

(答案請寫於答案卷上)
需列計算過程,否則不予計分

填充計算題(總計10題,每題10分)

1. (10%) 求 $\lim_{n \rightarrow \infty} \frac{1}{n} \int_2^{2+n} e^{-x^2} dx =$ _____
2. (10%) 球之體積為內接於此球之最大圓柱之體積的 _____ 倍
3. (10%) 曲線 $y = e^{-x^2}$ 下凹(concave downward)之範圍為 _____
4. (10%) 求 $\lim_{x \rightarrow 1} (2-x)^{\tan \frac{1}{2}\pi x} =$ _____
5. (10%) 求 $\int_{-1}^1 \frac{dx}{x^2} =$ _____
6. (10%) 求 $\int_0^1 \frac{\tan^{-1} x}{1+x^2} dx =$ _____
7. (10%) 星形線(Asteroid) $x = a \cos^3 t, y = a \sin^3 t$ 所圍成之面積= _____
8. (10%) 求無窮級數之收斂區間為 _____
$$1 - \frac{x}{5\sqrt{2}} + \frac{x^3}{5^2\sqrt{3}} - \frac{x^5}{5^3\sqrt{4}} + \dots$$
9. (10%) 求 y 軸上的點(0,8)與拋物線 $x^2 - 8y = 0$ 之最短距離為 _____
10. (10%) 設 $u = (x-y)(y-z)(z-x)$, 則 $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} =$ _____