A particle of mass 3kg is moving in a straight line. Its velocity is initially 5m/s but changes over a period of 2 seconds to 8m/s.
The change of momentum of the particle in kg m/s, in the direction of its motion is

A. –9
B. –6
C. 4.5
D. 6
E. 9

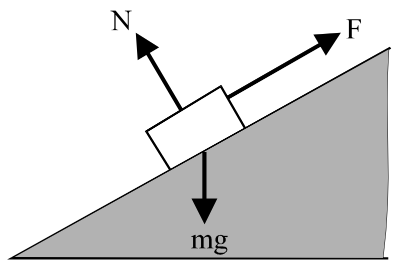
Question 26

In the diagram below, m represents the mass in kg of a particle that is stationary on a rough inclined plane.
N is the normal force, *P* is a pulling force running parallel to the plane and *F* is a friction force. All forces are measured in newtons.
Which of the following diagrams does **not** show a possible representation of the forces?

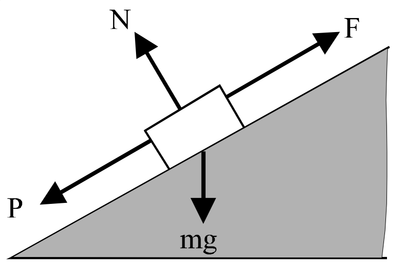
A.



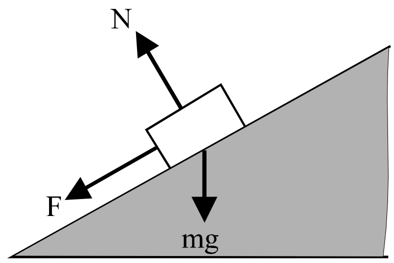
B.



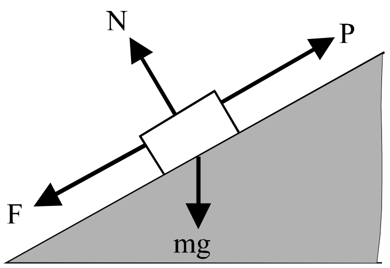
C.



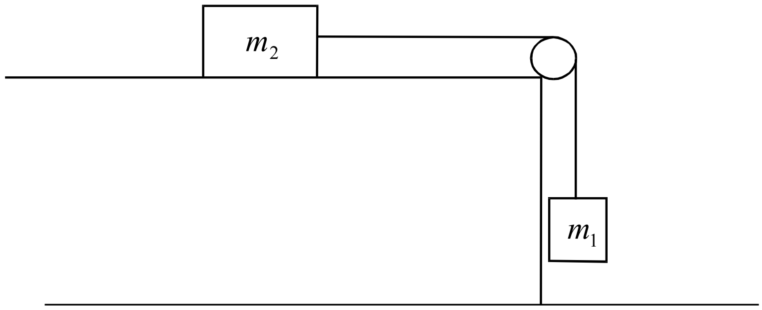
D.



E.



Question 27



Two particles of mass m_1 and m_2 are connected by a light string that passes over a smooth pulley. The particle of mass m_2 is at the point of moving over the rough horizontal table. The normal force is N and the tension force in the string is T. The coefficient of friction is

A. $m_1 g$

B. $m_2 g$

C. $\dfrac{m_1}{m_2}$

D. $\dfrac{m_2 g}{N}$

E. $\dfrac{m_1 m_2 g}{N}$

Question 28

In a chemical reaction, the rate at which the reaction occurs is proportional to the amount of substance left to react. If S is the amount of substance that has already reacted and S_0 is the initial quantity of the substance, then a differential equation that relates S and t is

A. $\dfrac{dS}{dt} = kS$

B. $\dfrac{dS}{dt} = kS_0 - S$

C. $\dfrac{dS}{dt} = kS - S_0$

D. $\dfrac{dS}{dt} = k(S - S_0)$

E. $\dfrac{dS}{dt} = k(S_0 - S)$

Question 29

A particle moves in a straight line so that at time t, $t \geq 0$, its acceleration is 1m/s^2, its velocity is v m/s and its displacement from a fixed origin is x.
Which one of the following equations could **not** be true?

A. $v = t$

B. $v = 2t$

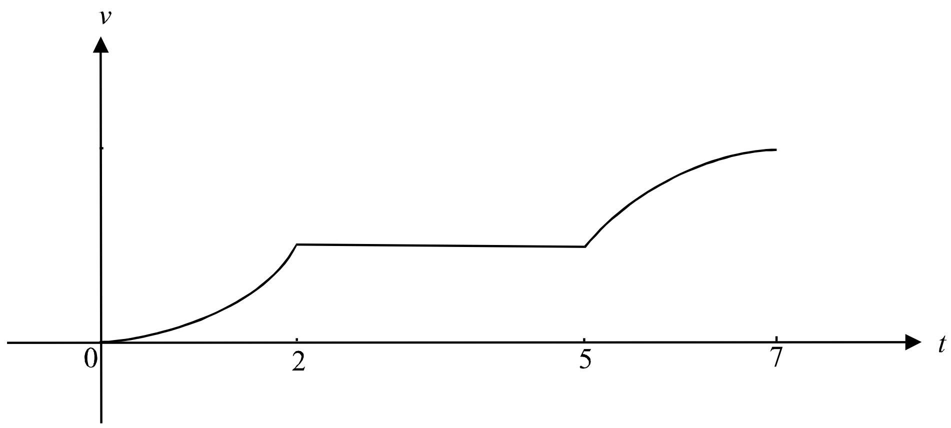
C. $2x = t^2$

D. $2x = v^2$

E. $x = \dfrac{t^2 + 2t}{2}$

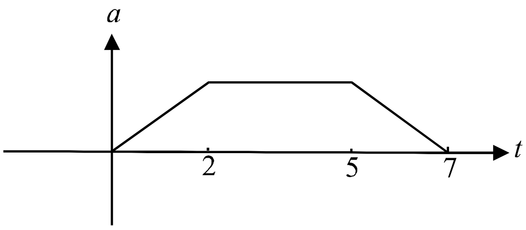
Question 30

The velocity-time graph of a vehicle is shown below.

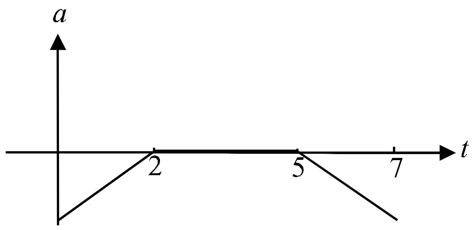


Which one of the following could be the acceleration-time graph of the vehicle?

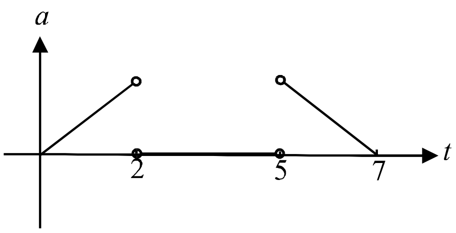
A.



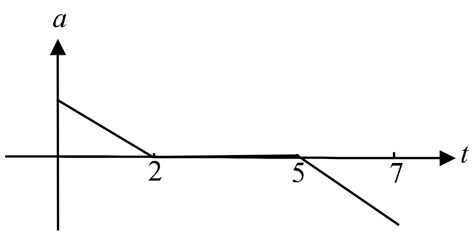
B.



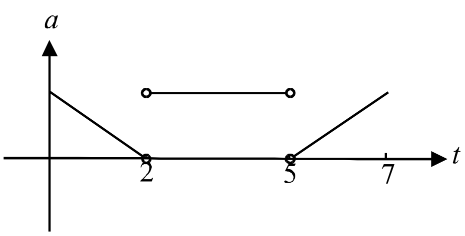
C.



D.



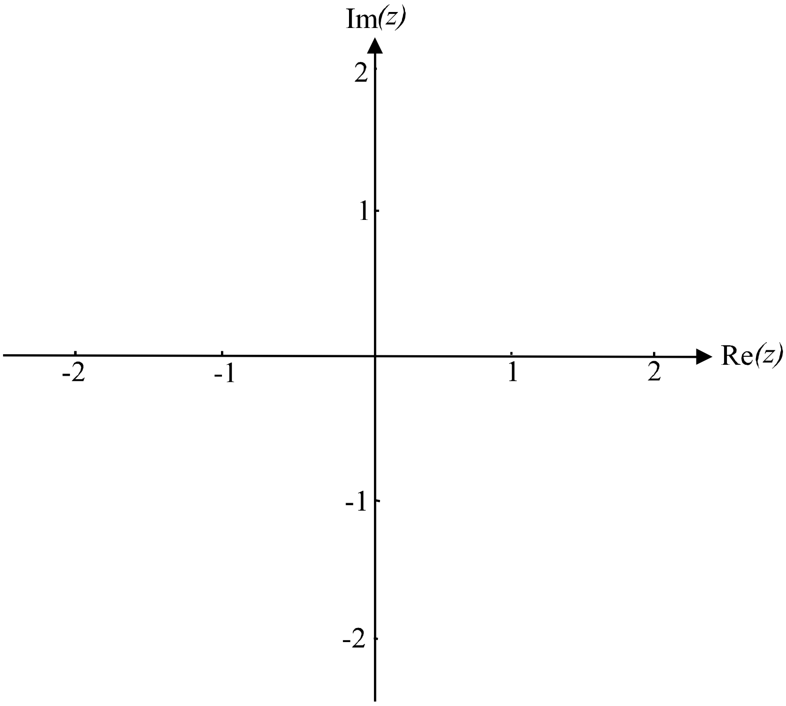
E.



PART II

Question 1

Shade the region of the complex plane described by $\left\{z : \operatorname{Arg} z < \frac{\pi}{3}\right\}$



2 marks

Question 2

Find all the solutions to the equation $z^6 = 729,\ z \in C$.

3 marks

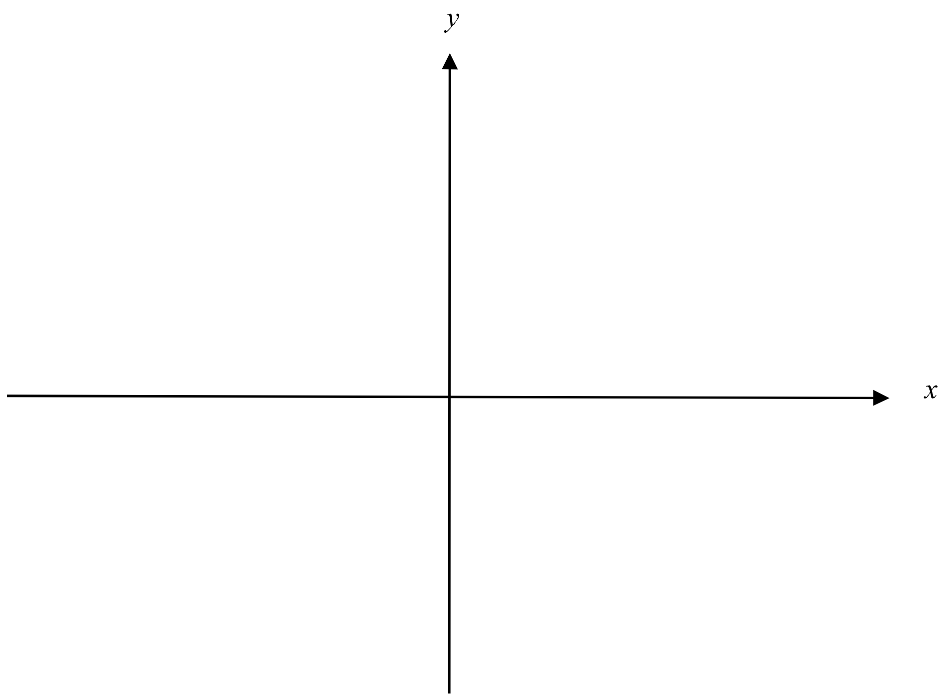
Question 3

Sketch the graph of the hyperbola with equation

$$\frac{(x-1)^2}{4}-\frac{(y+2)^2}{9}=1$$

on the set of axes below.

Show clearly on your diagram the centre, the equations of the asymptotes and any intercepts on the *x* or *y* axes.



4 marks

Question 4

If $y = 4x^2 \mathrm{Tan}^{-1}\left(\frac{x}{a}\right)$ is a solution of the equation

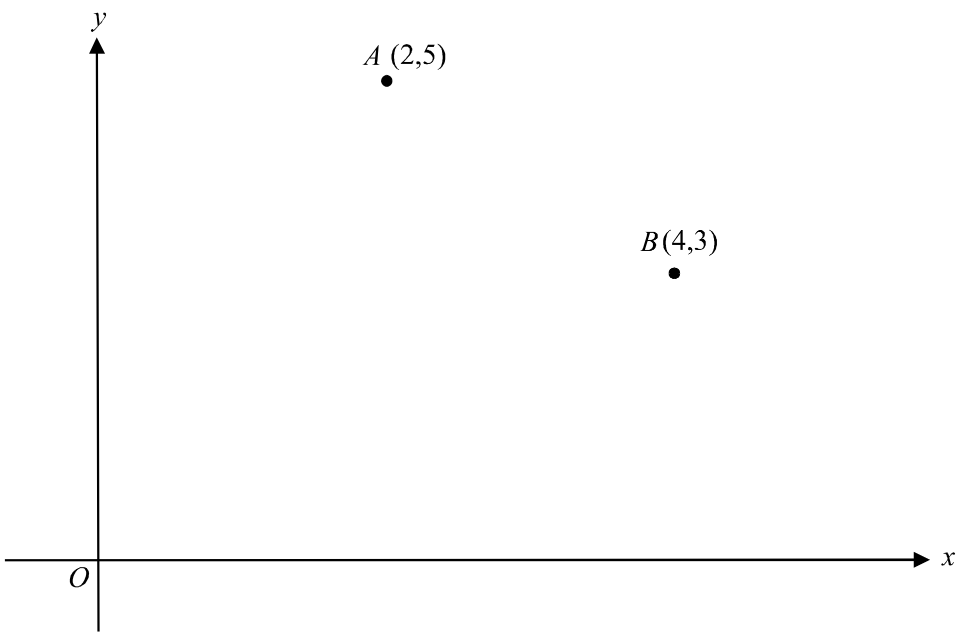
$$\frac{dy}{dx} - \frac{2y}{x} = 12 - \frac{108}{x^2 + 9}$$

find the value of a.

3 marks

Question 5

The points $A(2,5)$ and $B(4,3)$ lie on the Cartesian plane. The unit vector $\underset{\sim}{i}$ is in the direction of the positive branch of the x-axis and the unit vector $\underset{\sim}{j}$ is in the direction of the positive branch of the y-axis.



a. Find $\overrightarrow{AB}$.

1 mark

b. The vector $\overrightarrow{AC}$ is the component of the vector $\overrightarrow{AB}$ perpendicular to $\overrightarrow{OB}$. Find $\overrightarrow{AC}$.

2 marks

c. Hence find the coordinates of the point C.

2 marks

Question 6

Evaluate $\int_e^5 \frac{1}{x(x-2)}\,dx$.

3 marks
Total 20marks

Specialist Mathematics Formulas

Mensuration

area of a trapezium:	$\frac{1}{2}(a+b)h$
curved surface area of a cylinder:	$2\pi rh$
volume of a cylinder:	$\pi r^2 h$
volume of a cone:	$\frac{1}{3}\pi r^2 h$
volume of a pyramid:	$\frac{1}{3}Ah$
volume of a sphere:	$\frac{4}{3}\pi r^3$
area of a triangle:	$\frac{1}{2}bc\sin A$
sine rule:	$\frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$
cosine rule:	$c^2=a^2+b^2-2ab\cos C$

Coordinate geometry

ellipse:	$\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$
hyperbola:	$\frac{(x-h)^2}{a^2}-\frac{(y-k)^2}{b^2}=1$

Circular (trigonometric) functions

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

$$1+\tan^2(x)=\sec^2(x) \qquad \cot^2(x)+1=\operatorname{cosec}^2(x)$$

$$\sin(x+y)=\sin(x)\cos(y)+\cos(x)\sin(y) \qquad \sin(x-y)=\sin(x)\cos(y)-\cos(x)\sin(y)$$

$$\cos(x+y)=\cos(x)\cos(y)-\sin(x)\sin(y) \qquad \cos(x-y)=\cos(x)\cos(y)+\sin(x)\sin(y)$$

$$\tan(x+y)=\frac{\tan(x)+\tan(y)}{1-\tan(x)\tan(y)} \qquad \tan(x-y)=\frac{\tan(x)-\tan(y)}{1+\tan(x)\tan(y)}$$

$$\cos(2x)=\cos^2(x)-\sin^2(x)=2\cos^2(x)-1=1-2\sin^2(x)$$

$$\sin(2x)=2\sin(x)\cos(x) \qquad \tan(2x)=\frac{2\tan(x)}{1-\tan^2(x)}$$

function	Sin^{-1}	Cos^{-1}	Tan^{-1}
domain	$[-1, 1]$	$[-1, 1]$	R
range	$\left[-\frac{\pi}{2},\frac{\pi}{2}\right]$	$[0,\pi]$	$\left(-\frac{\pi}{2},\frac{\pi}{2}\right)$

These formula sheets have been copied from the 2004 Specialist Maths Exam 1. Teachers and students are reminded that changes to formula sheets are notified in the VCE Bulletins and on the VCAA website at www.vcaa.vic.edu.au. The VCAA publish an exam issue supplement to the VCAA bulletin.

Algebra (Complex numbers)

$z = x + yi = r(\cos\theta + i\sin\theta) = r\mathrm{cis}\,\theta$

$|z| = \sqrt{x^2 + y^2} = r$ $\qquad -\pi < \mathrm{Arg}\, z \le \pi$

$z_1 z_2 = r_1 r_2 \mathrm{cis}(\theta_1 + \theta_2)$ $\qquad \dfrac{z_1}{z_2} = \dfrac{r_1}{r_2}\mathrm{cis}(\theta_1 - \theta_2)$

$z^n = r^n \mathrm{cis}(n\theta)$ (de Moivre's theorem)

Calculus

$$\frac{d}{dx}\left(x^n\right) = nx^{n-1} \qquad \int x^n\,dx = \frac{1}{n+1}x^{n+1} + c,\ n \ne -1$$

$$\frac{d}{dx}\left(e^{ax}\right) = ae^{ax} \qquad \int e^{ax}\,dx = \frac{1}{a}e^{ax} + c$$

$$\frac{d}{dx}\left(\log_e(x)\right) = \frac{1}{x} \qquad \int \frac{1}{x}\,dx = \log_e(x) + c, \text{ for } x > 0$$

$$\frac{d}{dx}\left(\sin(ax)\right) = a\cos(ax) \qquad \int \sin(ax)\,dx = -\frac{1}{a}\cos(ax) + c$$

$$\frac{d}{dx}\left(\cos(ax)\right) = -a\sin(ax) \qquad \int \cos\,(ax)\,dx = \frac{1}{a}\sin(ax) + c$$

$$\frac{d}{dx}\left(\tan(ax)\right) = a\sec^2(ax) \qquad \int \sec^2(ax)\,dx = \frac{1}{a}\tan(ax) + c$$

$$\frac{d}{dx}\left(\mathrm{Sin}^{-1}(x)\right) = \frac{1}{\sqrt{1-x^2}} \qquad \int \frac{1}{\sqrt{a^2-x^2}}\,dx = \mathrm{Sin}^{-1}\left(\frac{x}{a}\right) + c,\ a > 0$$

$$\frac{d}{dx}\left(\mathrm{Cos}^{-1}(x)\right) = \frac{-1}{\sqrt{1-x^2}} \qquad \int \frac{-1}{\sqrt{a^2-x^2}}\,dx = \mathrm{Cos}^{-1}\left(\frac{x}{a}\right) + c,\ a > 0$$

$$\frac{d}{dx}\left(\mathrm{Tan}^{-1}(x)\right) = \frac{1}{1+x^2} \qquad \int \frac{a}{a^2+x^2}\,dx = \mathrm{Tan}^{-1}\left(\frac{x}{a}\right) + c$$

product rule: $\dfrac{d}{dx}(uv) = u\dfrac{dv}{dx} + v\dfrac{du}{dx}$

quotient rule: $\dfrac{d}{dx}\left(\dfrac{u}{v}\right) = \dfrac{v\dfrac{du}{dx} - u\dfrac{dv}{dx}}{v^2}$

chain rule: $\dfrac{dy}{dx} = \dfrac{dy}{du}\dfrac{du}{dx}$

These formulae sheets have been copied from the 2004 Specialist Maths Exam 1. Teachers and students are reminded that changes to formulae sheets are notified in the VCE Bulletins and on the VCAA website at www.vcaa.vic.edu.au. The VCAA publish an exam issue supplement to the VCAA bulletin.

mid-point rule: $\int_a^b f(x)dx \approx (b-a)f\left(\frac{a+b}{2}\right)$

trapezoidal rule: $\int_a^b f(x)dx \approx \frac{1}{2}(b-a)(f(a)+f(b))$

Euler's method: If $\frac{dy}{dx} = f(x),\ x_0 = a$ and $y_0 = b$,
then $x_{n+1} = x_n + h$ and $y_{n+1} = y_n + hf(x_n)$

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

constant (uniform) acceleration: $v = u + at$ $\quad s = ut + \frac{1}{2}at^2$

$v^2 = u^2 + 2as$ $\quad s = \frac{1}{2}(u+v)t$

Vectors in two and three dimensions

$\underset{\sim}{r} = x\underset{\sim}{i} + y\underset{\sim}{j} + z\underset{\sim}{k}$

$\left|\underset{\sim}{r}\right| = \sqrt{x^2 + y^2 + z^2} = r$ $\quad \underset{\sim}{r_1} . \underset{\sim}{r_2} = r_1 r_2 \cos\theta = x_1x_2 + y_1y_2 + z_1z_2$

$\dot{\underset{\sim}{r}} = \frac{d\underset{\sim}{r}}{dt} = \frac{dx}{dt}\underset{\sim}{i} + \frac{dy}{dt}\underset{\sim}{j} + \frac{dz}{dt}\underset{\sim}{k}$

Mechanics

momentum: $\underset{\sim}{p} = m\underset{\sim}{v}$

equation of motion: $\underset{\sim}{R} = m\underset{\sim}{a}$

friction: $F \le \mu N$

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SPECIALIST MATHEMATICS

TRIAL EXAMINATION 1

MULTIPLE- CHOICE ANSWER SHEET

STUDENT NAME:..

INSTRUCTIONS

Fill in the letter that corresponds to your choice. Example: A ▬ C D E

The answer selected is B. Only one answer should be selected.

1.	A	B	C	D	E	11.	A	B	C	D	E	21.	A	B	C	D	E
2.	A	B	C	D	E	12.	A	B	C	D	E	22.	A	B	C	D	E
3.	A	B	C	D	E	13.	A	B	C	D	E	23.	A	B	C	D	E
4.	A	B	C	D	E	14.	A	B	C	D	E	24.	A	B	C	D	E
5.	A	B	C	D	E	15.	A	B	C	D	E	25.	A	B	C	D	E
6.	A	B	C	D	E	16.	A	B	C	D	E	26.	A	B	C	D	E
7.	A	B	C	D	E	17.	A	B	C	D	E	27.	A	B	C	D	E
8.	A	B	C	D	E	18.	A	B	C	D	E	28.	A	B	C	D	E
9.	A	B	C	D	E	19.	A	B	C	D	E	29.	A	B	C	D	E
10.	A	B	C	D	E	20.	A	B	C	D	E	30.	A	B	C	D	E