Name and Surname   : _____

ID#   : _____

Show all your work. Correct answers without enough explanation will not be graded.

QUESTION:
(10pts) **Q.1.**   The temperature at a point (x, y, z) is given by $T(x, y, z) = 200 \, e^{-x^2 - 3y^2 - 9z^2}$ where T is measured in $^{\circ}C$ and x, y, z in meters.
a) Find the rate of change of temperature at the point $P(2, -1, 2)$ in the direction toward to the point $Q(3, -3, 3)$.

b) In which direction does the temperature increase fastest at P?

c) Find the maximum rate of change at P.