

系所組別： 環境醫學研究所甲組

考試科目： 微積分

考試日期： 0308 · 節次： 2

※ 考生請注意：本試題 可 不可 使用計算機

1. Draw a sketch of the graph of the following equation:
 $(x-2y+3)(y-x^2)=0$ (10%)
2. If a point $P(x, y)$ is such that its distance from $A(3, 2)$ is always twice its distance from $B(-4, 1)$, find an equation which the coordinates of P must satisfy. (10%)
3. Given $f(x) = 1/(4x^3 + 5x^2 - 7x + 8)$ find $f'(x)$. (10%)
4. Given the equation $x^2 + y^2 = 9$, find :
 - (1) $D_x y$ by implicit differentiation, (5%)
 - (2) two functions defined by the equation, (5%)
 - (3) the derivative of each of the functions obtained in part (2) by explicit differentiation. (5%)
 - (4) Verify that the result obtained in part (1) agrees with the results obtained in part (3). (5%)
5. Draw a sketch of the graph of the total cost function C for which $C(x) = x^3 - 6x^2 + 13x + 1$
 - (1) Determine where the graph is concave upward and where it is concave downward. (10%)
 - (2) Find any points of inflection and equation of any inflectional tangent and draw a segment of the inflection tangent. (10%)
6. Find the area of the region bounded by the two curves $y = x^3 - 6x^2 + 8x$ and $y = x^2 - 4x$. (10%)
7. (1) Find the third-degree Taylor polynomial of the cosine function at $\pi/4$ and Lagrange form of the remainder. (10%)
(2) Use the result of (1) to compute an approximate value of $\cos 47^\circ$ and determine the accuracy of the result. (10%)