2018年度马来西亚华文独中统一考试

高中组

高级数学

(SC05)

试卷一 选择题

日期: 2018年10月25日时间: 8.30 a.m. - 9.30 a.m.

(1小时)

考 生 须 知

(一) 本科试卷共分两份:

试卷一: 选择题 (40%), 试卷二: 作答题 (60%)。

- (二) 考生须于第一阶段规定的 1 小时内完成试卷一。暂停 15 分钟后, 才在第二阶段规定的 2 小时内作答试卷二。
- (三) 试卷一选择题 20 题**全答**。选出**正确**的答案,然后用 **5B** 铅笔将 "**O**" **答案纸**(电脑卡)上相应的字母所在的小方格涂黑。
- (四) 可使用所规定的电子计算机进行演算。
- (五) 数学公式表在第 2-4 面。
- (六) 试卷一选择题共印七面, 最后一面空白。

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(考生姓名:	考生编号:)
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数学公式表

I. 代数

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

$$(a \pm b)^2 = a^2 \pm 2ab + b^2$$

$$(a \pm b)^3 = a^3 \pm 3a^2b + 3ab^2 \pm b^3$$

$$a^2 - b^2 = (a + b)(a - b)$$

$$a^3 \pm b^3 = (a \pm b)(a^2 \mp ab + b^2)$$

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$(a^m)^n = a^{mn}$$

$$(ab)^n = a^n b^n$$

$$(ab)^n = a^n b^n$$

$$(ab)^n = \frac{a^n}{b^n}$$

$$\log_a xy = \log_a x + \log_a y$$

$$\log_a \frac{x}{y} = \log_a x - \log_a y$$

$$\log_a x^m = m \log_a x$$

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

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

$$(a+b)^{n} = \sum_{r=0}^{n} {}_{n}C_{r} a^{n-r}b^{r}$$

$$A^{-1} = \frac{1}{\det(A)} \operatorname{adj}(A)$$
等差数列 $a_{n} = a + (n-1)d$

$$S_{n} = \frac{n}{2} \Big[2a + (n-1)d \Big]$$
等比数列 $a_{n} = ar^{n-1}$

$$S_{n} = \frac{a(1-r^{n})}{1-r}$$

$$S_{\infty} = \frac{a}{1-r}$$

$$\sum_{k=1}^{n} k = \frac{n(n+1)}{2}$$

$$\sum_{k=1}^{n} k^{2} = \frac{n(n+1)(2n+1)}{6}$$

$$\sum_{k=1}^{n} k^{3} = \Big[\frac{n(n+1)}{2} \Big]^{2}$$

Ⅱ. 三角学

孤长 =
$$r\theta$$

扇形面积 = $\frac{1}{2}r^2\theta$
 $\tan \theta = \frac{\sin \theta}{\cos \theta}$
 $\csc \theta = \frac{1}{\sin \theta}$
 $\sec \theta = \frac{1}{\cos \theta}$
 $\cot \theta = \frac{1}{\tan \theta}$
 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$
 $a^2 = b^2 + c^2 - 2bc \cos A$
三角形的面积 = $\frac{1}{2}ab \sin C$

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

$$1 + \tan^2 \theta = \sec^2 \theta$$

$$1 + \cot^2 \theta = \csc^2 \theta$$

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

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

$$\sin 2A = 2\sin A \cos A$$

$$\cos 2A = \cos^2 A - \sin^2 A$$

$$= 2\cos^2 A - 1$$

$$= 1 - 2\sin^2 A$$

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

III. 解析几何

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
分比公式 $\left(\frac{mx_2 + nx_1}{m + n}, \frac{my_2 + ny_1}{m + n}\right)$
三角形的面积 = $\frac{1}{2} \left| (x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3) \right|$
直线方程式 $y - y_1 = m(x - x_1)$
点到直线的距离 = $\left| \frac{Ax_0 + By_0 + C}{\sqrt{A^2 + B^2}} \right|$
圆的标准式 $(x - h)^2 + (y - k)^2 = r^2$

IV. 统计与概率

平均數
$$\overline{x} = \frac{\sum f_i x_i}{\sum f_i}$$

平均差 $= \frac{\sum |x_i - \overline{x}| f_i}{\sum f_i}$

变异系数 $v = \frac{\sigma}{\overline{x}} \times 100\%$

中位数 $M = L + \left(\frac{n}{2} - F_m\right) C_m$

上四分位数 $Q_3 = L_3 + \left(\frac{3n}{4} - F_3\right) C_3$

作四分位数 $Q_1 = L_1 + \left(\frac{n}{4} - F_1\right) C_1$

四分位数 $Q_0 = L_1 + \left(\frac{n}{4} - F_1\right) C_1$

四分位差 $Q_0 = Q_0$

四分位差 $Q_0 = \frac{Q_0 - Q_1}{2}$
 $p(A \cup B) = p(A) + p(B) - p(A \cap B)$

标准差 $\sigma = \sqrt{\frac{\sum (x_i - \overline{x})^2 f_i}{\sum f_i}} = \sqrt{\frac{\sum x_i^2 f_i}{\sum f_i}} - \overline{x}^2$

期望值 $E = x_1 p_1 + x_2 p_2 + \dots + x_k p_k$

V. 微积分

$$\lim_{x \to 0} \frac{\sin x}{x} = 1$$

$$\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$$

$$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$$

$$\frac{d}{dx}x^n = nx^{n-1}$$

$$\frac{d}{dx}\sin x = \cos x$$

$$\frac{d}{dx}\cos x = -\sin x$$

$$\frac{d}{dx}\tan x = \sec^2 x$$

$$\frac{d}{dx}\cot x = -\csc^2 x$$

$$\frac{d}{dx}\sec x = \sec x \tan x$$

$$\frac{d}{dx}\csc x = -\csc x \cot x$$

$$\frac{d}{dx}\ln x = \frac{1}{x}$$

$$\frac{d}{dx}\log_a x = \frac{1}{x \ln a}$$

$$\frac{d}{dx}e^x = e^x$$

$$\frac{d}{dx}a^x = a^x \ln a$$

面积
$$\int_a^b y dx$$
 或 $\int_c^d x dy$

$$\lim_{x \to \infty} \left(1 + \frac{1}{x} \right)^x = e^{-\frac{1}{x}}$$

$$\frac{dy}{dx} = \frac{dy}{du} \frac{du}{dx}$$

$$\frac{d}{dx}f(g(x)) = f'(g(x))g'(x)$$

$$\int x^{n} dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$$

$$\int \cos x \, dx = \sin x + C$$

$$\int \sin x \, dx = -\cos x + C$$

$$\int \sec^2 x \, dx = \tan x + C$$

$$\int \csc^2 x \, dx = -\cot x + C$$

$$\int \sec x \tan x \, dx = \sec x + C$$

$$\int \csc x \cot x \, dx = -\csc x + C$$

$$\int \frac{1}{x} dx = \ln |x| + C$$

$$\int e^x dx = e^x + C$$

$$\int a^x dx = \frac{a^x}{\ln a} + C$$

体积
$$\pi \int_a^b y^2 dx$$
 或 $\pi \int_c^d x^2 dy$

- 1. 已知 $f(x) = \frac{\sqrt{x+1}}{\sqrt{x+2}}$, 求函数 f 的定义域。
 - $\mathbf{A} \quad \{x \in \mathbf{R} \mid x \ge 0\}$

 $\{x \in \mathbf{R} \mid x \le -1 \text{ is } x > 4\}$

 $\mathbf{C} = \mathbf{R} \setminus \{4\}$

D $\{x \in \mathbb{R} \mid x \ge 0, x \ne 4\}$

- 2. 化简 $\frac{\sqrt{x^4y} \sqrt{x^2y^3}}{\sqrt{x^3y} + xy}$.
 - $\mathbf{A} \quad x + y$

- $\mathbf{B} \quad x y \qquad \qquad \mathbf{C} \quad \sqrt{x} + \sqrt{y} \qquad \qquad \mathbf{D} \quad \sqrt{x} \sqrt{y}$
- 已知多项式 p(x) 除以 (x+1)(x+2) 所得的余式是 2x+3,求 p(x) 除以 x+2 的余 数。
- **B** 1

C 2

D

- $4. \quad \cancel{\$} \quad \sum_{k=0}^{\infty} \left[k(k+2) \right].$
 - **A** 338350
- B 338 550
- C 348450
- 676 700
- 5. 已知矩阵 $\begin{pmatrix} 1 & 2 & a \\ 2 & b & 3 \\ c & 0 & 8 \end{pmatrix}$ 的逆矩阵是 $\begin{pmatrix} -40 & u & x \\ 13 & v & y \\ 5 & w & z \end{pmatrix}$, 求 b 的值。

5

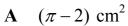
- 6. 求 $\left(\frac{1}{x}-2x^2\right)^9$ 的展开式中的常数项。
 - A -4032
- **B** -672
- \mathbf{C} 672
- D 4032
- 7. 求无穷等比级数 $2+(-1)+\frac{1}{2}+\left(-\frac{1}{4}\right)+\cdots$ 的和。
- **B** $\frac{4}{3}$ **C** $\frac{5}{3}$

- D 4
- 8. 已知一组数据 x_1, x_2, \dots, x_6 ,且 $\sum_{i=1}^{6} x_i = 216$, $\sum_{i=1}^{6} x_i^2 = 22776$,求这组数据的标准 差。
 - **A** 25.75
- B 50

- **C** 63.09
- D 633.06

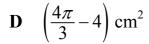
- 已知 Z 呈标准常态分配且 P(Z>a)=0.7, 求 P(Z>-a)。
 - **A** 0.3
- **B** 0.35
- **C** 0.5
- **D** 0.7
- 用 MATHEMATICS 一字中的全部字母作排列,如果相同的字母必须相邻,有几种 不同的排法?
 - **A** 39 916 800
- **B** 4989600
- **C** 40 320
- 5 0 4 0 D
- 11. 已知中国郑州市的经纬度是(34.8°N, 116.6°E), 日本大阪的经纬度是(34.8°N, 135.6℃)。求这两座城市沿着纬线的距离。
- A 1140 海里 B 936.1 海里 C 650.6 海里
- D 570 海里

图 1 中, 圆 O 的半径为 2 cm, A 与 B 为圆 12. 上两点且 $\angle AOB = \frac{2\pi}{3}$ 。求阴影区域的面积。



$$\mathbf{B} \quad \frac{1}{2} \text{ cm}^2$$

$$\mathbf{C} \quad \left(\frac{4\pi}{3} - \sqrt{3}\right) \, \mathrm{cm}^2$$



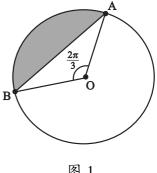
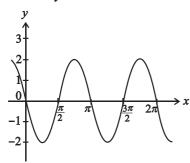


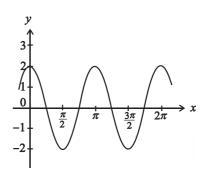
图 1

13. 以下何者是 $y=2\cos 2x$ 的图像?

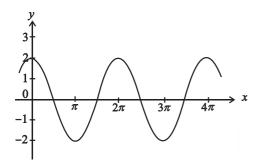




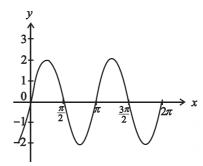
B



 \mathbf{C}



D



- - A $-\frac{7}{25}$ $\stackrel{?}{=}$ $\frac{7}{25}$

B $\frac{7}{25}$

 $C = \frac{24}{25}$

- **D** $-\frac{24}{25}$ $\stackrel{?}{=}$ $\frac{24}{25}$
- 已知原点 O 落在线段 AB 上且 AO: OB = 2:3。 若点 B 的坐标是(4, -1), 求点 A 的 坐标。

- **A** $\left(-\frac{8}{3}, \frac{2}{3}\right)$ **B** $\left(-\frac{4}{3}, \frac{2}{3}\right)$ **C** $\left(-\frac{2}{3}, \frac{4}{3}\right)$ **D** $\left(-\frac{2}{3}, \frac{8}{3}\right)$
- 16. 已知直线 ax + by = 2 的斜率为 $-\frac{1}{2}$ 且通过点 (-4, 1)。求 a 的值。
 - \mathbf{A} -2
- \mathbf{B} -1

C 1

- D 2
- 17. 求曲线 $x^2 5xy + 6y^3 = 0$ 在点(2, 1)处的切线斜率。
 - $A \frac{1}{2}$ $B \frac{1}{8}$
- $\mathbf{C} = \frac{1}{2}$
- 2 D

- 18. 已知 $\frac{d}{dx}(\sin 2x 2x) = k \sin^2 x$,求 k 的值。
 - \mathbf{A} -4

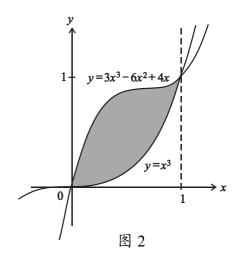
 \mathbf{C} 2

- D 4
- 19. 已知 $\int_0^1 f(x)dx = 2$, $\int_0^2 f(x)dx = 10$, 求 $\int_0^1 f(2x)dx$.

C 5

- 10 D
- 图 2 中的阴影部分是由曲线 $y = 3x^3 6x^2 + 4x$ 20. 及 $y=x^3$ 所围成,求其面积。

 - $C = \frac{1}{2}$
 - **D** $\frac{3}{5}$



2018年度马来西亚华文独中统一考试

高中组

高级数学

(SC05)

试卷二 作答题

日期: 2018年10月25日 时间: 9.45 a.m. - 11.45 a.m. (2小时)

考生 须知

(一) 本科试卷共分两份:

试卷一: 选择题 (40%), 试卷二: 作答题 (60%)。

(二) 试卷二共分两组:

甲组(必答题): 5 题**全答**(20%); 乙组(选答题): 7 题**选答 4 题**,但**不能超过** 4 题(40%)。 两组全部共答 **9 题**完卷。

- (三) 每题必须用新的一张纸作答。
- (四) 只可用蓝色或黑色的原子笔书写,惟可用铅笔画图。
- (五) 不必抄题,惟试题号码必须书写清楚。
- (六) 所有演算必须清楚地写出。必要的几何图形必须画出。
- (七) 可使用所规定的电子计算机进行演算,除非题目限制。
- (八) 作答前,须在**积分表**(电脑卡)上正确填写考生编号及用 5B 铅笔 将对应的小方格涂黑。作答后,须根据所答题数在**试题号码**栏上 将有关小方格涂黑,并指出作答总数。
- (九) 答卷必须依试题号码次序排列,并且将**积分表**(电脑卡)置于上面,合订成一本。
- (十) 数学公式表在第2-4面。
- (十一) 试卷二作答题共印七面,最后一面空白。

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数学公式表

I. 代数

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

$$(a \pm b)^2 = a^2 \pm 2ab + b^2$$

$$(a \pm b)^3 = a^3 \pm 3a^2b + 3ab^2 \pm b^3$$

$$a^2 - b^2 = (a + b)(a - b)$$

$$a^3 \pm b^3 = (a \pm b)(a^2 \mp ab + b^2)$$

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$(a^m)^n = a^{mn}$$

$$(ab)^n = a^n b^n$$

$$(ab)^n = a^n b^n$$

$$(ab)^n = \frac{a^n}{b^n}$$

$$\log_a xy = \log_a x + \log_a y$$

$$\log_a \frac{x}{y} = \log_a x - \log_a y$$

$$\log_a x^m = m \log_a x$$

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

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

$$(a+b)^{n} = \sum_{r=0}^{n} {}_{n}C_{r} a^{n-r}b^{r}$$

$$A^{-1} = \frac{1}{\det(A)} \operatorname{adj}(A)$$
等差数列 $a_{n} = a + (n-1)d$

$$S_{n} = \frac{n}{2} [2a + (n-1)d]$$
等比数列 $a_{n} = ar^{n-1}$

$$S_{n} = \frac{a(1-r^{n})}{1-r}$$

$$S_{\infty} = \frac{a}{1-r}$$

$$\sum_{k=1}^{n} k = \frac{n(n+1)}{2}$$

$$\sum_{k=1}^{n} k^{2} = \frac{n(n+1)(2n+1)}{6}$$

$$\sum_{k=1}^{n} k^{3} = \left[\frac{n(n+1)}{2}\right]^{2}$$

Ⅱ. 三角学

孤长 =
$$r\theta$$

扇形面积 = $\frac{1}{2}r^2\theta$
 $\tan \theta = \frac{\sin \theta}{\cos \theta}$
 $\csc \theta = \frac{1}{\sin \theta}$
 $\sec \theta = \frac{1}{\cos \theta}$
 $\cot \theta = \frac{1}{\tan \theta}$
 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$
 $a^2 = b^2 + c^2 - 2bc \cos A$
三角形的面积 = $\frac{1}{2}ab \sin C$

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

$$1 + \tan^2 \theta = \sec^2 \theta$$

$$1 + \cot^2 \theta = \csc^2 \theta$$

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

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

$$\sin 2A = 2\sin A \cos A$$

$$\cos 2A = \cos^2 A - \sin^2 A$$

$$= 2\cos^2 A - 1$$

$$= 1 - 2\sin^2 A$$

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

III. 解析几何

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
分比公式 $\left(\frac{mx_2 + nx_1}{m + n}, \frac{my_2 + ny_1}{m + n}\right)$
三角形的面积 $= \frac{1}{2} \left| (x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3) \right|$
直线方程式 $y - y_1 = m(x - x_1)$
点到直线的距离 $= \left| \frac{Ax_0 + By_0 + C}{\sqrt{A^2 + B^2}} \right|$
圆的标准式 $(x - h)^2 + (y - k)^2 = r^2$

IV. 统计与概率

平均數
$$\overline{x} = \frac{\sum f_i x_i}{\sum f_i}$$

平均差 $= \frac{\sum |x_i - \overline{x}| f_i}{\sum f_i}$

变异系数 $v = \frac{\sigma}{\overline{x}} \times 100\%$

放数 $= L + \left(\frac{d_1}{d_1 + d_2}\right) C$

中位数 $M = L + \left(\frac{n}{2} - F_m\right) C_m$

相关系数 $r = \frac{\sum x_i y_i}{\sqrt{\left(\sum x_i^2} - \overline{x}^2\right) \left(\sum y_i^2} - \overline{y}^2\right)}$

上四分位数 $Q_3 = L_3 + \left(\frac{3n}{4} - F_3\right) C_3$

统计指数 $I = \frac{Q_1}{Q_0} \times 100$

综合指数 $= \frac{\sum w_i x_i}{\sum w_i}$
 $= \frac{n!}{(n-r)!}$

四分位距 $= Q_3 - Q_1$

四分位差 $Q.D. = \frac{Q_3 - Q_1}{2}$
 $= \frac{n!}{(n-r)!r!}$
 $= \frac{n!}{(n-r)!}$
 $= \frac{n!}{(n-r)!r!}$
 $= \frac{n!}{(n-r)!}$
 $= \frac{n!}{(n-r)!r!}$
 $= \frac{n!}{(n-r)!}$
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V. 微积分

$$\lim_{x \to 0} \frac{\sin x}{x} = 1$$

$$\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$$

$$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$$

$$\frac{d}{dx}x^n = nx^{n-1}$$

$$\frac{d}{dx}\sin x = \cos x$$

$$\frac{d}{dx}\cos x = -\sin x$$

$$\frac{d}{dx}\tan x = \sec^2 x$$

$$\frac{d}{dx}\cot x = -\csc^2 x$$

$$\frac{d}{dx}\sec x = \sec x \tan x$$

$$\frac{d}{dx}\csc x = -\csc x \cot x$$

$$\frac{d}{dx}\ln x = \frac{1}{x}$$

$$\frac{d}{dx}\log_a x = \frac{1}{x\ln a}$$

$$\frac{d}{dx}e^x = e^x$$

$$\frac{d}{dx}a^x = a^x \ln a$$

面积
$$\int_a^b y dx$$
 或 $\int_c^d x dy$

$$\lim_{x \to \infty} \left(1 + \frac{1}{x} \right)^x = e$$

$$\frac{dy}{dx} = \frac{dy}{du} \frac{du}{dx}$$

$$\frac{d}{dx}f(g(x)) = f'(g(x))g'(x)$$

$$\int x^{n} dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$$

$$\int \cos x \, dx = \sin x + C$$

$$\int \sin x \, dx = -\cos x + C$$

$$\int \sec^2 x \, dx = \tan x + C$$

$$\int \csc^2 x \, dx = -\cot x + C$$

$$\int \sec x \tan x \, dx = \sec x + C$$

$$\int \csc x \cot x \, dx = -\csc x + C$$

$$\int \frac{1}{x} dx = \ln |x| + C$$

$$\int e^x dx = e^x + C$$

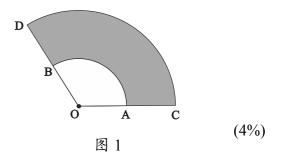
$$\int a^x dx = \frac{a^x}{\ln a} + C$$

体积
$$\pi \int_a^b y^2 dx$$
 或 $\pi \int_c^d x^2 dy$

甲组 必答题 (20%)

(本组5题全答。)

- 1. 已知函数 $f(x) = a + \frac{b}{x+5}$ 且 f(-4) = -1 , f(-1) = 2 。 求
 - (a) a 及 b 的值; (2%)
 - (b) $f^{-1}(x)$.
- 2. 图 1 所示为以 O 为圆心的两个扇形, OAC 及 OBD 为直线, OA:OC=1:2。若 OA=1 cm, 扇形 OAB 的周长为 4 cm, 求阴影部分的面积。



- 3. 已知圆 $x^2 + y^2 4x + 2y 4 = 0$ 与 y 轴相交于 A, B 两点。求
 - (a) 圆心及半径; (2%)
 - (b) AB 的长。
- 4. 七个小矮人的身高(cm)为:

121 116 112 124 127 115 118

- (a) 小红帽加入这群小矮人后,平均身高没有改变。求小红帽的身高。 (2%)
- (b) 小木偶加入这群小矮人后,身高的中位数增加了1cm。求小木偶的身高。 (2%)
- 5. 已知 $f(x) = \frac{1}{\sqrt[3]{x}}$, 求 f'(64) 并用近似计算求 $\frac{1}{\sqrt[3]{66}}$ 的近似值,答案 以分数表示。 (4%)

乙组 选答题 (40%)

(本组7题选答4题,但不能超过4题。)

- 6. (a) 解不等式 $3 < \frac{x}{x+4} < 5$. (4%)
 - (b) 解方程式 $\sqrt{4-3x} = x$. (3%)
 - (c) 一银行的年利率为 5%。若以复利计算,每半年计息一次,至少要经过多少年,存款才是本金的两倍? (3%)
- 7. (a) 已知 6x²-41≡A(x+3)(x-2)+B(x+3)+C(x-2), 求 A, B 及 C 的 值。 (3%)
 - (b) 解方程式 $\log_5[\log_4(\log_3 x)] = 0$. (3%)
 - (c) 已知等差数列 553, 546, 539,...。若此数列的首 n 项之和为负值,求 n 的最小值。 (4%)
- 8. (a) $\triangle \Delta ABC$ 中, C = 2, a = 1, $\cos B = \frac{3}{5}$, $\triangle ABC$ 的面积。 (3%)
 - (b) 已知 $\tan x = 4$,不许使用计算机,求 $\frac{\sin x + \cos x}{\sin x \cos x}$ 的值。 (2%)
 - (c) 将 $3\cos\theta \sqrt{3}\sin\theta$ 化为 $R\cos(\theta + \alpha)$ 的形式,其中 R > 0,0° < $\alpha < 90$ °。 据此,解方程式 $3\cos\theta - \sqrt{3}\sin\theta = 2$,0° ≤ $\theta \le 360$ °。(答案准确至两位小数) (5%)
- 9. (a) 已知平行四边形 ABCD 的三个顶点 A(-1, 2), B(3, 1) 及 C(2, 4)。 不许用图解法,求
 - (i) 点 D 的坐标; (2%)
 - (ii) 平行四边形 ABCD 的面积; (2%)
 - (iii) 点 B 到直线 AC 的距离。 (2%)
 - (b) 若直线 y = kx 是圆 $(x-1)^2 + (y-2)^2 = 4$ 的切线, 求 k 的值。 (4%)

10. (a) 有几种方法将十二名学生分成三个小组且每组有四名学生?

(b) 一项投资计划的盈利胥视市场的情况而定,其关系以及对市场的预测如表 1 所示。

市场情况	市场良好	市场稳定	市场低迷
盈利	RM 200,000	RM 50,000	-RM 350,000
概率	0.35	0.45	0.2

表 1

求这项投资计划盈利的期望值。

(3%)

(4%)

(3%)

(c) 表 2 显示五名学生每天上网的平均时间与他们的学期成绩总平均:

学生	甲	乙	丙	丁	戊
平均上网时间(小时)	1.5	2	0.5	1	4
学期成绩总平均	62.3	60.7	72.5	73.4	55.5

表 2

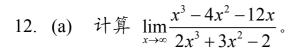
求这些学生每天上网的平均时间(小时)与学期成绩总平均的相关系数。

11. (a) 已知函数
$$f(x) = x^2 e^{-3x}$$
, 求 f 为增函数的区间。 (4%)

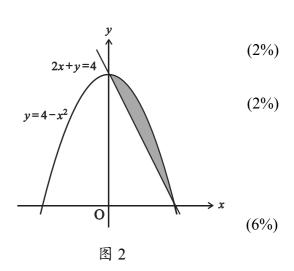
(b) 已知一圆柱体的底圆半径为r cm, 高为h cm 且其体积为 250π cm³。

(i) 证明此圆柱体的表面积
$$A = \left(2\pi r^2 + \frac{500\pi}{r}\right) \text{ cm}^2$$
. (2%)

(提示: 圆柱体的体积, $V = \pi r^2 h$; 表面积, $A = 2\pi r^2 + 2\pi r h$.)



(c) 图 2 中的阴影区域是由曲线 $y=4-x^2$ 与直线 2x+y=4 所围成。求此区域绕 x 轴旋转 360° 所形成的旋转体体积。



THE UNIFIED EXAMINATION (2018) INDEPENDENT CHINESE SECONDARY SCHOOLS MALAYSIA

Senior Middle Level

ENGLISH LANGUAGE

(SY03)

PAPER 2 READING AND LANGUAGE USE

Date : 23 October 2018 Time : 10.25 a.m. - 11.45 a.m. (1 hour 20 minutes)

INSTRUCTIONS TO CANDIDATES

1. This subject comprises two papers:

Paper 1: Writing (50%) Paper 2: Reading and Language Use (50%)

2. Paper 2 consists of two sections:

Section A: Reading (30%)

There are three parts in this section: Part I: Critical Reading (10%)

Part II: Vocabulary (10%)
Part III: Comprehension (10%)

Section B: Language Use (20%)

There are two parts in this section:

Part I: Error Identification (10%)

Part II: Word Forms (10%)

- 3. (i) Answer all the multiple-choice questions on 'answer-sheet O' (computer card), select the **best** answer and blacken the square corresponding to the same letter of the alphabet as the answer you have selected and mark with a **5B** pencil.
 - (ii) Answer Section B-Part II (Word Forms) question on the **Senior English Language answer sheet** provided. Please use **blue** or **black** ink to write your answers.
- 4. Before attempting the questions, fill in your index number on the **marking-sheet** (computer card) and blacken the corresponding letters/numbers with a **5B** pencil. After answering all the questions, blacken the numbers of the questions you have answered in the **question number column** and also indicate the total number of questions answered.
- 5. Paper 2 consists of eleven printed pages and a blank page at the end.

Do Not Turn Over This Page Until You Are Told To Do So

Candidate's Name:	Index Number:	,
Candidate 8 Maine.	muck Number.	

SECTION A READING (30%)

Part I Critical Reading (10%)

Read each extract and then choose the **best** sentence that summarises the extract.

- 1. Snow-makers often talk about dry snow and wet snow. Dry snow has a relatively low amount of water, so it is very light and powdery. This type of snow is excellent for skiing because skis glide over it easily without getting stuck in wet slush. One of the advantages of using a snow-maker is that this powdery snow can be produced to give the ski slopes a level surface. However, on slopes which receive heavy use, resort owners also use denser, wet snow underneath the dry snow. Many resorts build up the snow depth this way once or twice a year, and then regularly coat the trails with a layer of dry snow throughout the winter.
 - **A** Dry snow is better than wet snow for skiing and resort owners.
 - **B** Dry snow is different from wet snow in terms of its characteristics.
 - C Dry snow is suitable for skiing and is used by resort owners for coating.
 - **D** Dry snow is the best snow to be used in skiing and coating the trails throughout the winter.
- 2. Language is also part of the different ways that men and women think about friendship. Most North American men believe that friendship means doing things together such as camping or playing tennis. Talking is not an important part of friendship for most of them. American women, on the other hand, usually identify their best friend as someone with whom they talk frequently. Tannen believes that for women, talking with friends and agreeing with them is very important. Tannen has found that women, in contrast to men, often use tag questions. For example, a woman might say, "This is a great restaurant, isn't it?" By adding a tag question to her speech ("isn't it"), she is giving other people a chance to agree with her.
 - A Women and men think differently about languages.
 - **B** Men never use tag questions, while women often use tag questions.
 - C For women, the purpose of using tag questions frequently is to identify their best friends.
 - **D** For women, agreeing with them is important and they like to seek agreement from others by using tag questions.

- The popularity of home tuition (home schooling) has traditionally been blamed on the rigidity of the examination system, parents being unable to get their children into the school of their choice, and dissatisfaction with teaching methods. Some parents also prefer to keep their children at home because of bullying and a lack of discipline in schools. Academics now claim, however, that a significant proportion of families educating children at home do so because they feel that the concept of institutionalised education is a thing of the past. They believe that schools could be obsolete within 20 years as parents turn instead to media technology, such as the Internet, to educate their children.
 - **A** In twenty years, all schools will be closed down because of the inflexibility of the examination system.
 - **B** Many parents will switch to home schooling because they are not capable of getting their children into the school of their choice.
 - C Many parents might choose to home-school their children with the help of the advanced media technology and give up on schools.
 - **D** Most of the schools will be reviewed by the government if they fail to prevent students from getting bullied and there is a lack of discipline.
- 4. Many educational organisations in the United States believe that a high school graduation requirement should be that students devote a certain number of hours outside of the classroom to community service. Supporters of mandatory volunteering believe that the school's role should include not only preparing children to be academically successful, but also helping them to be responsible citizens and active participants in their communities. However, not everybody believes that mandatory volunteering is a good idea. Those opposed to the requirement believe that the term "mandatory volunteering" is an oxymoron, a contradiction; they believe that volunteering should be something you do out of your own free will. It is not something that is forced on you.
 - A Mandatory volunteering has been set as a high school graduation requirement in many schools in the United States
 - **B** Many people think that students should spend a lengthy period of time on mandatory volunteering to be academically competent.
 - C Even though some people support the idea of mandatory volunteering, there are still others who think that volunteering should be of one's free will.
 - **D** Most of the people disagree on the idea of mandatory volunteering as they think that students should not be forced to do something they do not like.

3.

- 5. Creating a study timetable is a vital step to be a successful student. It is advisable for students to plan one hour of study time for every one hour of class time. At exam time, more study time would be essential. Moreover, students must study in a quiet place away from the distraction of other people, television and radio. Students should find a comfortable place with plenty of space for all the needed study supplies. Then, students need to study the information in small amounts. It is a good idea to learn the required concepts slowly and thoroughly instead of trying to learn everything at the eleventh hour. Students who want to be successful should remember these three helpful study strategies.
 - A Successful students study one hour a day.
 - **B** Successful students study for eleven hours.
 - C Successful students study just before an examination.
 - **D** Successful students are consistent with their study time.

Part II Vocabulary (10%)

Read the following passage carefully and choose the most appropriate meaning of each word or phrase printed in **bold** as used in the passage.

I was diagnosed with Attention Deficit Disorder (ADD). It means that I appear to be listening while all the time my mind is somewhere else. I've learnt to accept the fact that I'm an enigma to some. The whole syndrome can sometimes make me feel like I am on the outside looking in. Everyone seems to be getting it and I'm not.

What really burns me up, though, is when teachers don't get it. In middle school, I was enrolled in Mrs Smith's gifted section. That first day, she not only set down the rules of her cellblock, but she handed out copies of them for us to memorise and be tested on the following day. I knew right away that I had better "advocate" for myself. Basically, I have lousy reading comprehension and my handwriting is the pits. So I told her I have ADD and that I might need to take home some reading assignments because my concentration is better when I am in a quiet surrounding. As I explained all this to Mrs Smith, she gave me a squinty-eyed look down her bespectacled nose and said, "You are no different from anyone else, young man. If I do for you, I have to do for all the others," She snorted once and then added, "I will not give you an unfair advantage over your peers."

One day, after she had handed me back my fifth X'd out paper of the term, I approached her desk for the second time. "Would you mind very much if I complete the next packet at home, Mrs Smith? I think I might do better when there is less distraction." Then I backed away from her desk as though I were within firing range of her loaded mouth as she said, "It's against the school policy, young man. No unfair advantages. I have treated all students the same in thirty years I have taught here." Then she flared her nose, clicked her heels and turned away from me, **in more ways than one**.

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So I did what any other kid would do in my situation: I smuggled the packet out of the classroom. I felt like I was doing something illegal, and yet my motives were pure. I had to prove to her, or rather prove to myself, that I could do the work under the right conditions.

I secretly unfolded the contraband on my bed that night. The story, which had seemed so confusing in class, became quite clear to me in the still of my room. I could even relate to it. It was the true story of Louis Braille, who lived in the 1800s and was blinded by a childhood accident. During this time, society shut off the blind from having much of an education. Despite much misunderstanding of his disability, Louis Braille "advocated" himself. He developed a reading system of raised dots for the blind, which enabled him to read on par with his peers. I was like Louis in my classroom setting. I was being made to learn like the other students who were sighted in a way I wasn't.

That night I sat down at my word processor. My thoughts spilled out so fast that my fingers danced across the keyboard, straining to keep up. I explained myself in terms of Louis, in hopes that Mrs Smith would finally understand me. Funny thing is, somewhere along the line I began to understand myself in a way I never had before. I cited many other famous people who were in some way different in their learning styles and abilities throughout history. I summed it up all by asking, "If I were a student with vision impairment, would I be seated at the back of the room?" I questioned, "Would I have my glasses taken away from me so that I would not have an unfair advantage over other glassless students?"

Mrs Smith never looked at me as she handed my paper back face down on my desk that day. I found an A decorating the margin instead of her customary X.

(Extracted and adapted from *Applying Myself* by C.S Dweck from *Chicken Soup for the Teenage Soul on Tough Stuff*)

		from Chicken Soup for the Teenage Soul on
6.	I'm	an enigma (lines 2-3) means
	A	friendly but mysterious
	B	mysterious and confusing
	\mathbf{C}	approachable and friendly
	D	approachable but mysterious
7.	Wh	en the writer says he is on the outside looking in (lines 3-4), he is
	A	frustrated in not being able to follow the lesson
	B	depressed that he is locked out of the classroom
	C	punished for not being able to follow the lessons
	D	confused as to why he was locked out of the classroom
8.	The	e phrase what really burns me up (line 5) expresses the writer's
	A	disappointment
	В	depression
	C	stress
	D	anger

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9.	The writer frontcally describes the class as a cellblock (line /) because
	A the classroom resembles a cell
	B the classroom is dull and cubicle in shape
	C of the strict and stringent rules set by the teacher
	D the class comprises students with discipline problems
10.	I had better "advocate" (line 8) for myself shows that the writer is determined to
	A express his feelings to everyone
	B express his frustration to his teacher
	C speak up to his teacher about his disability
	D get his parents to talk to the teacher about his disability
11.	When the writer describes his handwriting is the pits (line 9), it means that it
	A is illegible
	B is very clear and legible
	C can be deciphered easily
	D causes an indent on the paper
12.	When Mrs Smith told the writer that I will not give you an unfair advantage over your peers (lines
	13-14), it shows that she
	A is lenient
	B is not biased
	C is an unfair person
	D is a practical person
13.	The phrase in more ways than one (lines 20-21) refers to Mrs Smith's
	A numerous ways of showing her dissatisfaction of the writer
	B various ways to avoid answering students' questions
	C reaction to the writer's request
	D displeasure on being disturbed
14.	The phrase I could even relate to it (line 26) shows that the writer is able to
	A sympathise with Louis
	B have a rapport with Louis
	C associate the situation in the passage with his
	D retell the situation described in the passage to the teacher
15.	When the writer said that his classmates were sighted in the way I wasn't (lines 31-32), it describes that
	A he is less privileged than his classmates due to his condition
	B he is privileged than his classmates due to his situation
	C his classmates all do well due to their good vision

D his poor vision is a hindrance to his studies

Part III Comprehension (10%)

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Read the following passage carefully and then answer the questions that follow. Select the **best** answer for each question from options A, B, C or D.

Research is beginning to reveal that positive thinking is about much more than just being happy or displaying an upbeat attitude. Positive thoughts can actually create real value in your life and help you build skills that last much longer than a smile.

The impact of positive thinking on your work, your health, and your life is being studied by behavioural psychologists and one of them is Barbara Fredrickson.

Fredrickson is a positive psychology researcher at the University of North Carolina and she published a **landmark** paper that provides surprising insights about positive thinking and its impact on developing skills. Her work is among the most referenced and cited in her field and it is surprisingly useful in everyday life.

Researchers have long known that negative emotions programme your brain to do a specific action. When a tiger crosses your path, for example, you run. The rest of the world doesn't matter. You are focused entirely on the tiger, the fear it creates, and how you can get away from it. In other words, **negative emotions narrow your mind and focus your thoughts**. At that same moment, you might have the option to climb a tree, pick up a leaf, or grab a stick — but your brain ignores all of those options because they seem irrelevant when a tiger is standing in front of you.

This is a useful instinct if you're trying to save life and limb, but in our modern society we don't have to worry about stumbling across tigers in the wilderness. The problem is that your brain is still programmed to respond to negative emotions in the same way — by shutting off the outside world and limiting the options you see around you.

For example, when you're in a fight with someone, your anger and emotion might consume you to the point where you can't think about anything else. Or, when you are stressed out about everything you have to get done today, you may find it hard to actually start anything because you're paralysed by how long your to-do list has become. Or, if you feel bad about not exercising or not eating healthy, all you think about is how little willpower you have, how you're lazy, and how you don't have any motivation.

In each case, your brain closes off from the outside world and focuses on the negative emotions of fear, anger, and stress — just like it did with the tiger. Negative emotions prevent your brain from seeing the other options and choices that surround you. It's your survival instinct.

On the contrary, when you are experiencing positive emotions like joy, contentment, and love, you will see more possibilities in your life. These findings were among the first that proved that positive emotions broaden your sense of possibility and open up your mind to more options.

The benefits of positive emotions don't stop after a few minutes of good feelings subside. In fact, the biggest benefit that positive emotions provide is an enhanced ability to build skills and develop resources for use later in life.

Let's consider a real-world example.

A child who runs around outside, swinging on branches and playing with friends, develops the ability to move athletically (physical skills), the ability to play with others and communicate

- 32 -

with a team (social skills), and the ability to explore and examine the world around them (creative skills). In this way, the positive emotions of play and joy prompt the child to build skills that are useful and valuable in everyday life.

Fredrickson refers to this as the "**broaden and build**" theory because positive emotions broaden your sense of possibilities and open your mind, which in turn allows you to build new skills and resources that can provide value in other areas of your life.

Positive thinking isn't just a soft and fluffy feel-good term. Yes, it's great to simply "be happy," but those moments of happiness are also critical for opening your mind to explore and build the skills that become so valuable in other areas of your life.

To put it simply: seek joy, play often, and pursue adventure. Your brain will do the rest.

(Adapted from: *How Positive Thinking Builds Your Skills, Boosts Your Health, and Improves Your Work*by James Clear, *Behavioral Psychologist)*

- 16. According to James Clear, the writer of the article, positive thinking has certain benefits. Which of the following is an exception?
 - **A** being happy and displaying an upbeat attitude
 - **B** creating real value in your life
 - C boosting your intelligence
 - **D** helping you build skills

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- 17. The impact of positive thinking on people's work, health and life is being studied by psychologist, Barbara Fredrickson. Which of the following is her area of psychology research?
 - **A** Educational psychology
 - **B** Counseling psychology
 - C Positive psychology
 - **D** Clinical psychology
- 18. Barbara Fredrickson's research report has been acclaimed as a landmark paper in behavioural psychology. Which of the following is the best contextual definition for the word **landmark** (line 7)?
 - **A** A prominent identifying feature of a landscape
 - **B** An event marking an important stage of development
 - C A fixed marker, such as a concrete block, that indicates a boundary line
 - **D** A building or site with historical significance, especially one marked for preservation
- 19. What do you understand by the statement negative emotions narrow your mind and the focus of your thoughts (line 13)?
 - **A** It means the mind focuses on very limited options to respond or to react.
 - **B** It means the avenue to future prospect has become narrower.
 - C It means chances of becoming successful in life are lower.
 - **D** It means the mind has become sharper and more polished.

- 20. Identify the following examples and single out one that is unrelated to the fact that **negative emotions** narrow your mind (line 13)?
 - A In a fight with someone, your anger and emotion may affect your reaction choices
 - **B** Feeling weak in willpower when incapable of leading a healthy lifestyle
 - C Cannot differentiate between needs and wants in one's life
 - **D** Difficulty in starting to do anything when one is stressed out
- 21. When we are experiencing positive emotions, we can always see more possibilities in our life. Which of the following feelings is **not** a positive emotion?
 - A Contentment
 - **B** Superiority
 - C Love
 - **D** Joy
- 22. The biggest benefit that positive emotions provide is an enhanced ability to build skills and develop resources for future use. A child who plays happily outdoors with his friends can learn certain skills. Which of the following skills is unrelated?
 - A Management skills
 - **B** Physical skills
 - C Creative skills
 - **D** Social skills
- 23. Which of the following is not the expected process of Barbara Frederick's theory of **"broaden and build"** (line 42)?
 - A Positive emotions open your mind.
 - **B** Positive emotions allow you to build new skills.
 - C Positive emotions enhance your mathematical talent.
 - **D** Positive emotions broaden your sense of possibilities.
- 24. Negative thinking and negative emotions can result in undesirable and harmful consequences. Which of the following is **not** one such consequence?
 - **A** The bank interest of a pessimist's savings will be affected.
 - **B** A negative attitude can shorten one's life as it is hazardous to health.
 - C A person's negative behaviour can also affect people around him or her.
 - **D** A pessimist is usually insecure in life and feels uncertain of his or her future.
- 25. Which of the following groups of people, do you think, will appreciate and gain most from the message conveyed by this article about the benefits of positive thinking?
 - A Country farmers who are happy about their simple working lifestyle
 - **B** A family excitedly planning for their forthcoming overseas trip
 - C Pessimists who have failed to discern negative consequences
 - **D** Retired senior citizens who now lead a sedentary lifestyle

SECTION B LANGUAGE USE (20%)

Part	I Error Identification (10%) In each of the sentences below, four parts are underlined and lettered A, B, C and D. One of these parts contains an error. Decide whether it is A, B, C or D.
26.	You had better done your revision before the 15 th of September or you might not be ready for your final A B C D examination.
27.	Andy will be leaving for Hokkaido on Tuesday. He will first travel by Air Asia to Tokyo and then A B takes a connecting flight by ANA to Hokkaido. C D
28.	Each time John drives $\frac{\text{through}}{A}$ the checkpoint at the Swiss border, the border patrol insists he $\frac{\text{opens}}{B}$ the canvas for them to $\frac{\text{inspect}}{C}$ the cargo he is $\frac{\text{transporting}}{D}$.
29.	When Arthur \underline{landed} on his head, he \underline{felt} his head \underline{spun} before collapsing on to the mattress with \underline{A} blood $\underline{streaming}$ down his face. \underline{D}
30.	The centre of Diane's bed always $\underbrace{smells}_{\mathbf{A}}$ like dog because Reliable, her beagle, $\underbrace{lays}_{\mathbf{B}}$ there $\underbrace{every}_{\mathbf{C}}$ chance $\underbrace{it \ gets}_{\mathbf{D}}$.
31.	Neither anything you $\underline{\text{have presented}}$ me, nor anything I have otherwise $\underline{\text{learned}}$, $\underline{\text{have convinced}}$ $\underline{\textbf{A}}$ me that he $\underline{\text{has been unfaithful}}$ to this charge.
32.	$\frac{\text{During the last period, the classroom was } \underbrace{\text{warm and stuffy}}_{\textbf{B}}. \text{ Johnathan, who } \underbrace{\text{felt tired}}_{\textbf{C}} \text{ and } \underbrace{\text{boring}}_{\textbf{D}},$ soon dozed off.
33.	Sebastian is an <u>all-round</u> athlete. <u>In other</u> words, he is <u>good in</u> a number of <u>track and field</u> events. $\frac{\mathbf{A}}{\mathbf{B}}$
34.	Owing to her father's new posting, Jennifer and her family will have to shift from Kuala Lumpur to A Penang before the end of this year. D
35.	Scientific advances over the last fifty years have lead to revolutionary changes in health, agriculture A and communication, and generally have enhanced socio-economic development and the quality of B Our

D

Part II Word Forms (10%)

Read the passage and then fill in each blank with the correct form of the word in the brackets.

Interaction and communication is important to achieve total excellence in relaying a
message or a conversation. The speaker plays a vital role to ensure the(36) (intend)
message is being played. It is not easy to talk well but sales personnel, insurance agents and
direct selling agents are able to achieve their targets because of their(37) (influence) talk.
The first(38) (<i>require</i>) for a good speaker is to have a good voice. The speaker must
have a voice that is neither too loud, too low,(39) (audible), nor harsh. What the speaker
needs is a voice that is sweet and far-reaching. A good voice is sometimes God's gift. Some
people are(40) (gift) with the voice that can arrest and attract you. However, an
experienced speaker will comment that this can be(41)(cultivate) to the required quality.
Facial expression is also important for a speaker. The emotions expressed should be
appropriate to the speech.
The physical(42) (appear) and gestures of the speaker are very important too. The
audience will be sitting in a room looking at a speaker who must be pleasant though not
(43) (necessary) beautiful. As the saying goes, 'Mankind normally judges a person by the
looks'.
The length of a speech is a matter of importance. An hour is long enough for a good
public speech. The secret of success is the art of (44) (omit). Leave the audience with a
feeling that you have spoken(45) (effect). Bear in mind the pulse of the audience. Stop
before the audience get tired or restless.

THE UNIFIED EXAMINATION (2018) INDEPENDENT CHINESE SECONDARY SCHOOLS MALAYSIA

Senior Middle Level

ENGLISH LANGUAGE

(SY03)

PAPER 1 WRITING

Date : 23 October 2018

Time : 8.30 a.m. - 10.10 a.m.

(1 hour 40 minutes)

INSTRUCTIONS TO CANDIDATES

1	TD1 : 1 :	. ,	•	4	
1	This sub	iect comi	nricec	two	naners:
1.	Tills sub		011303	LVVO	papers.

Paper 1: Writing (50%)

Paper 2: Reading and Language Use (50%)

- 2. Complete Paper 1 within the 1 hour 40 minutes allocated. After a 15-minute interval, proceed with Paper 2.
- 3. Paper 1 consists of two sections:

Section A: Summary Writing (15%)

Section B: Essay Writing (35%)

Section B should be written on the provided Essay Writing sheets.

- 4. Please use **blue** or **black** ink to write your answers.
- 5. Question number or the topic you have chosen should be clearly written.
- 6. Your essay will be assessed on content, grammar, organisation, spelling and punctuation.
- 7. Before attempting the questions, fill in your index number on the **marking-sheet** (computer card) and blacken the corresponding letters/numbers with a **5B** pencil. After answering all the questions, blacken the numbers of the questions you have chosen in the **question number** column and also indicate the total number of questions answered.
- 8. Paper 1 consists of three printed pages and a blank page at the end.

Do Not Turn Over This Page Until You Are Told To Do So

SECTION A SUMMARY WRITING (15%)

Read the following passage carefully. Write a summary on:

- how amazing the human brain is
- how to enable it to function well

Your summary should be in continuous writing and should not be longer than **150** words. Credit will be given for the use of own words. State in brackets the number of words you have written.

Go ahead and multiply the number 8,388,628 x 2 in your head. Can you do it in a few seconds? There is a young man who can double that number 24 times in the space of a few seconds. He gets it right every time.

The brain is an amazing thing.

Your brain may not be nearly so odd, but it is no less extraordinary. Easily the most sophisticated information-transfer system on Earth, your brain can process it in less time than it takes you to blink. To accomplish this miracle, your brain sends jolts of electricity crackling through hundreds of miles of wires composed of brain cells so small that thousands of them could fit into the period at the end of this sentence. You accomplish all of this in less time than it takes you to blink. What's equally incredible is this: most of us have no idea how our brain works.

There are Brain Rules.

For starters, we are not used to sitting at a desk for eight hours a day. From an evolutionary perspective, our brains developed while working out, walking as many as 12 miles a day. That's why exercises boost brain power. Exercisers outperform couch potatoes in long-term memory, reasoning, attention and problem-solving tasks.

As you no doubt have noticed if you've ever sat through a typical PowerPoint presentation, people don't pay attention to boring things. You've got seconds to grab someone's attention and only 10 minutes to keep it. At 9 minutes and 59 seconds, something must be done to regain attention and restart the clock. Also, the brain needs a break.

Ever feel tired about 3 o'clock in the afternoon? That's because your brain really wants to take a nap. You might be more productive if you did: in one study, a 26-minute nap improved NASA pilots' performance by 34 percent. And whether you get enough rest at night affects your mental agility the next day. Sleep well, think well.

We have heard of a man who can read two pages at the same time, one with each eye, and remember everything in the pages forever. Most of us tend to forget more than we can remember and that's why repetition is essential to boost memory.

Babies may not have a lot of knowledge about the world, but they know a whole lot about how to get it. Then we will understand better why the terrible twos only look like active rebellion but actually are a child's powerful urge to explore. We are powerful and natural explorers, and this never leaves us, despite the artificial environments we've built for ourselves.

(Adapted from *Brain Rules* by John Medina)

SECTION B ESSAY WRITING (35%)

Write an essay of not fewer than 350 words on one of the following topics.

- 1. We often hear of how selfish and materialistic people in our society have become. Suggest one community service activity that you and your friends can do to show that you care. Why do you choose this activity and how will it benefit society?
- 2. Attitude is the most important factor that leads to success in life. Do you agree?
- 3. Cyberbullying is so rampant nowadays that it is becoming a worrying trend. Discuss the effects of this alarming trend.
- 4. In this digital age students are encouraged to replace textbooks with e-books to make way for smart learning in the classrooms. Compare and contrast the two ways of learning.
- 5. The current cost of living is very high. In your opinion, what are the ways for a family to reduce their monthly expenditure in order to stretch their ringgit.

2018年度马来西亚华文独中统一考试

高中组

华文

(SY01)

试卷二 语文测验

日期: 2018年10月19日 时间: 10.30 a.m. - 12.15 p.m.

(1小时45分钟)

考生须知

(一) 本科试卷共分两份:

试卷一: 写作 (40%) 试卷二: 语文测验 (60%)

(二) 试卷二共分四组:

甲组: 语文基本知识 乙组: 文学与文化常识 丙组: 现代文阅读

丁组: 古诗文阅读

- (三) 试卷二须直接作答在**高中华文作答纸**的特备空格内。答案的号码必 须与题目号码相符。
- (四) 所有答案,均须加标点符号。
- (五) 只可用蓝色或黑色的原子笔书写。字迹不得过于潦草。
- (六)作答前,须在**积分表**(电脑卡)上正确填写考生编号及用 5B 铅笔将对应的小方格涂黑。作答后,须根据所答题数在**试题号码**栏上将有关小方格涂黑,并指出作答总数。
- (七) 答卷必须依试题号码次序排列,并且将**积分表**(电脑卡)置于上面, 合订成一本。
- (八) 试卷二语文测验共印十面。

未经正式宣布 不得翻看内页

م ادا. <i>بلا</i> ر		14 .1 .15 FF	
(考生姓名:		考生编号: _)
	- 3 -		

林文/二

甲组 语文基本知识 (10%) 6 题全答

1.	下列各组词语中, 没有 错别字的一组是:	(1%)
	A 烦燥不安 意气风发 瑟缩	
	B 牙牙学语 玲珑剔透 震憾	
	C 黯然失色 桀骜不驯 演译	
	D 崭露头角 随声附和 膜拜	
2.	依序填入各句横线上 最适合 的一组词语是:	(1%)
	① 教育部特聘国外教育专才编写中小	、学各学科教材。
	② 现今许多国家的法律明确规定,成年子女对	· 文母有的义务。
	③ 现代作家不仅力求上的新颖,也力	求风格上的标新立异,而不
	是因循守旧。	
	A 审定 抚养 题材	
	B 审定 赡养 体裁	
	C 审订 赡养 题材	
	D 审订 抚养 体裁	
3.	下列哪个句子的成语运用 有误 ?	(1%)
٠.	A 我得学好华文,免得 出口成章 ,成为他	· · · · · · · · · · · · · · · · · · ·
	B 在华裔的宴席里, 觥筹交错 的场面是一	
	C 十年磨一剑,他可是经多年努力才能达	
	D 莫老师的一席话如 醍醐灌顶 ,让我下定	
		1131-2034 Beneave
4.	5 写出汉语拼音所标示的汉字和加点字的汉语	拼音。 (2%)
	多少时日,我企渴于中世纪田园的飘逸。山谷	谷下一弯 (a) 澄 清如
	镜的河上,荡起垂钓的 (b) piān 舟,舟上沟	
	阳的余晖下熟睡。遗下岸边柳青里鸟声啾_(<u>""</u> 。此番情意,何
	处寻觅?	
5.	按提示在横线上填入适当的惯用语。	(2%)
	周星星是知名演员,获奖无数,但他初出道	
		至配角都不是的小角色)
6.	运用比拟和比喻两种修辞法,造一个句子,	描述 大雨将至 的情景。 (3%)

乙组 文学与文化常识(14%)

(I) 选择题 (4%)

4 题全答, 每题 1%

1. 下列哪一项**不是**对莎士比亚的称誉?

(1%)

- A 天才艺术家
- B 时代的灵魂
- C 人类最伟大的戏剧天才
- D 人类文学奥林匹克山上的宙斯
- 2. 下列对汉赋的叙述何者**有误**?

(1%)

- A 西汉初期的赋称为"骚体赋",代表人物为贾谊。
- B 汉赋是介于诗与散文的文体, 其影响了楚辞的形成。
- C 汉代最具代表性的赋为"大赋",以司马相如的成就最高。
- D 东汉出现的篇幅较小的赋称为"小赋",代表人物为张衡。
- 3. 以下有关诸子散文的叙述,何者**正确**?

(1%)

- A 孟子主张"性善"与"仁政"。《孟子》一书记载他的思想和政治言论,属论辩体散文。
- B 孔子所著的《论语》是一部语录体散文作品,全书二十篇,记载了 他和他的一些学生的言语行事。
- C 墨子提出"非攻""尚贤""尚同"的政治主张,《公输》一文即是 其"非攻"主张的具体体现。墨子学说与道家学说并称"显学"。
- D 荀子特别重视养生的方法,后人把《劝学》编在《荀子》三十二篇的第一篇。他的文章运用了各种生动的比喻,说理透辟,论证严谨。
- 4. 以下诗句和传统节日说明搭配不正确的一项是:

(1%)

- A "但愿人长久,千里共婵娟",是诗人在中秋节时抒发的情感。
- B "遥知兄弟登高处,遍插茱萸少一人",登高望远是重阳节的习俗。
- C "千门万户瞳瞳日, 总把新桃换旧符", "桃符" 是指元宵节时在门边贴上新的桃木板。
- D "迢迢牵牛星,皎皎河汉女","牵牛星"和"河汉女"一年一度相会的日子是乞巧节。

(II)填充与简答题(10%)

5 题全答, 每题 2%

- 5. 词,是中国古代诗歌的一种,发展至宋代达到顶峰,故俗称"宋词"。 词在唐代已经形成,在晚唐时出现以 (a) 为首的"花间派"词人, 五代时期则以 (b) 的成就最高。
 - (2%)
- 6. 中国文学史中最长的抒情诗是屈原的《 (c) 》, 最长的叙事诗是汉 代乐府《 (d) 》。 (2%)
- 7. 梁任公,就是 (e) ,别号 (f) ,是中国近代著名的思想家、 文学家,曾与其师康有为一起领导"维新变法"。 (2%)
- 文天祥在《正气歌》里礼赞了十二位前代英烈,其中两句,诗人歌颂 8. 东汉管宁安贫乐道,严格奉守清廉的节操。请写出相关句子。 (2%)
- 9. 太白和子美异地相逢。子美开心地拉着太白的手说: "贤兄别来无恙啊! **令堂**安康吗?前些日子家里桃子收成,**拙荆**还叨念着要我给你府上送一篮 呢!"

请问子美话中的"令学"和"拙荆"各指谁? (2%)

丙组 现代文阅读(18%)

细读下列两篇文章, 然后按要求回答问题。

[文章 1]

乡下老家种植着大面积的花生、父亲则是种植花生的大户。很多人 仰慕他的名声而特地前来向他请教,父亲笑眯眯地点起一支烟,说:"花 生啊,好活……"声音拉得倍儿长,像讲自己的孩子一样骄傲。

好活?还真是如此。似乎从有记忆开始,秋田里就是一望无际的花 生。这一种就是几十年,从来没有让人失望过。

印象里,每年在麦子将要熟的时候,父亲就开始种花生了。一个三 角撑子,一把铲子,就是全部工具。不几天,小种子已在土里发了芽。 等到麦子收割完, 青青的小苗已摇曳满地了。看着它们, 我们瞪大了好 奇的眼睛, 宝贝得不得了。父亲开着农用车一趟一趟拉麦子麦秆, 车轮 碾在花生苗上,花生苗扁下去,流出了青色的汁液。我们心疼得直哭, 父亲却哈哈大笑,说:"没事的,它们结实着呢!"

果然,一段时间后,再见到它们,都好好的,青色的叶间还缀满了 小黄花。父亲告诉我们,别小瞧这不起眼的小花,一朵花就是一颗白白 胖胖的花生。他又给我们讲花生地上开花地下结果的特性。我们听得有 趣,情不自禁地数起了那些小小的花,一朵,两朵,三朵……心里溢满 了欢喜。

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有一年,麦收过后,邻家图省事,就把田里的麦茬点燃了。谁知火势借着风力蔓延到我家的地,一地青青,几个小时后,变成了一片黑乎乎的天地,受牵连的人何止我们一家?对花生一向自信的父亲脸色煞白,猛地坐在地头,喃喃地说:"完了!这下花生肯定活不了了……"第二天,父亲就去街上重新买了花生种子。没想到,夜里一场雨后,黑乎乎的田里又冒出了绿绿的嫩芽。

一遍除草剂,就任其自由生长了。长长的夏天,容易干旱,花生可不怕。当玉米、棉花耷拉着焦渴的叶片时,花生依然擎着黄色的花蕊,绽成属于自己的一道风景。秋天收获的时候,又会碰上连绵的风雨天,那又有什么关系呢,果实长在地下,雨水反而滋润了它。

犹记得刚毕业那会儿,我没有经验,只在一个小公司里做着一份打杂的工作,时常心灰意懒。秋忙时节,正赶上放假,我便回去帮父亲收花生。父亲见我闷闷不乐,问缘由,我一股脑儿道出了心中的烦恼和困惑。父亲听了,一边拔花生,一边和我聊起了小时候学过的课文——许地山的《落花生》。他借用许父的话,说:"花生不像好看的苹果、桃子、石榴,把它们的果实悬在枝上,鲜红嫩绿的颜色,令人一望而生发羡慕之心。它只把果子埋在地下,等到成熟,人们才把它挖出来。"

最后,我也学着父亲的样子,拔出一株花生,抖抖土。白花花的花 35 生,太阳下,晃人的眼,那一刻,**我心里豁然开朗**。

(耿艳菊《像花生一样活着》, 有删改)

题目

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4 题**全答**

- 1. 试写出爸爸的人物形象特征,并从文中举例说明之。 (2%)
- 2. 试分析文末"我心里豁然开朗"的原因。 (2%)
- 3. 关于本文的写作方式,下列叙述何者正确? (2%)
 - A 通过议论来抒发个人感想
 - B 透过寓言故事阐述人生哲理
 - C 以环境衬托法来凸显全文意旨
 - D 以物为线索叙事,从而点明主旨
- 4. 文中第7段提及: "花生不像好看的苹果、桃子、石榴,把它们的果实悬在枝上,鲜红嫩绿的颜色,令人一望而生发羡慕之心。它只把果子埋在地下,等到成熟,人们才把它挖出来。"

你认为社会上需要像花生这种"藏而不露"的人吗?为什么?

(3%)

[文章 2]

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秦始皇是中国历史上第一个大一统王朝——秦朝的开国皇帝,公元前 221 年至前 210 年在位期间立下诸多功绩:这个独断专行的改革家不仅修筑了最早的长城,还统一了国家的文字、货币和度量衡制度,同时为英语的"中国"一词提供了词源("China"来源于"秦"在英语中的发音"Chin")。

今日造访西安兵马俑博物馆的游人所见的颜色单调的灰陶俑,实际 上最初是野心勃勃的统治者为自己辞世后营造的彩色梦幻。

当然了,秦始皇这样的举措也在为自己的来世做准备,他下令建造了占地90平方公里的陵墓。秦朝时的陶俑大军并非今日这般色彩暗哑,而是披着各种超自然的浓烈色彩——红、绿、紫、黄等等。遗憾的是,大多数色彩都没能经得住时间的考验,还有发掘后暴露在空气中所受的损伤。

早期发掘过程中,考古学家们往往只能眼睁睁地看着陶俑的色彩在西安干燥的空气中逐渐消退。一项研究表明,颜料之下的漆层暴露在空气中仅15秒就会卷曲,4分钟内便会剥落——煮熟一个鸡蛋的时间里,承载着悠悠历史的生动色块便丧失殆尽。

如今,好运气加上保护技术的进步为我们揭示出兵马俑的真实色彩。在西安最著名的俑坑一号坑进行为期三年的挖掘后,一百多名士兵重见天日,其中一部分带有彩绘痕迹,比如黑色头发、粉色脸庞,还有黑色或褐色眼睛。俑坑底部发现的陶俑保存得最为完好,因为这一区域由洪水形成的泥层发挥了保护作用,相当于给陶俑进行了一场为期 2000年的水疗。

中方研究人员与德国巴伐利亚州文物保护局专家合作研制出一种 叫做 PEG 的防腐剂,用于保护兵马俑的色彩。在最近的发掘过程中,带有彩绘的文物刚一出土,工作人员便用该试剂喷涂其暴露在外的色块表面,随后用塑料膜包裹,以保持其湿度。色彩最为丰富的陶俑与周围土块一起移至现场的实验室,进行进一步处理。令人欣喜的是,用于保护古老色彩的现代化技术似乎颇显奇效。

沿着一号坑北侧的一条狭窄坑道进去,红土上散落着陶制背包一样的器物,这些物件实际上是装满铜镞的箭箙。绕过刚发掘出的一辆战车残骸,掀起塑料布,露出一面长1米、参差不整的盾,上面的木结构已经腐蚀殆尽,但明亮的红、绿、白色彩绘印迹留在了周围的土层上。

-8-

几步之外,一面完整军鼓的皮制表面也在土中印出华丽图案,深红色的线条如发丝般细腻。这些文物,连同此地发现的纺织精细的丝绸和麻布,为我们了解秦朝的艺术文化领域及当时所使用的色彩提供了宝贵线索。

如此之多的色彩与艺术纹样印存在土层中,更加说明了土层的重要性,这亦是保护目标之一。迄今为止,这座庞大墓葬已经发掘的部分仅占总体的不足1%,因此,要想将剩下的部分全部出土,恐怕还需花费数百年时间。2011年,秦俑博物馆在76米高的中央皇陵侧翼启动两项长期发掘项目。十年前对该区域进行的探索性挖掘,出土了一批从事杂技、角力等宫廷娱乐生活的"百戏俑"。随着更加广泛深入的发掘工作将带来"令人震惊的发现"。

早期进行发掘后,兵马俑身上的裂隙和瑕疵都用石膏填盖,如今,随着博物馆观念改变为倾向于还原历史真相,俑坑西侧一支披着伤痕的新大军正逐渐成型。每一尊陶俑身上都可清晰看出修复的手工痕迹。这似乎是在拼凑远古的谜题。

(《兵马俑是彩色的》, 摘自《国家地理》杂志)

题目

35

40

45

4 题**全答**

- 文章第4段(第13~16行)用了什么说明方法?这个段落对文章起了什么作用?
- 关于兵马俑的文章很多,这篇文章主要侧重兵马俑的哪个特点来写?请
 简要说明。 (2%)
- 3. 文章最后一句呼应全文,请结合文章内容说说何谓"拼凑远古的谜 题"。 (2%)
- 4. 你认为兵马俑是值得令中华民族引以为傲的奇景,还是让人感慨万千的遗迹?为什么? (3%)

丁组 古诗文阅读(18%)

细读下列三篇古诗文,然后按要求回答问题。

[课内文言文]

令尹子兰闻之,大怒。卒使上官大夫短屈原**于**顷襄王。顷襄王怒而 迁之。

届原至于江滨,被发行吟泽畔,颜色憔悴,形容枯槁。渔父见而问之曰:"子非三闾大夫欤?何故而至此?"屈原曰:"举世混浊而我独清,众人皆醉而我独醒,是以见放。"渔父曰:"夫圣人者,不凝滞于物,而能与世推移。举世混浊,何不随其流而扬其波?众人皆醉,何不哺其糟而啜其醨?何故怀瑾握瑜,而自令见放为?"屈原曰:"吾闻之,新沐者必弹冠,新浴者必振衣。人又谁能以身之察察,受物之汶汶者乎?宁少赴常流而葬乎江鱼腹中耳。又安能以皓皓之白,而蒙世之温蠖乎?"乃作《怀沙》之赋……于是怀石,遂自投汨罗以死。

屈原既死之后,楚有宋玉、唐勒、景差之徒者,皆好辞而以赋见称。 12 然皆祖屈原之从容辞令,终莫敢直谏。其后楚日以削,数十年竟为秦所 灭。

(司马迁《屈原列传》节选)

题目

4 题**全答**

- 1. 下列哪一句中的"于"字与例句中的"于"字意思**相同**? (2%) 例句:内惑于郑袖,外欺于张仪
 - A 卒使上官大夫短屈原**于**顷襄王
 - B 屈原至于江滨
 - C 夫圣人者,不凝滞于物
 - D 于是怀石,遂自投汨罗以死
- 2. 文章主要表现了屈原怎样的精神和品德? (2%)
- 3. 屈原一再受到诬陷以致被帝王疏远,却依然不愿听从渔父的劝告, 最后还以死企图唤醒帝王。你赞同他的做法吗?为什么? (2%)
- 4. 试将下列句子翻译成白话文。 (2%) **举世混浊而我独清,众人皆醉而我独醒,是以见放。**(第4~5行)

[课外文言文]

崇明县有吴姓老人者,年已九十九岁,其妇亦九十七岁矣。老人生 四子,壮年家贫,鬻[®]子以自给,四子尽为富家奴。及四子长,咸能自立, 各自赎身娶妇。遂同居而共养父母焉。

卜居于县治之西,列肆共五间。伯开花布店,仲开布庄,叔开腌腊,季开南北杂货。四铺并列,其中一间,为出入之所。四子奉养父母,曲尽孝道。始拟膳每月一轮,周而复始,其媳曰:"翁姑老矣,若一月一轮,则必历三月后,方得侍奉颜色,太疏。"拟每日一家,周而复始,媳又曰:"翁姑老矣,若一日一轮,则历三日后,方得侍奉颜色,亦疏。"

12 老人饮食之所,后置一橱,橱中每家各置钱一串,每串五十文,老人每食毕,反手于橱中,随意取钱一串,即往市中嬉,买果饼啖之。橱中钱缺,则其子潜补之,不令老人知也。老人间往知交游,或博弈,或樗蒲[®],四子知其所往,随遣人密持钱二三百文,安置所游家,并嘱其家佯输钱于老人。老人胜,辄踊跃持钱归,老人亦不知也。亦率以为常。盖数十年无异云。

18 老人夫妇,至今犹无恙。其长子年七十七岁,余子皆颁白。孙与曾孙约共二十余人。崇明总兵刘兆,以联表其门曰:"百龄夫妇齐眉,五世儿孙绕膝。"洵[®]不诬也。**因援笔记之,以告世之为人子者**。

(陆陇其《崇明老人记》)

注: ① 鬻: 卖。

- ② 昭穆: 指辈分的次序。
- ③ 樗蒲(shūpú): 古代博戏, 似现代的掷骰子。
- ④ 洵: 确实, 真。

题目

3 题**全答**

1. 找出下列句子中的通假字,并注明通何字。

(2%)

- (a) 则明日蚤餐季 (第9行)
- (b) 余子皆颁白 (第18行)
- 2. 文中哪一件事, 是儿子为父亲设想周到的举动? (2%)
- 3. 作者 "**因援笔记之,以告世之为人子者**", 其作用何在? (2%)

[课外古典诗词]

朝闻游子唱离歌, 昨夜微霜初渡河。 鸿雁不堪愁里听, 云山况是客中过。 关城树色催寒近晚多。 莫见长安行乐处,

(李颀《送魏万之京》)

注: ① 御苑: 皇宫中的林苑,这里借指长安。

空令岁月易蹉跎。

② 砧声: 捣衣声。

题目

2 题**全答**

1. 作者如何劝勉他的朋友? (2%)

2. 试从诗中找出两个衬托季节变化的景物。 (2%)

2018年度马来西亚华文独中统一考试

高中组

华文

(SY01)

试卷一 写作

日期: 2018年10月19日

时间: 8.30 a.m. - 10.15 a.m.

(1小时45分钟)

考 生 须 知

(一) 本科试卷共分两份:

试卷一: 写作 (40%)

试卷二: 语文测验 (60%)

- (二) 考生须于第一阶段规定的 1 小时 45 分钟内完成试卷一。暂停 15 分钟后,才在第二阶段规定的 1 小时 45 分钟内作答试卷二。
- (三) 试卷一共分两组:

甲组:作文共 5 题,**选答 1 题**。用白话文写作。不可用诗歌或戏剧体裁作答。文长至少 600 字。须作答于作文稿纸上。

乙组:应用文共2题,**选答1题**。用白话文写作,按新式应用文格式书写。须作答于华文科应用文作答纸上。

- (四) 只可用蓝色或黑色的原子笔书写。字迹不得过于潦草。
- (五) 写作前,须书明所选题目或其编号。写作时,不得使用本身真实姓 名和真实校名。
- (六) 标点符号须清楚及正确地标示在空格内。
- (七) 作答前,须在**积分表**(电脑卡)上正确填写考生编号及用 **5B** 铅笔将对应的小方格涂黑。作答后,须根据所答题数在**试题号码**栏上将有关小方格涂黑,并指出作答总数。
- (八) 答卷必须依组别次序排列,并且将**积分表**(电脑卡)置于上面,合 订成一本。
- (九) 试卷一写作共印两面。

未经正式宣布 不得翻看内页

考生姓名:	_ 考生编号:	_)
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注意: 书写作文和应用文时, 考生不得使用本身真实姓名或真实校名。

写信人姓名用: 李志强 收信人地址用: 78, Jalan Bukit, 地址用: 10, Jalan Pudu, 43000 Kajang,

55200 Kuala Lumpur. Selangor Darul Ehsan.

甲组 作文 (30%)

选答1题

选答第3、4及第5题者,必须书明题目。

- 1. 远和近
- 2. 生命中的美好时刻
- 3. 我是_____迷 (请在横线上填入任何一项能令你着迷的事物为题)
- 4. 自古以来,人们对月亮有许多丰富的想象,神话与古典诗词中有关月亮的故事、名句多不胜数。

试以"月"为主题,完成一篇记叙文,题目自拟。

5. 培根说: "奇迹多是在厄运中出现的。"别林斯基说: "不幸是一所最好的大学。"有同学问: "我生活得很幸福,这里没有厄运,也没有不幸,我能创造出奇迹吗?"

奇迹是否只在厄运和不幸之中产生呢?厄运或不幸与创造奇迹是怎样的关系呢?请自拟题目写一篇文章,表达你的看法。

乙组 应用文 (10%)

选答1题

- 6. 试以至善花园居民李志强的名义,致函该花园居民协会主席王思齐,请 求在社区内开办太极拳班。
- 7. 大雁百货公司将进行促销活动。试以该公司销售经理李志强的名义,拟 一则促销活动启事。

2018年度马来西亚华文独中统一考试

高中组

数学

(SC04)

试卷一 选择题

日期: 2018年10月22日时间: 8.30 a.m. - 9.30 a.m.

(1小时)

考 生 须 知

(一) 本科试卷共分两份:

试卷一: 选择题 (40%), 试卷二: 作答题 (60%)。

- (二) 考生须于第一阶段规定的 1 小时内完成试卷一。暂停 15 分钟后, 才在第二阶段规定的 2 小时内作答试卷二。
- (三) 试卷一选择题 20 题**全答**。选出**正确**的答案, 然后用 **5B** 铅笔将**"O" 答案纸**(电脑卡)上相应的字母所在的小方格涂黑。
- (四) 可使用所规定的电子计算机进行演算。
- (五) 数学公式表在第 2-3 面。
- (六) 试卷一选择题共印六面。

未经正式宣布 不得翻看内页

(考生姓名:	考生编号:)

数学公式表

I. 代数

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

$$\left(a \pm b\right)^2 = a^2 \pm 2ab + b^2$$

$$(a \pm b)^3 = a^3 \pm 3a^2b + 3ab^2 \pm b^3$$

$$a^{2}-b^{2}=(a+b)(a-b)$$

$$a^{3} \pm b^{3} = (a \pm b)(a^{2} \mp ab + b^{2})$$

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$\left(a^{m}\right)^{n}=a^{mn}$$

$$(ab)^n = a^n b^n$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$\log_a xy = \log_a x + \log_a y$$

$$\log_a \frac{x}{y} = \log_a x - \log_a y$$

$$\log_a x^m = m \log_a x$$

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

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

逆矩阵
$$\frac{1}{ad-bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$$

等差数列
$$a_n = a + (n-1)d$$

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

等比数列
$$a_n = ar^{n-1}$$

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

II. 三角学

弧长=
$$r\theta$$

扇形面积=
$$\frac{1}{2}r^2\theta$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\csc \theta = \frac{1}{\sin \theta}$$

$$\sec \theta = \frac{1}{\cos \theta}$$

$$\cot \theta = \frac{1}{\tan \theta}$$

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

$$1 + \tan^2 \theta = \sec^2 \theta$$

$$1 + \cot^2 \theta = \csc^2 \theta$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

三角形的面积=
$$\frac{1}{2}ab\sin C$$

III. 解析几何

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
 直线方程式 $y - y_1 = m(x - x_1)$ 分比公式 $\left(\frac{mx_2 + nx_1}{m + n}, \frac{my_2 + ny_1}{m + n}\right)$ 点到直线的距离 $= \left|\frac{Ax_0 + By_0 + C}{\sqrt{A^2 + B^2}}\right|$ 三角形的面积 $= \frac{1}{2} \left| (x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3) \right|$

IV. 统计与概率

平均數
$$\overline{x} = \frac{\sum f_i x_i}{\sum f_i}$$
 $\hat{\sigma}^2 = \frac{\sum (x_i - \overline{x})^2 f_i}{\sum f_i} = \frac{\sum x_i^2 f_i}{\sum f_i} - \overline{x}^2$
 $\hat{\chi}$
 $\hat{\chi}$

V. 微积分

$$\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$$

$$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$$

$$\frac{d}{dx}f(g(x)) = f'(g(x))g'(x)$$

$$\frac{d}{dx}x^n = nx^{n-1}$$

$$\int x^n dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$$

- 1. $? (2x^3 13x^2 + 19x 6) \div (2x 3)$
 - **A** $x^2 + 5x + 2$ **B** $x^2 5x + 2$
- **C** $x^2 + 8x + 2$ **D** $x^2 8x + 2$
- 2. 求函数 $f(x) = \sqrt{25 x^2}$ 的值域。
 - **A** $\{ y \in \mathbf{R} \mid -5 \le y \le 5 \}$

B $\{y \in \mathbb{R} \mid y \le 5\}$

 $\mathbf{C} \quad \{ y \in \mathbf{R} \mid y \ge 0 \}$

D $\{y \in \mathbf{R} \mid 0 \le y \le 5\}$

- 以下哪个矩阵没有逆矩阵?
- $\mathbf{A} \quad \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \qquad \mathbf{B} \quad \begin{pmatrix} 1 & -1 \\ 0 & 1 \end{pmatrix} \qquad \mathbf{C} \quad \begin{pmatrix} 1 & -1 \\ -1 & 1 \end{pmatrix} \qquad \mathbf{D} \quad \begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix}$

- 4. 化简 $\frac{x^2-3x+2}{x^3+x^2-4x-4}$ 。
 - A $\frac{1}{x+2}$ B $\frac{1}{x-2}$

- C $\frac{x-1}{x^2+3x+2}$ D $\frac{x-2}{x^2+4x+4}$

- 5. 化简 $\sqrt{x^2\sqrt{x^3\sqrt{x^4}}}$ 。

 - **A** $x^{\frac{9}{8}}$ **B** $x^{\frac{9}{4}}$
- **C** $x^{\frac{9}{2}}$

- $\mathbf{D} \quad x^4$
- 已知等差数列 $\{a_n\}$ 的首项是 3 且 $a_{20}-a_{10}=-5$ 。求此数列的第50 项。

 - **A** $-\frac{43}{2}$ **B** $-\frac{37}{2}$ **C** $\frac{55}{2}$
- **D** $\frac{61}{2}$
- 求满足不等式 $x^2 + 3x 10 \le 0$ 的最大整数与最小整数之差。
 - **A** 2
- **B** 3

C 5

- D 7
- 8. 若多项式 $(2m+1)x^2-x+(2m+1)$ 为一完全平方式,求m的值。
 - **A** $-\frac{3}{4}$ \pm $-\frac{1}{4}$

B $-\frac{3}{2}$ $\stackrel{?}{=}$ $\frac{2}{3}$

 $\mathbf{C} \quad \frac{1}{4} \quad \mathbf{\vec{3}} \quad \frac{3}{4}$

D -3 或 -1

- 9. 若角 θ 落在第三象限,则点 $(\sin\theta\cos\theta,\sin\theta+\cos\theta)$ 落在第几象限?
 - A 第一象限
 - B 第二象限
 - C 第三象限
 - D 第四象限
- 10. 图 1 中, 扇形 AOB 的半径为 8 cm, ∠AOB=1.5 rad。求此扇形的周长。



- 20 cm B
- C 28 cm
- **D** 48 cm

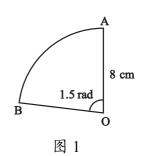
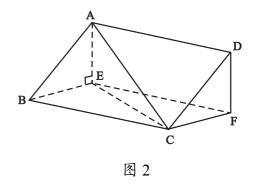


图 2 中, ABCD 与 EBCF 为长方形。已知 11. $\angle AEB = 90^{\circ}$, AE = 4 cm, EF = 12 cm \mathcal{Z} BE=6 cm。求直线 AC 与平面EBCF的 夹角。



- **B** 17.35°
- C 26.57°
- **D** 33.69°



12. 在 $\triangle ABC$ 中,AB=5,AC=3, $\angle B=30^{\circ}$,求 $\angle C$ 。

A 17.46°

B 17.56° **C** 54.63°

- **D** 56.44°
- 13. 若点(4, a)落在过点(1,-1)及(3,-2)的直线上,求a的值。

- **A** -7 **B** $-\frac{5}{2}$ **C** $-\frac{1}{2}$ **D** $-\frac{1}{7}$
- 14. 已知 M(2k,k) 与 N(k-3,2k+1) 两点到原点的距离相等,求k的值。

 $\mathbf{A} -3$

- **B** −1
- $\mathbf{C} = 0$

D 5

- 15. 求数据 101, 106, 118, 126, 124, 130 的四分位差。
- **B** 10

- \mathbf{C} 18
- D 20

- 以下哪种情况最适合使用平均数?
 - 老师想知道哪个班的数学程度比较参差不齐
 - 记者想要比较在不同行业间新进员工的薪水
 - 手机制造商想知道年轻人最常用的手机功能
 - 研究员想探究人类的身高与体重之间的关系
- 17. 已知 $y = \sqrt{x^2 1}$, 求 $\frac{dy}{dx}$ 。

- **A** $\frac{x}{\sqrt{x^2-1}}$ **B** $\frac{2x}{\sqrt{x^2-1}}$ **C** $2x\sqrt{x^2-1}$ **D** $\frac{1}{2\sqrt{x^2-1}}$
- 18. 已知 y = (2x-1)(3x+5)。当 x=3 时,求 $\frac{d^2y}{dx^2}$ 的值。
 - $\mathbf{A} = 0$
- **B** 6

- \mathbf{C} 12
- **D** 43
- 19. $\exists x = \int_{-1}^{1} f(x) dx = 5$, $\int_{-1}^{5} f(x) dx = -3$, $\int_{-1}^{5} g(x) dx = 2$, f(x) = -3
 - $\mathbf{A} 8$
- \mathbf{B} -2
- \mathbf{C} 4

- 20. $\angle \# \frac{d}{dx} \left(\frac{(x-3)^5}{(2x+2)^2} \right) = \frac{1}{4} g(x), \quad \# \int g(x) dx.$
 - A $\frac{(x-3)^3}{(x+1)^2} + C$

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

 $C = \frac{4(x-3)^3}{(x+1)^2} + C$

 $\mathbf{D} = \frac{(4x-12)^5}{(2x+2)^2} + C$

2018年度马来西亚华文独中统一考试

高中组

数学

(SC04)

试卷二 作答题

日期: 2018年10月22日 时间: 9.45 a.m. - 11.45 a.m. (2小时)

考 生 须 知

(一) 本科试卷共分两份:

试卷一: 选择题 (40%), 试卷二: 作答题 (60%)。

- (二) 试卷二共分两组: 甲组(必答题): 5 题**全答**(20%); 乙组(选答题): 7 题**选答 4 题**,但不能超过 4 题(40%)。 两组共答 **9 题**完卷。
- (三) 每题必须用新的一张纸作答。
- (四) 只可用**蓝色**或**黑色**的原子笔书写,惟可用铅笔画图。
- (五) 不必抄题,惟试题号码必须书写清楚。
- (六) 所有演算必须清楚地写出。必要的几何图形必须画出。
- (七) 可使用所规定的电子计算机进行演算,除非题目限制。
- (八) 作答前,须在**积分表**(电脑卡)上正确填写考生编号及用 5B 铅笔 将对应的小方格涂黑。作答后,须根据所答题数在**试题号码**栏上 将有关小方格涂黑,并指出作答总数。
- (九) 答卷必须依试题号码次序排列,并且将**积分表**(电脑卡)置于上面,合订成一本。
- (十) 数学公式表在第2-3面。
- (十一) 试卷二作答题共印七面,最后一面空白。

未经正式宣布 不得翻看内页

(考生姓名:	考_	生编号:)

- 43 -

数学/二

数学公式表

I. 代数

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

$$\left(a \pm b\right)^2 = a^2 \pm 2ab + b^2$$

$$(a \pm b)^3 = a^3 \pm 3a^2b + 3ab^2 \pm b^3$$

$$a^{2}-b^{2}=(a+b)(a-b)$$

$$a^{3} \pm b^{3} = (a \pm b)(a^{2} \mp ab + b^{2})$$

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$\left(a^{m}\right)^{n}=a^{mn}$$

$$(ab)^n = a^n b^n$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$\log_a xy = \log_a x + \log_a y$$

$$\log_a \frac{x}{y} = \log_a x - \log_a y$$

$$\log_a x^m = m \log_a x$$

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

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

逆矩阵
$$\frac{1}{ad-bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$$

等差数列
$$a_n = a + (n-1)d$$

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

等比数列
$$a_n = ar^{n-1}$$

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

Ⅱ. 三角学

弧长=
$$r\theta$$

扇形面积=
$$\frac{1}{2}r^2\theta$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\csc \theta = \frac{1}{\sin \theta}$$

$$\sec \theta = \frac{1}{\cos \theta}$$

$$\cot \theta = \frac{1}{\tan \theta}$$

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

$$1 + \tan^2 \theta = \sec^2 \theta$$

$$1 + \cot^2 \theta = \csc^2 \theta$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

三角形的面积 =
$$\frac{1}{2}ab\sin C$$

III. 解析几何

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
 直线方程式 $y - y_1 = m(x - x_1)$ 分比公式 $\left(\frac{mx_2 + nx_1}{m + n}, \frac{my_2 + ny_1}{m + n}\right)$ 点到直线的距离 $= \left|\frac{Ax_0 + By_0 + C}{\sqrt{A^2 + B^2}}\right|$ 三角形的面积 $= \frac{1}{2} \left| (x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3) \right|$

IV. 统计与概率

平均数
$$\overline{x} = \frac{\sum f_i x_i}{\sum f_i}$$
 $\dot{\sigma} \stackrel{?}{=} = \frac{\sum (x_i - \overline{x})^2 f_i}{\sum f_i} = \frac{\sum x_i^2 f_i}{\sum f_i} - \overline{x}^2$

众数 $= L + \left(\frac{d_1}{d_1 + d_2}\right)C$

标准差 $\sigma = \sqrt{\frac{\sum (x_i - \overline{x})^2 f_i}{\sum f_i}} = \sqrt{\frac{\sum x_i^2 f_i}{\sum f_i}} - \overline{x}^2$

中位数 $M = L + \left(\frac{n_2 - F_m}{f_m}\right)C_m$

平均差 $= \frac{\sum |x_i - \overline{x}|f_i}{\sum f_i}$

统计指数 $I = \frac{Q_1}{Q_0} \times 100$

综合指数 $= \frac{\sum w_i x_i}{\sum w_i}$

下四分位数 $= \frac{Q_1}{2} + \frac{n_1}{f_1} + \frac{$

V. 微积分

$$\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$$

$$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$$

$$\frac{d}{dx}f(g(x)) = f'(g(x))g'(x)$$

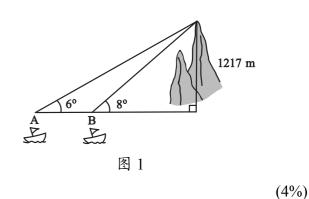
$$\frac{d}{dx}x^n = nx^{n-1}$$

$$\int x^n dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$$

甲组 必答题 (20%)

(本组5题**全答**。)

- 1. 已知 f(x) = 2x 5 及 g(x) = x + k, 其中 k 为常数。 求 k 的值使得 $(f \circ g)(x) = 2(g \circ g)(x)$ 。 (4%)
- 2. 如图 1 所示,芳芳从海平面上远眺日菜山的峰顶,她在点 A 处测得仰角为 6°。当她朝山的方向航行一段距离后,在点 B 处测得峰顶的仰角为 8°。已知日菜山峰顶在海拔 1217 m,求 A,B 两点之间的距离。(答案准确至 1 m)



3. 已知 Δ ABC 的顶点为 A(3, 1) ,B(1, -3) 及 C(0, y) 。若 Δ ABC 的面积为 3, 求

4. 已知数据 4, x, 10, 11, 4, 2 的平均数是 6。求

5. (a)
$$2 \neq y = 4\sqrt{x} + \frac{1}{x}$$
, $\cancel{x} = \frac{dy}{dx}$. (2%)

(b) 计算
$$\int (x^2 - \sqrt{x}) dx$$
。 (2%)

乙组 选答题 (40%)

(本组7题选答4题,但不能超过4题。)

6. (a) 解方程组
$$\begin{cases} x - 3y + 4 = 0 \\ x^2 + xy = 40 \end{cases}$$
 (4%)

(b) 若
$$a = \log 2$$
, 以 a 表示 $\log 50$ 。 (2%)

(c) 解不等式组
$$\begin{cases} 2x+3<9\\ 4-x^2 \le 0 \end{cases}$$
 (4%)

7. (a) 解方程式
$$2^{3x} = 8 + 2^{3x-1}$$
。 (4%)

(b) 已知
$$\mathbf{X} \begin{pmatrix} 2 & 1 \\ 5 & 3 \end{pmatrix} = \begin{pmatrix} -1 & 2 \\ 2 & -3 \end{pmatrix}$$
, 求矩阵 \mathbf{X} 。

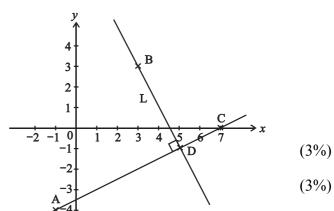
(c) 解方程式
$$x(x+2)(x-1)-3x=0$$
. (3%)

- 8. (a) 描绘函数 $y = \sin x$, $-\pi \le x \le \pi$ 的图像, 并写出此函数的最大值 及最小值。 (3%)
 - (b) 在ΔABC中, a:b:c=2:3:4。求此三角形中最大的角。(答案准确至0.01°)(4%)
 - (c) 证明 $(\csc\theta \cot\theta)(\csc\theta + \cot\theta) = 1$ 。 据此,若 $\csc\theta - \cot\theta = 5$,求 $\csc\theta + \cot\theta$ 的值。 (3%)
- 9. 如图 2 所示, A, B, C 三点的坐标分 别为(-1,-4), (3, 3)及(7, 0)。直线 L 过点 B 且垂直直线 AC 于点 D。

不许使用图解法,求



- (b) 直线 L 的方程式;
- (c) 点 D 的坐标;
- (d) AD:DC.



(3%)

图 2 (1%)

10. (a) 表 1 显示三种商品在 2012 年及 2017 年的价格、价比及权数。

商品	价本	各	2017 年价比	10 *L
门口口	2012 (RM)	2017 (RM)	(以 2012 年为基期)	权数
A	x	28	140	1
В	10	y	115	2
С	12	15	125	2

表 1

求

(b) 在15件样品中,9件是一等品,6件是二等品。若随机抽出2件, 求

11. 表 2 显示某班 40 名学生在一次数学考试所得分数的频数分配。

分数	40-49	50-59	60-69	70-79	80-89
频数	6	9	12	8	5

表 2

(a) 计算这班学生在这次考试的平均分数。

(2%) (2%)

(2%)

(b) 重抄并完成表 3。

分数	频数	分数低于	累积频数
40-49	6		
50-59	9		
60-69	12		
70-79	8		
80-89	5		

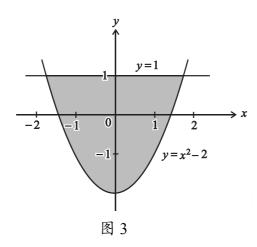
表 3

(c) 根据(b)小题中所完成的表,作一累积频数多边形。(比例尺:纵轴每2 cm 代表 5人,横轴每2 cm 代表 10分) (3%)

(d) 若 55 分为及格分数,根据(c)小题所作的图,求及格人数所占的百分比。

(3%)

- - (b) 图 3 所示的阴影区域是由曲线 $y=x^2-2$ 与直线 y=1 所围成。 求此阴影区域的面积,并将答案以根式表示。 (4%)



2018年度马来西亚华文独中统一考试

高中组

高级数学(I)

(SC06)

试卷一 选择题

日期: 2018年10月25日时间: 8.30 a.m. - 9.30 a.m.

(1小时)

考生须知

(一) 本科试卷共分两份:

试卷一: 选择题 (40%), 试卷二: 作答题 (60%)。

- (二) 考生须于第一阶段规定的 1 小时内完成试卷一。暂停 15 分钟后, 才在第二阶段规定的 2 小时内作答试卷二。
- (三) 试卷一选择题 20 题**全答**。选出**正确**的答案,然后用 **5B** 铅笔将 "**O**" **答案纸**(电脑卡)上相应的字母所在的小方格涂黑。
- (四) 可使用所规定的电子计算机进行演算。
- (五) 数学公式表在第2-4面。
- (六) 试卷一选择题共印七面, 最后一面空白。

未经正式宣布 不得翻看内页

(考生姓名:	考生编号:)

数学公式表

I. 代数

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

$$a^2 - b^2 = (a+b)(a-b)$$

$$a^3 \pm b^3 = (a\pm b)(a^2 \mp ab + b^2)$$

$$\log_a xy = \log_a x + \log_a y$$

$$\log_a \frac{x}{y} = \log_a x - \log_a y$$

$$\log_a x^m = m \log_a x$$

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

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

$$(a+b)^n = \sum_{r=0}^n {}_n C_r a^{n-r} b^r$$

$$A^{-1} = \frac{1}{\det(A)} \operatorname{adj}(A)$$

等差数列
$$a_n = a + (n-1)d$$

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

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

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

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

$$S_n = \frac{a}{1-r}$$

II. 三角学

孫长 =
$$r\theta$$
 $\sin^2\theta + \cos^2\theta = 1$ $1 + \tan^2\theta = \sec^2\theta$ $1 + \cot^2\theta = \csc^2\theta$ $\sin(A\pm B) = \sin A\cos B \pm \cos A\sin B$ $\cos\theta = \frac{1}{\sin\theta}$ $\cos(A\pm B) = \cos A\cos B \mp \sin A\sin B$ $\cot\theta = \frac{1}{\tan\theta}$ $\tan(A\pm B) = \frac{\tan A \pm \tan B}{1\mp \tan A \tan B}$ $\sin 2A = 2\sin A\cos A$ $\cos 2A = \cos^2 A - \sin^2 A$ $\sin 2A = 2\sin A\cos A$ $\cos 2A = \cos^2 A - \sin^2 A$ $\cos 2A = \cos^2 A - 1$ $\sin 2A = 2\sin^2 A$ $\cos 2A = \cos^2 A - 1$ $\sin 2A = 2\sin^2 A$ $\cos 2A = \cos^2 A - 1$ $\sin 2A = 2\sin^2 A$ $\cos 2A = \cos^2 A - \sin^2 A$ $\cos 2A = \cos^2 A - \cos^2 A$ $\cos^2 A = \cos^2 A - \cos^2 A$ $\cos^2 A = \cos^2 A + \cos^2 A$ $\cos^2 A = \cos^2 A$ $\cos^2 A = \cos^2 A + \cos^2 A$ $\cos^2 A = \cos^2 A$

III. 解析几何

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
分比公式 $\left(\frac{mx_2 + nx_1}{m + n}, \frac{my_2 + ny_1}{m + n}\right)$
三角形的面积 $= \frac{1}{2} \left| (x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3) \right|$
直线方程式 $y - y_1 = m(x - x_1)$
两直线的夹角 θ , $\tan \theta = \left| \frac{m_2 - m_1}{1 + m_2 m_1} \right|$
点到直线的距离 $= \left| \frac{Ax_0 + By_0 + C}{\sqrt{A^2 + B^2}} \right|$
圆的标准式 $(x - h)^2 + (y - k)^2 = r^2$

IV. 统计与概率

平均数
$$\overline{x} = \frac{\sum f_i x_i}{\sum f_i}$$
众数
$$= L + \left(\frac{d_1}{d_1 + d_2}\right) C$$
中位数
$$M = L + \left(\frac{\frac{n}{2} - F_m}{f_m}\right) C_m$$
上四分位数
$$Q_3 = L_3 + \left(\frac{\frac{3n}{4} - F_3}{f_3}\right) C_3$$
下四分位数
$$Q_1 = L_1 + \left(\frac{\frac{n}{4} - F_1}{f_1}\right) C_1$$
四分位距
$$= Q_3 - Q_1$$
四分位差
$$Q.D. = \frac{Q_3 - Q_1}{2}$$

$$\overrightarrow{D} = \frac{\sum (x_i - \overline{x})^2 f_i}{\sum f_i} = \frac{\sum x_i^2 f_i}{\sum f_i} - \overline{x}^2$$
标准差
$$\sigma = \sqrt{\frac{\sum (x_i - \overline{x})^2 f_i}{\sum f_i}} = \sqrt{\frac{\sum x_i^2 f_i}{\sum f_i}} - \overline{x}^2$$

平均差
$$= \frac{\sum |x_i - \overline{x}| f_i}{\sum f_i}$$
统计指数
$$I = \frac{Q_1}{Q_0} \times 100$$
综合指数
$$= \frac{\sum w_i x_i}{\sum w_i}$$

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

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

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

$$P(A) = 1 - P(A')$$
期望值
$$E = x_1 p_1 + x_2 p_2 + \dots + x_k p_k$$
二项分配
$$P(X = r) = {}_{n}C_{r} p^{r} q^{n-r}$$

V. 微积分

$$\lim_{x\to 0}\frac{\sin x}{x}=1$$

$$\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$$

$$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$$

$$\frac{d}{dx}x^n = nx^{n-1}$$

$$\frac{d}{dx}\sin x = \cos x$$

$$\frac{d}{dx}\cos x = -\sin x$$

$$\frac{d}{dx}\tan x = \sec^2 x$$

$$\frac{d}{dx}\cot x = -\csc^2 x$$

$$\frac{d}{dx}\sec x = \sec x \tan x$$

$$\frac{d}{dx}\csc x = -\csc x \cot x$$

$$\frac{d}{dx}\ln x = \frac{1}{x}$$

$$\frac{d}{dx}\log_a x = \frac{1}{x\ln a}$$

$$\frac{d}{dx}e^x = e^x$$

$$\frac{d}{dx}a^x = a^x \ln a$$

面积
$$\int_a^b y dx$$
 或 $\int_c^d x dy$

$$\lim_{x \to \infty} \left(1 + \frac{1}{x} \right)^x = e$$

$$\frac{dy}{dx} = \frac{dy}{du} \frac{du}{dx}$$

$$\frac{d}{dx}f(g(x)) = f'(g(x))g'(x)$$

$$\int x^{n} dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$$

$$\int \cos x \, dx = \sin x + C$$

$$\int \sin x \, dx = -\cos x + C$$

$$\int \sec^2 x \, dx = \tan x + C$$

$$\int \csc^2 x \, dx = -\cot x + C$$

$$\int \sec x \tan x \, dx = \sec x + C$$

$$\int \csc x \cot x \, dx = -\csc x + C$$

$$\int \frac{1}{x} dx = \ln |x| + C$$

$$\int e^x dx = e^x + C$$

$$\int a^x \, dx = \frac{a^x}{\ln a} + C$$

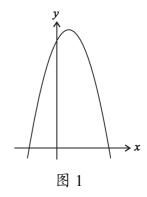
体积
$$\pi \int_a^b y^2 dx$$
 或 $\pi \int_c^d x^2 dy$

- 1. 已知 $f(x) = \sqrt{\frac{x+1}{r-2}}$, 求函数 f 的定义域。
 - $\mathbf{A} \quad [0, \infty)$
 - $\mathbb{C} \setminus \mathbb{R} \setminus \{2\}$

- **B** $\{x \in \mathbb{R} \mid x \le -1 \text{ is } x > 2\}$
- **D** $\{x \in \mathbb{R} \mid -1 \le x < 2\}$
- 图 1 所示为 $y = ax^2 + bx + c$ 的图像。

以下哪一项是正确的?

- $\mathbf{A} \quad a > 0$
- ab < 0
- $\mathbf{C} = \frac{c}{c} > 0$
- **D** $b^2 4ac < 0$



- 3. 已知多项式 p(x) 除以 (x+1)(x+2) 所得的余式是 2x+3, 求 p(x) 除以 x+2 的 余数。
 - $\mathbf{A} 1$
- **B** 1

 \mathbf{C} 2

D 3

- 4. $\not = \sum_{k=0}^{100} [k(k+2)]$.
 - **A** 338350
- B 338550
- **C** 348 450
- 676700 D
- 5. 已知矩阵 $\begin{pmatrix} -40 & u & x \\ 13 & v & y \\ 5 & w & z \end{pmatrix}$ 的逆矩阵是 $\begin{pmatrix} 1 & 2 & a \\ 2 & b & 3 \\ c & 0 & 8 \end{pmatrix}$, 求b的值。

D 5

- 6. 求 $\left(\frac{1}{x}-2x^2\right)^9$ 的展开式中的常数项。
 - A -4032
- **C** 672
- 4032

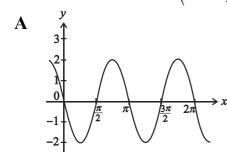
- 7. 求无穷等比级数 $2+(-1)+\frac{1}{2}+\left(-\frac{1}{4}\right)+\cdots$ 的和。
- **B** $\frac{4}{3}$ **C** $\frac{5}{3}$

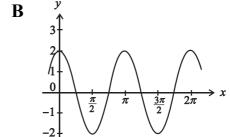
- D 4
- 8. 已知 Z 呈标准常态分配且 P(Z>a)=0.7, 求 P(Z>-a)。
 - **A** 0.3
- **B** 0.35
- \mathbf{C} 0.5
- **D** 0.7

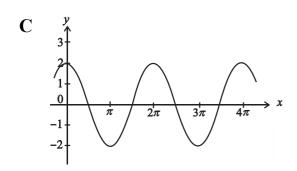
- 9. 用 MATHEMATICS 一字中的全部字母作排列,如果相同的字母必须相邻,有几种 不同的排法?
 - **A** 39 916 800
- **B** 4989600
- C 40320
- **D** 5 040
- 已知中国郑州市的经纬度是(34.8°N, 116.6°E), 日本大阪的经纬度是(34.8°N, 10. 135.6℃)。求这两座城市沿着纬线的距离。
 - A 1140 海里 B 936.1 海里 C 650.6 海里 D 570 海里

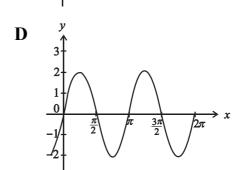
- 11. 在 $\triangle ABC$ 中, a=b=5, c=4,求 $\triangle ABC$ 的内切圆半径。
 - **A** $\frac{18\sqrt{35}}{7}$ **B** $\frac{9\sqrt{35}}{7}$ **C** $\frac{2\sqrt{21}}{7}$ **D** $\frac{2\sqrt{14}}{7}$

12. 以下何者是 $y = 2\sin\left(2x + \frac{\pi}{2}\right)$ 的图像?









- 13. 若 $\cos\theta + \sin\theta = \frac{7}{5}$, 求 $\cos 2\theta$ 的值。
 - A $-\frac{7}{25}$ $\stackrel{?}{=}$ $\frac{7}{25}$

 $C = \frac{24}{25}$

D $-\frac{24}{25}$ $\stackrel{?}{=}$ $\frac{24}{25}$

- 14. 已知原点 O 落在线段 AB 上且 AO: OB = 2:3。 若点 B 的坐标是(4, -1), 求点 A 的 坐标。

 - **A** $\left(-\frac{8}{3}, \frac{2}{3}\right)$ **B** $\left(-\frac{4}{3}, \frac{2}{3}\right)$ **C** $\left(-\frac{2}{3}, \frac{4}{3}\right)$ **D** $\left(-\frac{2}{3}, \frac{8}{3}\right)$
- 15. 已知直线 ax + by = 2 的斜率为 $-\frac{1}{2}$ 且通过点(-4, 1)。求a的值。
 - \mathbf{A} -2
- $\mathbf{B} 1$

C 1

- D 2
- 16. 已知点 P(a, a+1) 在圆 $x^2 + y^2 = 25$ 内, 求 a 的取值范围。
 - **A** -4 < a < 3 **B** -5 < a < 4 **C** -6 < a < 4 **D** -5 < a < 5

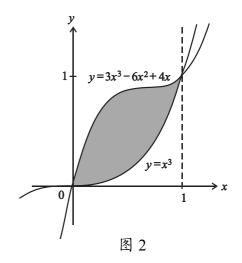
- 17. 求曲线 $x^2 5xy + 6y^3 = 0$ 在点(2,1)处的切线斜率。
 - $\mathbf{A} \quad -\frac{1}{2} \qquad \qquad \mathbf{B} \quad -\frac{1}{9} \qquad \qquad \mathbf{C} \quad \frac{1}{9}$
- **D** 2

- 18. 已知 $\frac{d}{dx}(\sin 2x 2x) = k \sin^2 x$, 求 k 的值。
 - $\mathbf{A} \quad -4$
- \mathbf{B} -2
- **C** 2

- **D** 4
- 19. 已知 y = f(x) 的图像对称于 y 轴且 $\int_{0}^{1} f(x)dx = 1$, $\int_{1}^{2} f(x)dx = 2$, $\int_{2}^{3} f(x)dx = 3$, $\not \stackrel{!}{\not =} f(3x)dx .$
 - **A** 0
- $\mathbf{B} = \frac{2}{3}$
- **C** 4

- D 36
- 20. 图 2 中的阴影部分是由曲线 $y = 3x^3 6x^2 + 4x$ 及 $y=x^3$ 所围成,求其面积。
 - A

 - $C = \frac{1}{2}$



2018 年度马来西亚华文独中统一考试

高中组

高级数学(I)

(SC06)

试卷二 作答题

日期: 2018年10月25日 时间: 9.45 a.m. - 11.45 a.m. (2小时)

考生须知

(一) 本科试券共分两份:

试卷一: 选择题 (40%), 试卷二: 作答题 (60%)。

(二) 试卷二共分两组: 甲组(必答题): 5 题全答(20%);

乙组 (选答题): 7题选答 4 题,但不能超过 4 题 (40%)。

两组全部共答9颗完卷。

- (三) 每题必须用新的一张纸作答。
- (四) 只可用**蓝色**或**黑色**的原子笔书写,惟可用铅笔画图。
- (五) 不必抄题,惟试题号码必须书写清楚。
- (六) 所有演算必须清楚地写出。必要的几何图形必须画出。
- (七) 可使用所规定的电子计算机进行演算, 除非题目限制。
- (八) 作答前,须在**积分表**(电脑卡)上正确填写考生编号及用 **5B** 铅笔 将对应的小方格涂黑。作答后,须根据所答题数在**试题号码**栏上 将有关小方格涂黑,并指出作答总数。
- (九) 答卷必须依试题号码次序排列,并且将积分表(电脑卡)置于上 面, 合订成一本。
- (十) 数学公式表在第 2-4 面。
- (十一) 试卷二作答题共印七面, 最后一面空白。

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(考生姓名:	考生编号:	
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数学公式表

I. 代数

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

$$a^2 - b^2 = (a+b)(a-b)$$

$$a^3 \pm b^3 = (a\pm b)(a^2 \mp ab + b^2)$$

$$\log_a xy = \log_a x + \log_a y$$

$$\log_a \frac{x}{y} = \log_a x - \log_a y$$

$$\log_a x^m = m \log_a x$$

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

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

$$(a+b)^n = \sum_{r=0}^n {}_n C_r a^{n-r} b^r$$

$$A^{-1} = \frac{1}{\det(A)} \operatorname{adj}(A)$$

等差数列
$$a_n = a + (n-1)d$$

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

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

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

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

$$S_n = \frac{a}{1-r}$$

Ⅱ. 三角学

孫长 =
$$r\theta$$

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

$$1 + \tan^2\theta = \sec^2\theta$$

$$1 + \cot^2\theta = \csc^2\theta$$

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

$$\csc\theta = \frac{1}{\sin\theta}$$

$$\cos(A\pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\cot\theta = \frac{1}{\tan\theta}$$

$$\tan(A\pm B) = \frac{\tan A \pm \tan B}{1\mp \tan A \tan B}$$

$$\sin 2A = 2\sin A \cos A$$

$$\cos(A\pm B) = \cos^2\theta$$

$$\tan(A\pm B) = \frac{\tan A \pm \tan B}{1\mp \tan A \tan B}$$

$$\sin 2A = 2\sin A \cos A$$

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$$\tan(A\pm B) = \frac{\tan A \pm \tan B}{1\mp \tan A \tan B}$$

$$\sin 2A = 2\sin A \cos A$$

$$= 2\cos^2 A - \sin^2 A$$

$$= 2\cos^2 A - 1$$

$$= 1 - 2\sin^2 A$$

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

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III. 解析几何

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
分比公式 $\left(\frac{mx_2 + nx_1}{m + n}, \frac{my_2 + ny_1}{m + n}\right)$
三角形的面积 $= \frac{1}{2} \left| (x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3) \right|$
直线方程式 $y - y_1 = m(x - x_1)$
两直线的夹角 θ , $\tan \theta = \left| \frac{m_2 - m_1}{1 + m_2 m_1} \right|$
点到直线的距离 $= \left| \frac{Ax_0 + By_0 + C}{\sqrt{A^2 + B^2}} \right|$
圆的标准式 $(x - h)^2 + (y - k)^2 = r^2$

IV. 统计与概率

平均数
$$\overline{x} = \frac{\sum f_i x_i}{\sum f_i}$$
众数
$$= L + \left(\frac{d_1}{d_1 + d_2}\right) C$$
中位数
$$M = L + \left(\frac{\frac{n}{2} - F_m}{f_m}\right) C_m$$
上四分位数
$$Q_3 = L_3 + \left(\frac{\frac{3n}{4} - F_3}{f_3}\right) C_3$$
下四分位数
$$Q_1 = L_1 + \left(\frac{\frac{n}{4} - F_1}{f_1}\right) C_1$$
四分位距
$$= Q_3 - Q_1$$
四分位差
$$Q.D. = \frac{Q_3 - Q_1}{2}$$

$$\overrightarrow{D} \stackrel{\text{\frac{\pi}}}{D}} = \frac{\sum x_i^2 f_i}{\sum f_i} - \overline{x}^2$$
标准差
$$\sigma = \sqrt{\frac{\sum (x_i - \overline{x})^2 f_i}{\sum f_i}} = \sqrt{\frac{\sum x_i^2 f_i}{\sum f_i}} - \overline{x}^2$$

平均差
$$= \frac{\sum |x_i - \overline{x}| f_i}{\sum f_i}$$
统计指数
$$I = \frac{Q_1}{Q_0} \times 100$$
综合指数
$$= \frac{\sum w_i x_i}{\sum w_i}$$

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

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

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

$$P(A) = 1 - P(A')$$
期望值
$$E = x_1 p_1 + x_2 p_2 + \dots + x_k p_k$$

$${}_{n} = x_1 p_1 + x_2 p_2 + \dots + x_k p_k$$

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$${}_{n} = x_1 p_1 + x_2 p_2 + \dots + x_k p_k$$

V. 微积分

$$\lim_{x\to 0}\frac{\sin x}{x}=1$$

$$\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$$

$$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$$

$$\frac{d}{dx}x^n = nx^{n-1}$$

$$\frac{d}{dx}\sin x = \cos x$$

$$\frac{d}{dx}\cos x = -\sin x$$

$$\frac{d}{dx}\tan x = \sec^2 x$$

$$\frac{d}{dx}\cot x = -\csc^2 x$$

$$\frac{d}{dx}\sec x = \sec x \tan x$$

$$\frac{d}{dx}\csc x = -\csc x \cot x$$

$$\frac{d}{dx}\ln x = \frac{1}{x}$$

$$\frac{d}{dx}\log_a x = \frac{1}{x\ln a}$$

$$\frac{d}{dx}e^x = e^x$$

$$\frac{d}{dx}a^x = a^x \ln a$$

面积
$$\int_a^b y dx$$
 或 $\int_c^d x dy$

$$\lim_{x \to \infty} \left(1 + \frac{1}{x} \right)^x = e$$

$$\frac{dy}{dx} = \frac{dy}{du} \frac{du}{dx}$$

$$\frac{d}{dx}f(g(x)) = f'(g(x))g'(x)$$

$$\int x^{n} dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$$

$$\int \cos x \, dx = \sin x + C$$

$$\int \sin x \, dx = -\cos x + C$$

$$\int \sec^2 x \, dx = \tan x + C$$

$$\int \csc^2 x \, dx = -\cot x + C$$

$$\int \sec x \tan x \, dx = \sec x + C$$

$$\int \csc x \cot x \, dx = -\csc x + C$$

$$\int \frac{1}{x} dx = \ln |x| + C$$

$$\int e^x dx = e^x + C$$

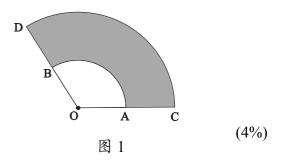
$$\int a^x \, dx = \frac{a^x}{\ln a} + C$$

体积
$$\pi \int_a^b y^2 dx$$
 或 $\pi \int_c^d x^2 dy$

甲组 必答题 (20%)

(本组5题**全答**。)

- 1. 已知函数 $f(x) = a + \frac{b}{x+5}$ 且 f(-4) = -1, f(-1) = 2。 求
 - (a) a 及 b 的值; (2%)
 - (b) $f^{-1}(x)$.
- 2. 图 1 所示为以 O 为圆心的两个扇形, OAC 及 OBD 为直线, OA: OC=1:2。若 OA=1 cm , 扇形 OAB 的周长为 4 cm, 求阴影部分的面积。



- 3. 已知圆 $x^2 + y^2 4x + 2y 4 = 0$ 与 y 轴相交于 A, B 两点。求
 - (a) 圆心及半径; (2%)
 - (b) AB 的长。
- 4. 七个小矮人的身高(cm)为:

121 116 112 124 127 115 118

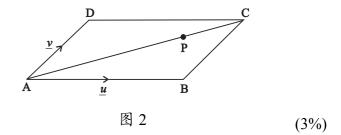
- (a) 小红帽加入这群小矮人后,平均身高没有改变。求小红帽的身高。 (2%)
- (b) 小木偶加入这群小矮人后,身高的中位数增加了1 cm。求小木偶的身高。 (2%)
- 5. 已知函数 $f(x) = x^2 e^{-3x}$, 求 f 为增函数的区间。 (4%)

乙组 选答题 (40%)

(本组7题选答4题,但不能超过4题。)

6. (a) 解不等式
$$3 < \frac{x}{x+4} < 5$$
. (4%)

- (b) 解方程式 $\sqrt{4-3x} = x$ 。 (3%)
- (c) 图 2 中,ABCD 为一平行四边形, P 为 AC 上的一点使得 AP=2PC。 若 $\overrightarrow{AB} = \underline{u}$, $\overrightarrow{AD} = \underline{v}$,以 \underline{u} , \underline{v} 表示 \overrightarrow{DP} 。



- 7. (a) 已知 $6x^2 41 \equiv A(x+3)(x-2) + B(x+3) + C(x-2)$, 求 A, B 及 C 的值。 (3%)
 - (b) 解方程式 $\log_5[\log_4(\log_3 x)] = 0$. (3%)
 - (c) 一数列 $\{a_n\}$ 的相邻两项之差 $a_n a_{n-1}$ 成一等差数列。已知数列 $\{a_n\}$ 的首四项分别为 1,3,7 及 13,求 a_{100} 。 (4%)
- 8. (a) $\triangle \Delta ABC$ 中, C = 2, a = 1, $\cos B = \frac{3}{5}$, $\triangle ABC$ 的面积。 (3%)
 - (b) 已知 $\tan x = 4$,不许使用计算机,求 $\frac{\sin x + \cos x}{\sin x \cos x}$ 的值。 (2%)
 - (c) 将 $3\cos\theta \sqrt{3}\sin\theta$ 化为 $R\cos(\theta + \alpha)$ 的形式,其中 R > 0,0° < α < 90°。 据此,解方程式 $3\cos\theta - \sqrt{3}\sin\theta = 2$,0° ≤ $\theta \le 360$ °。(答案准确至两位小数) (5%)
- 9. (a) 已知 ΔABC 的三个顶点为 A(-1, 2), B(3, 1)及 C(2, 4)。 D 为 BC 边上 一点使得 AD 垂直于 BC。
 - (i) 不许用图解法, 求点 D 的坐标。 (4%)
 - (ii) 求ΔABC的面积。 (2%)
 - (b) 求由原点到圆 $(x-1)^2 + (y-2)^2 = 4$ 的两条切线的方程式。 (4%)

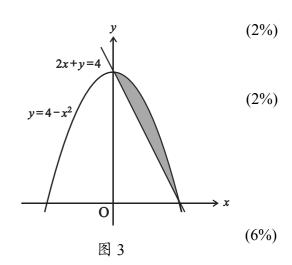
- 10. (a) 有几种方法将十二名学生分成三个小组且每组有四名学生? (3%)
 - (b) 投掷一枚匀称的六面骰子十次,求点数'1'至少出现两次的概率。 (答案准确至4位小数) (3%)
 - (c) 一次数学测验中,10位男生的平均分数是72分,标准差为15分。 班上17位女生的平均分数是68分,标准差为12分。求这些学生分数的平均数及标准差。(答案准确至2位小数) (4%)
- 11. (a) 已知 $f(x) = \frac{1}{\sqrt[3]{x}}$,求 f'(64) 并用近似计算求 $\frac{1}{\sqrt[3]{66}}$ 的近似值,答 案以分数表示。 (4%)
 - (b) 已知一圆柱体的底圆半径为r cm, 高为h cm 且其体积为 250π cm³。

(i) 证明此圆柱体的表面积
$$A = \left(2\pi r^2 + \frac{500\pi}{r}\right) \text{ cm}^2$$
. (2%)

(ii) 求r使得圆柱体的表面积为最小。 (4%)

(提示: 圆柱体的体积, $V = \pi r^2 h$; 表面积, $A = 2\pi r^2 + 2\pi r h$.)

- 12. (a) $\lim_{x \to \infty} \frac{x^3 4x^2 12x}{2x^3 + 3x^2 2}$.
 - (b) $\not \stackrel{1}{\times} \int_{-5}^{-3} \frac{1}{x^2 + 4x + 4} dx$.
 - (c) 图 3 中的阴影区域是由曲线 $y=4-x^2$ 与直线 2x+y=4 所围成。求此区域绕 x 轴旋转360°所形成的旋转体体积。



2018年度马来西亚华文独中统一考试

高中组

高级数学(II)

(SC07)

试卷一 选择题

日期: 2018年10月22日 时间: 8.30 a.m.— 9.30 a.m.

(1小时)

考生须知

(一) 本科试卷共分两份:

试卷一: 选择题 (40%), 试卷二: 作答题 (60%)。

- (二) 考生须于第一阶段规定的 1 小时内完成试卷一。暂停 15 分钟后, 才在第二阶段规定的 2 小时内作答试卷二。
- (三) 试卷一选择题 20 题**全答**。选出**正确**的答案, 然后用 **5B** 铅笔将 "**O**" **答案纸**(电脑卡)上相应的字母所在的小方格涂黑。
- (四) 可使用所规定的电子计算机进行演算。
- (五) 数学公式表在第2-4面。
- (六) 试卷一选择题共印七面, 最后一面空白。

未经正式宣布 不得翻看内页

(考生姓名:	考生编号:)

数学公式表

I. 代数

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

$$a^3 \pm b^3 = (a \pm b)(a^2 \mp ab + b^2)$$

$$\log_a xy = \log_a x + \log_a y$$

$$\log_a \frac{x}{y} = \log_a x - \log_a y$$

$$\log_a x^m = m \log_a x$$

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

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

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

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

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

$$x = \frac{a (n + 1)}{2}$$

$$x = \frac{a (n + 1)(2n + 1)}{6}$$

$$x = \frac{a (n + 1)(2n + 1$$

II. 三角学

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

$$1 + \tan^2\theta = \sec^2\theta$$

$$1 + \cot^2\theta = \csc^2\theta$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

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

$$\Delta = \sqrt{s(s-a)(s-b)(s-c)}, \quad s = \frac{a+b+c}{2}$$

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

$$\cos(A\pm B) = \cos A\cos B \mp \sin A\sin B$$

$$\tan(A\pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

$$\sin(2A = 2\sin A\cos A)$$

$$\cos(2A = \cos^2 A - \sin^2 A$$

$$= 2\cos^2 A - 1$$

$$= 1 - 2\sin^2 A$$

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

$$\sin(A - B) = \frac{\sin(A+B) + \sin(A-B)}{2}$$

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

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

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

$$\sin(A+B) = \frac{\cos(A+B) + \cos(A+B)}{2}$$

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

III. 解析几何

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
分比公式 $\left(\frac{mx_2 + nx_1}{m + n}, \frac{my_2 + ny_1}{m + n}\right)$
三角形的面积 $= \frac{1}{2} |(x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3)|$
直线方程式 $y - y_1 = m(x - x_1)$
两直线的夹角 θ , $\tan \theta = \left|\frac{m_2 - m_1}{1 + m_2 m_1}\right|$
点到直线的距离 $= \left|\frac{Ax_0 + By_0 + C}{\sqrt{A^2 + B^2}}\right|$
圆的标准式 $(x - h)^2 + (y - k)^2 = r^2$
平移 $\begin{cases} x = x' + h \\ y = y' + k \end{cases}$
转轴 $\begin{cases} x = x'\cos\theta - y'\sin\theta \\ y = x'\sin\theta + y'\cos\theta \end{cases}$
抛物线 标准式 $y^2 = 4ax$
焦点 $(a, 0)$
准线 $x + a = 0$
椭圆 标准式 $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$
离心率 $e = \frac{\sqrt{a^2 - b^2}}{a}$
焦点 $(\pm ae, 0)$
准线 $x \pm \frac{a}{e} = 0$
双曲线 标准式 $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$
离心率 $e = \frac{\sqrt{a^2 + b^2}}{a}$
焦点 $(\pm ae, 0)$

IV. 微积分

$$\begin{split} &\lim_{x\to 0}\frac{\sin x}{x}=1 &\lim_{x\to 0}\frac{dv}{dx}+v\frac{du}{dx} &\int u\,dv=uv-\int v\,du \\ &\frac{d}{dx}\left(\frac{u}{v}\right)=v\frac{dv}{dx}-u\frac{dv}{dx} &\frac{dy}{dx}=\frac{dy}{du}\frac{du}{dx} \\ &\frac{d}{dx}f\left(g\left(x\right)\right)=f'\left(g\left(x\right)\right)g'\left(x\right) \\ &\frac{d}{dx}x^n=nx^{n-1} &\int x^n\,dx=\frac{x^{n+1}}{n+1}+C, \quad n\neq -1 \\ &\frac{d}{dx}\sin x=\cos x &\int \cos x\,dx=\sin x+C \\ &\frac{d}{dx}\tan x=\sec^2 x &\int \sin x\,dx=-\cos x+C \\ &\frac{d}{dx}\cot x=-\csc^2 x &\int \csc^2 x\,dx=-\cot x+C \\ &\frac{d}{dx}\cot x=-\csc^2 x &\int \csc^2 x\,dx=-\cot x+C \\ &\frac{d}{dx}\cos x=\frac{1}{x} &\int \frac{1}{x}dx=\ln\left|x\right|+C \\ &\frac{d}{dx}\log_a x=\frac{1}{x\ln a} &\int \frac{d^2}{dx}\sin^2 x=\frac{1}{x} \\ &\frac{d}{dx}\sin^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1-x^2}&\sin^2 x+C \\ &\frac{d}{dx}\sin^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1-x^2}&\sin^2 x+C \\ &\frac{d}{dx}\tan^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1-x^2}&\sin^2 x+C \\ &\frac{d}{dx}\tan^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1+x^2}&\sin^2 x+C \\ &\frac{d}{dx}\sin^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1+x^2}&\sin^2 x+C \\ &\frac{d}{dx}\sin^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1+x^2}&\sin^2 x+C \\ &\frac{d}{dx}\sin^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1+x^2}&\sin^2 x+C \\ &\frac{dx}{1+x^2}&\sin^2 x+C \\ &\frac{dx}{1+x^2}&\frac{dx}{$$

- 1. 已知 $f(x) = 5x^2 + kx 4$, 其中 k 为常数。若 f 为偶函数, 求 f(3) 的值。
 - **A** 31
- **B** 38
- **C** 41
- **D** 49

- 2. 求多项式 f(x+2) 除以 x-2 时的余数。
 - **A** f(-2) **B** f(0)
- $\mathbf{C} = f(2)$
- **D** f(4)

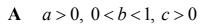
- 3. 求 $\frac{1}{\sqrt{1-x}}$ 的展开式中 x^3 的系数。
 - **A** $-\frac{5}{256}$ **B** $-\frac{5}{512}$ **C** $\frac{5}{512}$

- 4. 解不等式 $\sqrt{3-2x} > x$ 。
 - $\mathbf{A} \quad \{x \in \mathbf{R} \mid x < 1\}$

B $\{x \in \mathbb{R} \mid -3 < x < 1\}$

 $\mathbf{C} \quad \left\{ x \in \mathbf{R} \mid x \le \frac{3}{2} \right\}$

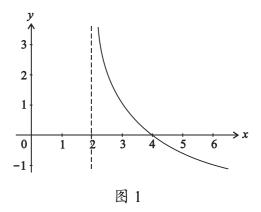
- $\mathbf{D} \quad \left\{ x \in \mathbf{R} \mid 0 < x \le \frac{3}{2} \right\}$
- 5. 图 1 所示为 $y = a + \log_b(x+c)$ 的图像, 其 中 a, b 及 c 为常数。若 x=2 为此曲线的 渐近线,以下何者正确?



B
$$a > 0, 0 < b < 1, c < 0$$

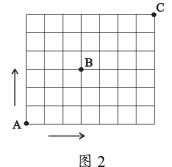
C
$$a > 0, b > 1, c > 0$$

D
$$a < 0, b > 1, c < 0$$



- 6. 晓明,晓强及晓华独立解一道数学题。若他们能解出该题的概率分别为 3, 1及 2, 求他们之间恰有两人能解出该题的概率。
- **B** $\frac{3}{10}$
- $C = \frac{5}{12}$

7. 一个小镇的街道为纵横交错的平行线,如图 2 所示。若伟强要从A经过B走到C, 且只能沿 着箭头的方向前进,有多少条路径?



108

 \mathbf{C} 700

D 1716

8. 己知 $\sin\left(\frac{\pi}{2} + \theta\right) = k$,求 $\sin\left(\frac{3\pi}{2} + 2\theta\right)$.

A
$$1-2k^2$$

B
$$2k^2-1$$

$$\mathbf{C} = 2k - 3$$

D
$$2k\sqrt{1-k^2}$$

9. $\epsilon \Delta ABC$ 中,若 $\frac{a+b+c}{\sin A+\sin C}=6$,求 ΔABC 的外接圆半径。

$$\mathbf{B}$$

$$\mathbf{C}$$

- **D** 6
- 10. 已知 $\frac{\pi}{4} < \alpha < \frac{\pi}{2}$ 且 $\sin \alpha \cos \alpha = \frac{2}{9}$, 求 $\cos \alpha \sin \alpha$ 的值。

A
$$-\frac{\sqrt{5}}{3}$$
 B $-\frac{\sqrt{2}}{3}$

$$\mathbf{B} \quad -\frac{\sqrt{2}}{3}$$

$$\mathbf{C} \quad \frac{\sqrt{2}}{3}$$

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

11. 已知 $\frac{\tan x}{1-\sec x} = -5$,求 $\frac{\tan x}{1+\sec x}$ 的值。

A
$$-\frac{1}{5}$$
 B $\frac{1}{5}$

$$\mathbf{B} \quad \frac{1}{5}$$

D 5

12. 求抛物线 $v = 2x^2 - 8x + 5$ 的焦点坐标。

A
$$\left(2, -\frac{5}{2}\right)$$

$$\mathbf{B} \quad \left(2, \ -\frac{7}{2}\right)$$

$$\mathbf{C} \quad \left(2, -\frac{23}{8}\right)$$

A
$$\left(2, -\frac{5}{2}\right)$$
 B $\left(2, -\frac{7}{2}\right)$ **C** $\left(2, -\frac{23}{8}\right)$ **D** $\left(2, -\frac{25}{8}\right)$

13. 将坐标轴按逆时针方向旋转 $\frac{2\pi}{3}$, 求点 P(1, 2) 在新坐标系中的坐标。

A
$$\left(\frac{2\sqrt{3}-1}{2}, \frac{-\sqrt{3}-2}{2}\right)$$

B
$$\left(\frac{1-2\sqrt{3}}{2}, \frac{\sqrt{3}-2}{2}\right)$$

$$\mathbf{C} \quad \left(\frac{1+2\sqrt{3}}{2}, \ \frac{2-\sqrt{3}}{2}\right)$$

D
$$\left(\frac{-1-2\sqrt{3}}{2}, \frac{\sqrt{3}-2}{2}\right)$$

- 14. 方程式 $4x^2-9y^2-16x+4y+29=0$ 的图像是 ______。
 - A 圆
- B 椭圆
- C 抛物线
- D 双曲线
- 15. 求极坐标方程式 $r = \frac{16}{3-5\sin\theta}$ 的直角坐标方程式。
 - **A** $3x^2 + 3y^2 5y 16 = 0$
- $\mathbf{B} \quad 3x^2 + 3y^2 5x 16 = 0$
- **C** $9x^2 + 16y^2 + 160y + 256 = 0$ **D** $9x^2 16y^2 160y 256 = 0$
- 16. 已知函数 $f(x) = \begin{cases} \frac{\ln(1+x)}{x}, & x \neq 0 \\ k, & x = 0 \end{cases}$ 在 x = 0 处连续,求常数k的值。

- 17. 已知曲线 $y=x^3+ax^2+2x+b$ 在点 (1, 0) 处的切线与直线 x+3y=5 互相垂 直, 求 b 的值。
 - $\mathbf{A} -2$
- $\mathbf{B} 1$
- $\mathbf{C} = 0$

- **D** 1
- 18. 一物体沿一直线运动,它在时间t的位移为 s(t)=(t-1)(t-3)(t-6)。求此物体最 后一次改变运动方向的时间。
- **B** $\frac{10+\sqrt{19}}{2}$ **C** $\frac{10-\sqrt{19}}{2}$
- 19. 已知 $f(x) = \int_{0}^{x} (1+\sin t) dt$, $0 \le x \le 2\pi$ 。 求 x 使得 f(x) 有最大值。

- $\mathbf{C} = \frac{3\pi}{2}$
- 2π

- 20. 已知 $\int f(x)dx = F(x) + C$, 求 $\int e^{-x} f(e^{-x}) dx$.
 - $\mathbf{A} F(e^{-x}) + C$

 $\mathbf{B} - F(x) + C$

 \mathbf{C} $F(e^{-x}) + C$

D F(x) + C

2018年度马来西亚华文独中统一考试

高中组

高级数学(II)

(SC07)

试卷二 作答题

日期: 2018年10月22日 时间: 9.45 a.m. - 11.45 a.m.

(2小时)

考生须知

(一) 本科试卷共分两份:

试卷一: 选择题 (40%); 试卷二: 作答题 (60%)。

(二) 试卷二 作答题 分四组:

甲组: 三角学 2题;

乙组: 代数 4题; 丙组: 解析几何 2题;

丁组: 微积分 4题。

全部 12 题,选答6题,惟每组最少选答1题,最多2题。

- (三) 每题必须用新的一张纸作答。
- (四) 只可用蓝色或黑色的原子笔书写,惟可用铅笔画图。
- (五) 不必抄题,惟试题号码必须书写清楚。
- (六) 所有演算必须清楚地写出。必要的几何图形必须画出。
- (七) 可使用所规定的电子计算机进行演算,除非题目限制。
- (八) 作答前,须在**积分表**(电脑卡)上正确填写考生编号及用 5B 铅笔 将对应的小方格涂黑。作答后,须根据所答题数在**试题号码**栏上 将有关小方格涂黑,并指出作答总数。
- (九) 答卷必须依试题号码次序排列,并且将**积分表**(电脑卡)置于上面,合订成一本。
- (十) 数学公式表在第2-4面。
- (十一) 试卷二作答题共印七面,最后一面空白。

未经正式宣布 不得翻看内页

(考生姓名:	考生编号:	

高级数学(II)/二

数学公式表

I. 代数

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

$$a^3 \pm b^3 = (a \pm b)(a^2 \mp ab + b^2)$$

$$\log_a xy = \log_a x + \log_a y$$

$$\log_a \frac{x}{y} = \log_a x - \log_a y$$

$$\log_a x^m = m \log_a x$$

$$\log_a x = \frac{a(1 - r^n)}{1 - r}$$

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

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

$$\frac{x}{2a} = \frac{2\log_b x}{\log_a x}$$

$$\frac{x}{2a} = \frac{2(1 - r^n)}{1 - r}$$

$$\frac{x}{2a} = \frac{x(1 - r^n)}{1 - r}$$

$$\frac{x}{2a}$$

Ⅱ. 三角学

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

$$1 + \tan^2\theta = \sec^2\theta$$

$$1 + \cot^2\theta = \csc^2\theta$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

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

$$\Delta = \sqrt{s(s-a)(s-b)(s-c)}, \quad s = \frac{a+b+c}{2}$$

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

$$\cos(A\pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\tan(A\pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

$$\sin(2A = 2\sin A \cos A$$

$$\cos(2A = \cos^2 A - \sin^2 A$$

$$= 2\cos^2 A - 1$$

$$= 1 - 2\sin^2 A$$

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

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

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

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

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

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

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

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

$$\cos(A+B)$$

III. 解析几何

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
分比公式 $\left(\frac{mx_2 + nx_1}{m + n}, \frac{my_2 + ny_1}{m + n}\right)$
三角形的面积 $= \frac{1}{2} |(x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3)|$
直线方程式 $y - y_1 = m(x - x_1)$
两直线的夹角 θ , $\tan \theta = \left|\frac{m_2 - m_1}{1 + m_2 m_1}\right|$
点到直线的距离 $= \left|\frac{4x_0 + By_0 + C}{\sqrt{A^2 + B^2}}\right|$
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离心率 $e = \frac{\sqrt{a^2 - b^2}}{a}$
焦点 $(\pm ae, 0)$
准线 $x \pm \frac{a}{e} = 0$
双曲线 标准式 $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$
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焦点 $(\pm ae, 0)$
准线 $x \pm \frac{a}{e} = 0$

IV. 微积分

$$\begin{split} &\lim_{x\to 0}\frac{\sin x}{x}=1 &\lim_{x\to 0}\frac{dv}{dx}+v\frac{du}{dx} &\int u\,dv=uv-\int v\,du \\ &\frac{d}{dx}\left(\frac{u}{v}\right)=v\frac{dv}{dx}-u\frac{dv}{dx} &\frac{dy}{dx}=\frac{dy}{du}\frac{du}{dx} \\ &\frac{d}{dx}f\left(g\left(x\right)\right)=f'\left(g\left(x\right)\right)g'\left(x\right) \\ &\frac{d}{dx}x^n=nx^{n-1} &\int x^n\,dx=\frac{x^{n+1}}{n+1}+C, \quad n\neq -1 \\ &\frac{d}{dx}\sin x=\cos x &\int \cos x\,dx=\sin x+C \\ &\frac{d}{dx}\tan x=\sec^2 x &\int \sin x\,dx=-\cos x+C \\ &\frac{d}{dx}\cot x=-\csc^2 x &\int \csc^2 x\,dx=-\cot x+C \\ &\frac{d}{dx}\cot x=-\csc^2 x &\int \csc^2 x\,dx=-\cot x+C \\ &\frac{d}{dx}\cos x=\frac{1}{x} &\int \frac{1}{x}dx=\ln\left|x\right|+C \\ &\frac{d}{dx}\log_a x=\frac{1}{x\ln a} &\int \frac{d^2}{dx}\sin^2 x=\frac{1}{x} \\ &\frac{d}{dx}\sin^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1-x^2}&\sin^2 x+C \\ &\frac{d}{dx}\sin^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1-x^2}&\sin^2 x+C \\ &\frac{d}{dx}\tan^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1-x^2}&\sin^2 x+C \\ &\frac{d}{dx}\tan^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1+x^2}&\sin^2 x+C \\ &\frac{d}{dx}\sin^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1+x^2}&\sin^2 x+C \\ &\frac{d}{dx}\sin^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1+x^2}&\sin^2 x+C \\ &\frac{d}{dx}\sin^2 x=\frac{1}{1+x^2} &\int \frac{dx}{1+x^2}&\sin^2 x+C \\ &\frac{dx}{1+x^2}&\sin^2 x+C \\ &\frac{dx}{1+x^2}&\frac{dx}{$$

甲组:三角学

(本组至少选答1题,最多2题。)

1. 图 1 的正棱锥 VABCD表示巴黎的著名地标罗浮 宫金字塔。底面 ABCD 为一边长 34 m 的正方形, M 为 AC 及 BD 的交点, 塔高 VM = 21.6 m。求

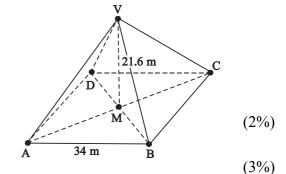


图 1

- (a) 侧棱 VA 的长度;
- (b) 三角形侧面 VAB 的面积;
- (c) 两个相邻侧面 VAB 与 VBC 的夹角。 (5%)
- (所有答案准确至两位小数)
- 2. (a) 证明 $\cos \theta \cos 3\theta + \cos 5\theta \cos 7\theta = 4\sin 4\theta \cos 2\theta \sin \theta$. 据此, 或用其他方法, 求方程式 $\cos\theta - \cos 3\theta + \cos 5\theta - \cos 7\theta = 0$ 的 一般解。 (7%)
 - (b) 不许使用计算机,求 $\tan\left(2\sin^{-1}\left(-\frac{2}{\sqrt{7}}\right)\right)$ 的值,答案以根式表示。 (3%)

乙组:代数

(本组**至少**选答1题, 最多2题。)

3. (a) 已知函数
$$f(x) = \frac{3x^2 - 2x + 1}{x^2 + 1}, x \in \mathbb{R}$$
, 求其值域。 (4%)

(b) 用数学归纳法证明对于所有 $n \in \mathbb{N}$,

$$\sum_{r=1}^{n} \frac{1}{4r^2 - 1} = \frac{n}{2n+1} .$$

据此, 求无穷级数 $\frac{1}{4\times 1^2-1} + \frac{1}{4\times 2^2-1} + \frac{1}{4\times 3^2-1} + \cdots$ 的和。 (6%) 4. (a) 已知 P(x) 为一个三次多项式。当 P(x) 除以 x^2+1 时,余式为 -6x+11。当 P(x) 除以 x^2-4x+3 时,余式为 3。求 P(x)。 (4%)

(b) 解方程式
$$7\sqrt{x-3} - 3 = x$$
. (4%)

(c) 证明
$$(\sim p \rightarrow q) \equiv (p \lor q)$$
。

5. (a) 解方程式
$$\left(\frac{1}{9}\right)^{x+\frac{1}{2}} - \left(\frac{1}{3}\right)^{x+1} - 24 = 0$$
. (4%)

(b) 已知
$$-\frac{1}{2} + \frac{\sqrt{3}}{2}i$$
 是方程式 $x^5 + x^3 - 6x^2 - 5x - 6 = 0$ 的一个根,求方程 式其余的根。

6. (a) 求级数
$$1^2 \times 2 + 2^2 \times 3 + \dots + n^2 \times (n+1)$$
 的和。 (5%)

(b) (i) 已知向量a及b,证明
$$4(\underline{a} \cdot \underline{b}) = |\underline{a} + \underline{b}|^2 - |\underline{a} - \underline{b}|^2$$
。 (2.5%)

(ii) 若
$$\underline{a} \perp \underline{b}$$
, 利用(i)的结果证明 $|\underline{a} + \underline{b}| = |\underline{a} - \underline{b}|$ 。 (2.5%)

丙组:解析几何

(本组至少选答1题,最多2题。)

- 7. (a) 一圆通过点 A(2, 0) 及 B(8, 0) 且与y轴相切,求此圆的方程式。 (5%)
 - (b) 从点P(-1, 1)发出的光线射到x轴上,被x轴反射,其反射光线l与圆 $(x-2)^2 + (y+1)^2 = 4$ 相切,求l的斜率。 (5%)
- 8. 已知直线 L: y = mx + c 及两个椭圆 $E_1: \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ 及 $E_2: \frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$, 其中 $a \neq b$ 。

(a) 若
$$L$$
 为 椭 圆 E_1 的 切线,证明 $c^2 = a^2 m^2 + b^2$ 。 (4%)

- (b) 若L为椭圆 E_2 的切线,写出a, b, c Q_m 的关系式。 (1%)
- (c) 求椭圆 E_1 及 E_2 的所有公切线。 (5%)

丁组: 微积分

(本组至少选答1题,最多2题。)

9. (a) 已知
$$f(x) = 2x^2 - 1$$
,利用导数的定义 $f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$ 证明 $f'(x) = 4x$ 。 (3%)

(b)
$$\exists \pm \frac{(x+2)^2}{3(x^3-1)} = \frac{A}{x-1} + \frac{Bx+C}{x^2+x+1}$$
.

(ii)
$$\not \stackrel{!}{R} \int \frac{(x+2)^2}{3(x^3-1)} dx$$
 (3%)

- - (b) 一长方形的两顶点在x轴上,另两顶点落在x轴上方的抛物线 $y = 25 x^2$ 上。求此长方形的最大面积。 (6%)
- 11. (a) 不许使用计算机,求 $\int_0^\pi \sin 2x \cos 3x \, dx$ 。 (4%)

(b)
$$\not \stackrel{|}{\times} \lim_{x \to \infty} \left(\frac{x}{x-1} \right)^x$$
 (3%)

- 12. (a) 已知一等边三角形的面积每秒钟增加 8√3 cm²。当其边长为 16 cm 时, 求边长的变率。 (3%)
 - (b) 不许使用计算机,求 $\int_0^{\pi} x \sin 2x \, dx$ 。 (3%)
 - (c) 用积分求椭圆 $x^2 + \frac{y^2}{4} = 1$ 在第一象限部分的面积。 (4%)