台北醫學大學微積分第一次平時測驗命題紙

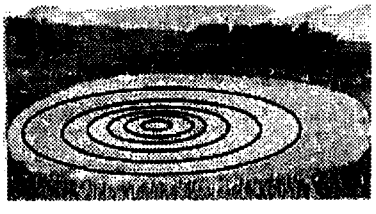
系級	授課教師	考試日期	學號	姓名
牙醫系	潘力誠			

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

2. 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%)

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

4. A pebble is dropped into a calm pool of water, causing ripples in the form of concentric circles, as shown in the figure below. The radius r of the outer ripple is increase at a constant rate of 1 foot per second. When the radius is 4 feet, at what rate is the total area A of the disturbed water changing? (10%)



5. Sketch and analyze the graph of $f(x)=\frac{1}{\sqrt{2\pi}}e^{-\frac{x^2}{2}}$. (10%)

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

7. In a research experiment, a population of fruit flies is increasing in accordance with the exponential growth model. After 2 days, there are 100 flies, and after 4 days, there are 300 flies. How many flies will there be after 54 days? (10%)

8. Approximate the root of $y = x^3 + 3x^2 - 5$, using Newton's method and $c_0 = 1$ as initial guess. (10%)

9. Find the slope of the graph $f(x) = \ln\left(x\left(x^2+1\right)^2\right)$, at x = 5. (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