1. Conjugate harmonic function of $\ln(x^2 + y^2)$ is:
   - ○ $5\cot^{-1}\left(\frac{2x}{y}\right)$
   - ○ $2\cot^{-1}\left(\frac{y}{x}\right)$
   - ○ $5\tan^{-1}\left(\frac{2x}{y}\right)$
   - ◉ $2\tan^{-1}\left(\frac{y}{x}\right)$

2. Value of the integral $\int_0^{1+i}(x - y + ix^2)dz$
   - ○ $\frac{5}{2} + \frac{5}{7}i$
   - ○ $\frac{3}{2} + \frac{5}{6}i$
   - ◉ $-\frac{1}{2} + \frac{5}{6}i$
   - ○ $\frac{1}{2} + \frac{1}{6}i$

3. Evaluate $\int_{[z1,z2]}(x^2 + y^2)dz$ where $z1 = 2 + i, z2 = -1 - i$
   - ○ $-6 - \frac{1}{3}i$
   - ◉ $-4 - \frac{8}{3}i$
   - ○ $-1 - \frac{2}{3}i$
   - ○ $-3 - \frac{4}{3}i$

4. The line integral $\oint z^2 dz$ where C is the parabolic path of $y = 2x^2$ is

◉ $-\frac{1}{3}(11 + 2i)$

○ $\frac{4}{3}(5 - 2i)$

○ $\frac{2}{5}(3 + 7i)$

○ $\frac{2}{3}(-13 + 5i)$

5. Evaluate the limit of $\lim_{z \to i} \frac{z^3+(1-3i)z^2+(i-3)z+2+i}{z-i}$ using L'Hospital's rule.

○ i

○ $\frac{i}{3}$

○ 3

◉ 3i