

Worksheet #15; date: 03/08/2018
MATH 53 Multivariable Calculus

1. (*Stewart 14.6.55*) Are there any points on the hyperboloid $x^2 - y^2 - z^2 = 1$ where the tangent plane is parallel to the plane $z = x + y$?
2. (*Stewart 14.6.61*) Show that the sum of the x -, y -, and z -intercepts of any tangent plane to the surface $\sqrt{x} + \sqrt{y} + \sqrt{z} = \sqrt{c}$ is a constant.
3. (*Stewart 14.6.63*) Find parametric equations for the tangent line to the curve of intersection of the paraboloid $z = x^2 + y^2$ and the ellipsoid $4x^2 + y^2 + z^2 = 9$ at the point $(-1, 1, 2)$.
4. (*Stewart 14.7.19*) Find the local maximum and minimum values and saddle point(s) of the function.

$$f(x, y) = y^2 - 2y \cos x.$$

5. (*Stewart 14.7.21*) Show that $f(x, y) = x^2 + 4y^2 - 4xy + 2$ has an infinite number of critical points and that $D = 0$ at each one. Then show that f has a local (and absolute) minimum at each critical point.
6. (*Stewart 14.7.45*) Find three positive numbers whose sum is 100 and whose product is a maximum.