國立彰化師範大學105學年度<u>碩士班</u>招生考試試題

1. Find $\int x\sqrt{3x+1}\,dx.$ (10%)

2. Find $\int x^3 e^{-2x}\,dx.$ (10%)

3. 某鏡頭廠生產 x 萬個的總收入為：$R(x) = 125 + 2x + x^2$，總成本為：$C(x) = 100 - 2x + \frac{3}{2}x^2$，利潤$P(x) = R(x) - C(x)$，請問，生產多少個可得到最大利潤? (10%)

4. $y = \sqrt{\dfrac{(x+1)(x^2+2)}{(x-1)^2}}$, Find y'. (10%)

5. 求下列各函數的 $\dfrac{dy}{dx}$ (10%)

   (1) $y = \dfrac{x^3 + 2x + 5}{(x^2+1)^3}$; (2) $y = \left(x + \dfrac{1}{(3x+2)^2}\right)^3$

6. Evaluate $A = \int_1^5 \dfrac{x}{\sqrt{2x-1}}\,dx$ (10%)

7. Evaluate $\int \dfrac{\tan^3 x}{\sqrt{\sec x}}\,dx$ (10%)

8. Evaluate $\int_0^{\frac{\pi}{4}} \tan^4 x\,dx.$ (5%)

9. Show that the normal probability density function $f(x) = \dfrac{1}{\sqrt{2\pi}} e^{-x^2/2}$ has points of inflection when x=$\pm$1. (5%)

10. Differentiate $g(t) = \dfrac{-7}{(2t-3)^2}$ (10%)

11. Find the derivative of $y = \dfrac{3 - (1/x)}{x+5}$ (10%)