

MA 22400 – EXAM 2

TRAPEZOIDAL RULE

$$\int_a^b f(x)dx \equiv \frac{\Delta x}{2} \left[f(x_1) + 2f(x_2) + 2f(x_3) + \cdots + 2f(x_n) + f(x_{n+1}) \right],$$

where $a = x_1, x_2, x_3, \dots, x_{n+1} = b$ subdivides $[a, b]$ into n equal subintervals of length $\Delta x = \frac{b-a}{n}$.

THE SECOND PARTIALS TEST

Suppose f is a function of two variables x and y , and that all the second-order partial derivatives are continuous. Let

$$D = f_{xx}f_{yy} - (f_{xy})^2$$

and suppose (a, b) is a critical point of f .

1. If $D(a, b) < 0$, then f has a saddle point at (a, b) ,
2. If $D(a, b) > 0$ and $f_{xx}(a, b) < 0$, then f has a relative maximum at (a, b) .
3. If $D(a, b) > 0$ and $f_{xx}(a, b) > 0$, then f has a relative minimum at (a, b) .
4. If $D(a, b) = 0$, the test is inconclusive.