國 立 宜 蘭 大 學

104 學 年 度 轉 學 招 生 考 試

微 積 分 試 題

《作答注意事項》

1. Find the x value at which $f(x) = \csc 2x$ is not continuous. (A) $\dfrac{\pi}{6}$ (B) $\dfrac{\pi}{3}$ (C) $\dfrac{\pi}{2}$ (D) π

2. Find the derivative of the function of $\arcsin t^2$. (A) $\dfrac{2t}{\sqrt{1-t^2}}$ (B) $\dfrac{t}{\sqrt{1-t^4}}$ (C) $\dfrac{2t}{\sqrt{1-t^4}}$
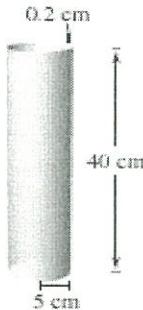
(D) $\dfrac{t}{\sqrt{1-t^2}}$

3. Find $\dfrac{dy}{dx}$ at $(0,2)$ for the equation of $x = 2\ln(y^2 - 3)$. (A) 0 (B) 1 (C) $\dfrac{1}{8}$ (D) $\dfrac{1}{2}$

4. A cylindrical shell with thickness 0.2 cm, height 40 cm, and radius 5 cm. Use differential to approximate the volume of the cylindrical shell. (A) $60\pi \text{ cm}^3$ (B) $70\pi \text{ cm}^3$ (C) $80\pi \text{ cm}^3$ (D) $90\pi \text{ cm}^3$

5. Find the limit of $\displaystyle\lim_{x \to 8^-} \dfrac{e^x}{(x-8)^3}$. (A) 1 (B) 0 (C) ∞ (D) $-\infty$

6. Find the limit of $\displaystyle\lim_{x \to \infty} \dfrac{x^2 + 3}{2x^2 - 1}$. (A) 1 (B) $\dfrac{1}{2}$ (C) ∞ (D) 3

7. Find the limit of $\displaystyle\lim_{x \to \infty} \dfrac{\ln x^4}{x^3}$. (A) 0 (B) ∞ (C) 1 (D) none

背面尚有試題

8. Evaluate $\int_{-1}^{1}(\sqrt[3]{t}-2)dt$. (A)1 (B)$\frac{1}{4}$ (C)-2 (D)-4

9. Evaluate $\int_{1}^{2}(\frac{3}{x^2}-1)dx$. (A)0 (B)$\frac{1}{2}$ (C)2 (D)3

10. Evaluate $\int_{0}^{2}\frac{x}{\sqrt{1+2x^2}}dx$. (A)1 (B)$\frac{1}{2}$ (C)2 (D)3

11. Evaluate $\int_{0}^{4\pi}\sqrt{1+\tan^2 x}\,dx$. (A)$\ln(\sqrt{2}+1)$ (B)$\ln(\sqrt{2})$ (C)0 (D)$\ln(\frac{\sqrt{2}}{2})$

12. Evaluate $\int_{0}^{\sqrt{3}/2}\frac{x^2}{(1-x^2)^{3/2}}dx$. (A)$\sqrt{3}-\frac{\pi}{3}$ (B)$\sqrt{2}-\frac{\pi}{3}$ (C)$\sqrt{3}/2-\frac{\pi}{3}$ (D)$\frac{\pi}{3}$

13. Solve the indefinite integral of $\int\sec^6 4x\tan 4x\,dx$. (A)$\frac{\tan^6 4x}{24}+C$ (B)$\tan^6 4x+C$

(C)$\sec^6 4x+C$ (D)$\frac{\sec^6 4x}{24}+C$

14. Find the volume of the solid formed by revolving the region bounded by the graphs

of $y=4x-x^2$, $y=4$, and $x=0$ about the y-axis. (A)$\frac{\pi}{2}$ (B)$\frac{8\pi}{3}$ (C)$\frac{2\pi}{3}$ (D)$\frac{\pi}{5}$

15. Find the area of the surface formed by revolving the graph of $f(x)=\frac{x^3}{6}+\frac{1}{2x}$ on the

interval [1 , 2] about the x-axis. (A)$\frac{\pi}{6}$ (B)$\frac{3\pi}{2}$ (C)$\frac{47\pi}{16}$ (D)$\frac{11\pi}{5}$

16. Find the radius of convergence of $\sum_{n=0}^{\infty}n!x^n$. (A)$R=0$ (B)$R=1$ (C)$R=2$ (D)$R=\infty$

17. Consider the function given by $f(x) = \sum_{n=1}^{\infty} \frac{x^n}{n}$. Find the intervals of convergence for $f'(x)$.

(A) $(-1,1)$ (B) $(-1,1]$ (C) $[-1,1)$ (D) $[-1,1]$

18. Find a geometric power series for $f(x) = \dfrac{5}{5+x^2}$, centered at 0.

(A) $\sum_{n=0}^{\infty} (-\frac{1}{5})^n x^{2n}$ (B) $\sum_{n=0}^{\infty} (-\frac{x}{2})^n$ (C) $\sum_{n=0}^{\infty} (-\frac{x}{5})^n$ (D) $\sum_{n=0}^{\infty} (-x)^n$

19. Find $\dfrac{\partial w}{\partial s}$ for $w = ze^{xy}$ where $x = s - t$, $y = s + t$ and $z = st$. (A) $e^{t^2}(2s^2 + 1)$ (B) $e^{s^2+t^2}(s^2 + 1)$ (C) $te^{s^2-t^2}$ (D) $te^{s^2-t^2}(2s^2 + 1)$

20. Find the length of the arc from $\theta = 0$ to $\theta = \pi$ for the cardioid $r = f(\theta) = 2 - 2\cos\theta$. (A)4 (B)8 (C)16 (D)32