1. Sketch the graph of f(x)= $x^{1/3}(x+4)$, and indicate the extrema, inflection points, concavity, and asymptotes (if any). (20%)
2. Find $\frac{d}{dx}\left[x^{\sin x}\right]$. (10%)
3. Find $\int \sin^{-1} x dx$. (10%)
4. Find the length of the curve $y = x^{3/2} + 2$ from x = 0 to x = 5/9. (10%)
5. Determine whether the integral $\int_e^{\infty} \frac{dx}{\sqrt{x+1}\ln x}$ converges. (10%)
6. Find the Taylor series expansion of $f(x) = \sqrt{x+1}$ in powers of x and give the radius of convergence. (10%)
7. Maximize 3x – 2y + z on the sphere $x^2 + y^2 + z^2 = 1$. (10%)
8. Evaluate $\iint (x-y)\cos[\pi(x-y)]dxdy$ in the parallelogram bounded by $x+y=0, x+y=1, x-y=0, x-y=2$. (10%)
9. Calculate the total flux of $\vec{v} = 2x\vec{i} + xz\vec{j} + z^2\vec{k}$ out of the solid bounded by the paraboloid $z = 9 - x^2 - y^2$ and the xy-plane. (10%)

試題隨卷繳回