Tangent Planes and Normal Lines
1. Find the equations of the tangent plane and normal line to the surface given by 
   \[ x(z^2 - y) - e^{x^3y} = 107 \] at the point \((6, -2, 4)\).

2. Find the point(s) on the surface \(x^2 + 6y^2 - 3z^2 = -6\) where the tangent plane is parallel to the plane \(2x - y - 4z = 2\).

Relative Extrema
For problems 3 & 4 find and classify all the critical points of the given function.

3. \(h(x, y) = x^4 - 2xy^2 - 8x^2 + 6y^2\)

4. \(g(x, y) = \frac{x^3 - 4x^2 - 2x}{y^2 + 10}\)

Absolute Extrema
5. Find the absolute extrema of \(f(x, y) = 2x(6 + xy + 2y^3)\) on the triangle with vertices \((0,0), (6,12)\) and \((6,-3)\).

Lagrange Multipliers
For problems 6 – 8 use Lagrange Multipliers to find the maximum and minimum values of the function subject to the given constraint.

6. \(f(x, y) = 4x^2 - 3y^2 \quad ; \quad x^4 + y^4 = 16\)

7. \(f(x, y, z) = xyz \quad ; \quad y^2 + 2z^2 - 2x = 32\)
   For this problem assume \(x \leq 0\). Why is this assumption important? And yes I do expect you to answer this.

8. \(f(x, y, z) = 3x - 4y - z^2 \quad ; \quad x^2 + y^2 + z^2 = 25\)