Please show **all** your work! Answers without supporting work will not be given credit.
Clearly mention what theorem(s), if any, you are using.
Write answers in spaces provided.
You have 12 minutes to complete this Quiz.
You can get MAXIMUM $(10)+(5+5)=20$ marks.

Name:

1. Use Lagrange multiplier to determine both the maximum and minimum of the function $f(x,y,z)=x^2-y^2$ with the constraint $x^2+2y^2+3z^2=1$.

2. Consider the function $f(x,y)=4+x^3+y^3-3xy$.

   (a) Find all the critical points of f.

   (b) Classify the critical points as local maxima, local minima, or saddle point.