# Calculus II

2016/05/10

**考試注意事項：**

1. 答案紙直行對折，兩直欄書寫作答。
2. 無清楚計算過程，不予計分。

**試題：**

1. (15%) Determine whether the series $\sum_{n=1}^{\infty}(-1)^{n-1}\frac{n^2+1}{2^n}$ is absolutely convergent, conditional convergent, or divergent.
2. (15%) Determine whether the series $\sum_{n=1}^{\infty}(-1)^{n-1}\frac{2^{n+3}}{(n+1)^n}$ is absolutely convergent, conditional convergent, or divergent.
3. (15%) Find the radius of convergence and the interval of convergence of $\sum_{n=1}^{\infty}\frac{x^n}{n}$.
4. (15%) Find the Taylor series for $f(x)=\ln x$ at 1.
5. (10%) Find the volume of the parallelepiped determined by the vectors $\mathbf{a}=\mathbf{i}+2\mathbf{j}+3\mathbf{k}$, $\mathbf{b}=\mathbf{i}-\mathbf{j}+\mathbf{k}$, and $\mathbf{c}=3\mathbf{i}+\mathbf{j}-2\mathbf{k}$.
6. (10%) Find an equation of the plane containing the points $P(3,-1,1)$, $Q(1,4,2)$, and $R(0,1,4)$.
7. (10%) Find parametric equations for the tangent line to the helix with parametric equations
$$x=3\cos t \quad y=2\sin t \quad z=t$$
at the point where $t=\pi/6$.
8. (10%) Evaluate $\int_0^1 \mathbf{r}(t)\,dt$ if $\mathbf{r}(t)=t^2\mathbf{i}+\frac{1}{t+1}\mathbf{j}+e^{-t}\mathbf{k}$.