

BRAC University
MAT-215
Practice Sheet # 4 (PART A)

1. Evaluate $\int_{(0,1)}^{(2,5)} (3x + y)dx + (2y - x)dy$ 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 $\oint_C (x + 2y)dx + (y - 2x)dy$ around the ellipse C defined by $x = 4\cos\theta$, $y = 3\sin\theta$, $0 \leq \theta \leq 2\pi$ if C is described in a counterclockwise direction.
3. Evaluate $\int_C (x^2 - iy^2)dz$ 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 $\oint_C |z|^2 dz$ around the square with vertices at $(0,0), (1,0), (1,1), (0,1)$.
5. Evaluate $\int_C (z^2 + 3z)dz$
 - (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 $\int_i^{2-i} (3xy + iy^2)dz$
 - (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 $\oint_C (\bar{z})^2 dz$ around the circles (a) $|z| = 1$ and (b) $|z - 1| = 1$.
8. Evaluate $\oint_C \frac{dz}{z - 2}$ around (a) the circle $|z - 2| = 4$ (b) the circle $|z - 1| = 9$.
9. Evaluate $\oint_C (5z^4 - z^3 + 2)dz$ around the circle $|z| = 1$.