

國立中山大學 102 學年度轉學考招生考試試題

科目名稱：微積分【海科系二年級】

題號：758001

※本科目依簡章規定「不可以」使用計算機

共 1 頁第 1 頁

注意事項：本試卷共 20 題填充題，每一題 5 分。

1. Find the limit $\lim_{\Delta x \rightarrow 0} \frac{\sin[(\pi/6) + \Delta x] - (1/2)}{\Delta x}$.
2. Find the second derivative of $h(t) = 10 \cos t - 15 \sin t$.
3. True or False? There is a relative maximum or minimum at each critical number.
4. Find the limit $\lim_{x \rightarrow -\infty} \frac{2x + 1}{\sqrt{x^2 - x}}$.
5. Find the indefinite integral $\int \frac{x^2}{\sqrt{x^3 + 3}} dx$.
6. Find $F(x) = \int_{-3}^x (t^2 + 3t + 2) dt$.
7. Find the limit $\lim_{x \rightarrow \infty} \tanh x$.
8. Find the derivative of $g(x) = 3 \arccos \frac{x}{2}$.
9. Find the arc length of the graph of the function $y = \frac{3}{2}x^{2/3}$ on $[1, 8]$.
10. Find the integral $\int \frac{\cos x}{\sin x + \sin^2 x} dx$.
11. Find the integral $\int x^3 \sin x dx$.
12. Determine the convergence or divergence of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1} \sqrt{n}}{n+2}$.
13. Find the Maclaurin series for the function $f(x) = \sqrt{1+x^2}$.
14. Find an equation of the parabola with vertex $(0, 5)$ and directrix $y = -3$.
15. Find the area of the surface formed by revolving the curve $r = 6 \cos \theta$, $0 \leq \theta \leq \frac{\pi}{2}$, about the polar axis.
16. Find the angle θ between the vectors $\mathbf{u} = \langle 10, -5, 15 \rangle$ and $\mathbf{v} = \langle -2, 1, -3 \rangle$.
17. Evaluate $\int (\ln t \mathbf{i} + t \ln t \mathbf{j} + \mathbf{k}) dt$.
18. Find the directional derivative of $f(x, y) = e^x \sin x$ at $P(0, 0)$ in the direction of $Q(2, 1)$.
19. True or False? Between any two relative minima of f , there must be at least one relative maximum of f .
20. Find the area of region inside the circle $r = 3 \cos \theta$ and outside the cardioid $r = 1 + \cos \theta$.

國立中山大學 102 學年度轉學考招生考試試題

科目名稱：英文【海科系二年級】

題號：758002

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I. 英翻中

1. The public officials need to do more to secure the public food safety in order to prevent foodborne illness. Guidelines of handling, preparation and storage of food must be established and chemicals that may cause severe health concerns must be prohibited from being used as food composition. (10 points)
2. HTC Corporation, a Taiwan based manufacturer, produces world leading smartphones and tablets. This company initially offered smartphones running on Microsoft's Windows Phone operating system and later its device, HTC Dream, was the first commercially available phone to run Android. (10 points)
3. Oceanography, a branch of Earth Science, also referred to as marine science and oceanology, is the discipline of studying the ocean. Oceanography is interdisciplinary, covering a wide range of topics, such as biology, chemistry, geology, meteorology, physics as well as geography. (10 points)
4. At Crocosaurus Cove, Darwin of North Australia, people may closely and safely encounter crocodiles by entering water in a transparent protective container called the Cage of Death. People in the cage can view the world's largest saltwater crocodiles face to face with a thrilling but safe experience. (10 points)
5. The Dongsha Marine National Park is an off-shore national park of Taiwan, located in the South China Sea about 445 km away from Kaohsiung and 340 km away from Hong Kong. The park is huge in area, 3,537 km² in total but only 1.74 km² of land, composed of the Dongsha Island and a circular atoll of 25 kilometres wide. Since 2013, a well equipped research station is set on the Dongsha Island. (10 points)
6. Flying fish is a group of marine fish, widely distributed all over the world in the tropical and subtropical waters. Flying fish can make gliding flight with the aid of their long wing-like fins for a considerable distance. Flying fish migrates and come to the Lanyu Island annually in spring, and the aboriginal people of Lanyu dress up to celebrate the launch of fishing season of flying fish. (10 points)
7. The Kuroshio, also known as "Black Tide" in Taiwan, is part of the North Pacific Ocean Gyre, a large system of rotating currents located between the equator and 50° N latitude. The Kuroshio flows northwards on the western side of the North Pacific Ocean, beginning off the east coast of the Philippines and merging with the North Pacific Current around Japan. (10 points)

II. 英文寫作

1. What is the reason to make you change your school? (15 points; no less than 100 words)
2. What is the reason to make you choose the Department of Oceanography, NSYSU, while decide to change your school? (15 points; no less than 100 words)