

Marking scheme

1. Each partial derivative = 2 pts, formula for df = 2 pts, new value = 2 pts
2. Check IFT = 4 pts, Each derivative = 3 pts.
3. f' = 4 pts, f'' = 6 pts
4. gradient = 5 pts, vector orthogonal to the gradient = 5 pts
5. knowledge of the fact $f' \cdot g' = 1$ = 5 pts. Expected solution will be trapped in the trap: $f'(x) = 1/g'(x)$. Trapped solution = 5 pts.
6. Statement of the Young's theorem = 4 pts. Point b = 6 pts. For intuitive (wrong) answer $H = 2A$ 2 points.

Partial credit is given!