

台北醫學大學微積分第一次平時測驗命題紙

系級	授課教師	考試日期	學號	姓名
保健營養系	潘力誠			

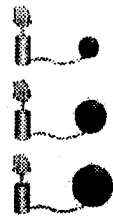
1. A radio manufacturer charges \$90 per unit for units that cost \$60 to produce. To encourage large orders from distributors, the manufacturer will reduce the price by \$0.01 per unit for each unit in excess of 100 units. (For example, an order of 101 units would have a price of \$89.99 per unit, and an order of 102 units would have a price of \$89.98 per unit.) This price reduction is discontinued when the price per unit drops to \$75. Express the profit P as a function of the order size x . (10%)

2. Let $f(x) = x^2 - 4x + 7$, and find derivative of $f(x)$ using limit notation. (10%)

3. Find the equation of the tangent line to the graph of $y = \frac{2x^2 - 4x + 3}{2 - 3x}$; when $x=1$. (10%)

4. Find the slope of the graph of $y^3 + y^2 - 5y - x^2 = -4$ at point $(1,1)$. (10%)

5. Air is being pumped into a spherical balloon at the rate of 4.5 cubic inches per minutes, as indicated in given figure. Approximate the rate of change of the radius when the radius is 2 inches. (10%)



6. Sketch and analyze the graph of $f(x) = \frac{6}{x^2 + 3}$. (10%)

7. The demand function for a product is modeled by $p = \sqrt{400 - x}$, $0 \leq x \leq 400$. (10%)

Use differentials to approximate the change in revenue as sales increase from 256 to 257 units.

8. In living organic material, the ratio of radioactive carbon isotopes to the total number of carbon atoms is about 1 to 1012. When organic material is dies, its radioactive carbon isotopes begin to decay, with a half-life of 5700

years. The formula for the ratio R of carbon isotopes to carbon atoms is

$$R = \left(\frac{1}{10^{12}}\right) \left(\frac{1}{2}\right)^{\frac{t}{5700}}$$

Find the ratio of R after 20,000 years of decay. (10%)

9. Find the slope of a logistic function $f(t) = \frac{1.25}{1 + 1.25e^{-0.4t}}$ at $t=10$. (10%)

10. Find the least square line for the given data. (10%)

X	y
10	84
20	71
30	80
40	73
50	60
60	52
70	56
80	46
90	36