

Class - 8

**Problems on Taylor's and Maclaurin's series for a function of two variables
continued**

1. Expand $f(x, y) = \cos(2x + y) + 3\sin(x + y)$ about the origin upto second degree terms. **Ans:** $1 + 3x + 3y - 2x^2 - 2xy - \frac{1}{2}y^2$
2. Find the Taylor polynomial of degree 2 at the point $(1, \frac{\pi}{2})$ for the function $f(x, y) = xy^2 + \cos xy$.
Ans: $\frac{\pi^2}{4} + \left(\frac{\pi^2}{4} - \frac{\pi}{2}\right)(x - 1) + (\pi - 1)\left(y - \frac{\pi}{2}\right) + \left(y - \frac{\pi}{2}\right)^2 + (\pi - 1)(x - 1)\left(y - \frac{\pi}{2}\right) + \dots$
3. Expand the function $f(x, y) = x^2 + xy - y^2$ by Taylor's theorem in powers of $(x-1)$ and $(y+2)$.
Ans: $-5 + 5(y + 2) + (x - 1)^2 + (x - 1)(y + 2) - (y + 2)^2$