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

a.) Find all critical points.

b.) Classify the points as to being local maximum,local minimum values or saddle points.

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

a.) Find all critical points.

b.) Classify the points as to being local maximum,local minimum values or saddle points.

3.) Set up the integral and use it to find the volume bounded by planes $x = 1$, $y = 2$, $x = -1$, $y = 0$, and $z = 3$ and $z = -1$

4.) Find the volume of the solid in the first octant volume bounded by the cylinder $x^2 + y^2 = 9$ and $z = 1$.

5.) Find the volume of the solid in the first octant volume bounded by the cylinder $x + y = 1$ and $z = 1$.

6.) Setup the triple integral to find the volume inside the paraboloids $z = 8 - x^2 - y^2$. and $z = x^2 + 3y^2$. You need not evaluate,evaluation is xtra.