UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

DEPARTMENT OF MATHEMATICAL SCIENCES

MA 376 OPTIMIZATION TECHNIQUES

Date: August, 2022 **Quiz One** ***Time***: 1hr 45min

Leave all answers to 4 d.p.

1. Define convex function
2. Examine whether the $f(x_1, x_2)$ is convex or concave and hence find the point of optima:

$$f(x_1, x_2) = x_1^3 + x_2^3 - 2x_1^2 + 3x_2^2 - 8$$

3. Minimize $f(x) = 0.65 - \dfrac{0.75}{1+x^2} - 0.65x\tan^{-1}\left(\dfrac{1}{x}\right)$ using the Coggin's Method. Terminate the search when $\left|\tilde{x}_{k+1}^* - \tilde{x}_k^*\right| < 0.01$ and take initial guess $x^{(0)} = 0$ and initial step length $\Delta x = 0.1$