1. Evaluate $\int\limits_{(0,1)}^{(2,5)}(3x+y)dx+(2y-x)dy$ along

   (a) the curve $y=x^2+1$

   (b) the straight line joining $(0,1)$ and $(2,5)$

   (c) the straight lines from $(0,1)$ to $(0,5)$ and then from $(0,5)$ to $(2,5)$

   (d) the straight lines from $(0,1)$ to $(2,1)$ and then from $(2,1)$ to $(2,5)$.

2. Evaluate $\oint\limits_{C}(x+2y)\,dx+(y-2x)dy$ around the ellipse C defined by $x=4\cos\theta$,

   $y=3\sin\theta,\ 0\le\theta\le2\pi$ if C is described in a counterclockwise direction.

3. Evaluate $\int\limits_{C}(x^2-iy^2)dz$ along

   (a) the parabola $y=2x^2$ from $(1,1)$ to $(2,8)$

   (b) the straight lines from $(1,1)$ to $(1,8)$ and then from $(1,8)$ to $(2,8)$

   (c) the straight line from $(1,1)$ to $(2,8)$.

4. Evaluate $\oint\limits_{C}|z|^2 dz$ around the square with vertices at $(0,0),(1,0),(1,1),(0,1)$.

5. Evaluate $\int\limits_{C}(z^2+3z)dz$

   (a) along the circle $|z|=2$ from $(2,0)$ to $(0,2)$ in a counter clockwise direction.

   (b) the straight line from $(2,0)$ to $(2,2)$ and then from $(2,2)$ to $(0,2)$.

6. Evaluate $\int\limits_{i}^{2-i}(3xy+iy^2)dz$

   (a) along the straight line joining $z=i$ and $z=2-i$

   (b) along the parabola $x=2t-2,\ y=1+t-t^2$.

7. Evaluate $\oint\limits_{C}(\bar{z})^2 dz$ around the circles (a) $|z|=1$ and (b) $|z-1|=1$.

8. Evaluate $\oint\limits_{C}\dfrac{dz}{z-2}$ around (a) the circle $|z-2|=4$ (b) the circle $|z-1|=9$.

9. Evaluate $\oint_C \left(5z^4 - z^3 + 2\right) dz$ around the circle $|z| = 1$.

(Cauchy's Integral Formula)   <u>**PART B**</u>

1. Evaluate $(a) \oint_C \dfrac{\sin \pi z^2 + \cos \pi z^2}{(z-1)(z-2)} dz \quad (b) \oint_C \dfrac{e^{2z}}{(z+1)^4} dz$

   where C is the circle $|z| = 3$.

2. Evaluate $\oint_C \dfrac{e^z}{(z^2 + \pi^2)^2} dz$

   where C is the circle $|z| = 4$.

3. Evaluate $\oint_C \dfrac{e^{3z}}{z - \pi i} dz$

   where C is the circle $|z - 1| = 4$.

4. Evaluate $\dfrac{1}{2\pi i} \oint_C \dfrac{e^{zt}}{(z^2 + 1)^2} dz$ if $t > 0$ and C is the circle $|z| = 3$.