

補足教育部規定 18 週上課時數：2012 年 1 月 7 日 (週六)
9:00 - 12:00 補課

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。
3. 此次考試，禁用 L'Hôpital's rule (羅必達規則)。

試題：

1. (15%) Evaluate the limit by interpreting it as the limit of a Riemann sum of a function on the interval on $[a, b]$:

$$\lim_{n \rightarrow \infty} \frac{\pi}{2n} \sum_{k=1}^n \cos\left(\frac{k\pi}{2n}\right); \quad \left[0, \frac{\pi}{2}\right].$$

2. (15%) Evaluate $\lim_{h \rightarrow 0} \frac{1}{h} \int_2^{2+h} \sqrt{5+t^2} dt$.
3. (15%) Find the area of the region bounded by the graphs of $y = \cos x$ and $y = (2/\pi)x - 1$ and the vertical lines $x = 0$ and $x = \pi$.
4. (15%) Find the arc length of the graph of the following equation from P to Q :

$$x = \frac{1}{4}y^4 + \frac{1}{8y^2}; \quad P\left(\frac{3}{8}, 1\right), \quad Q\left(\frac{129}{32}, 2\right)$$

5. (10%) Find the indefinite integral: $\int \frac{\sin \sqrt{x}}{\sqrt{x}} dx$.
6. (10%) Find the volume of the solid that is obtained by revolving the region bounded by $y = x^2$, $y = x^3$, $x = 0$ and $x = 1$ about the y -axis.
7. (10%) The region under the graph of $y = -x^3 + 3x^2$ on $[0, 3]$ is revolved about the y -axis. Find the volume of the resulting solid.
8. (10%) Find the area of the surface obtained by revolving the graph of $f(x) = \sqrt{x}$ on the interval $[0, 2]$ about the x -axis.