1. Find the equation of the tangent plane to \(f(x, y) = xy^2e^{x-y}\) when \((x, y) = (-2, -3)\).

2. Use spherical coordinates to find 
\[
\lim_{(x,y,z)\to(0,0,0)} \frac{\sin(x^2 + y^2 + z^2)}{x^2 + y^2 + z^2}
\]

3. A particle starts at the origin with an initial velocity of \((1, -1, 3)\). Its acceleration is \(\vec{a}(t) = \langle 6t, 12t^2, -6t \rangle\).
   (a) Find its position function \(\vec{r}(t)\).
   (b) Find and simplify the tangential and normal components of the acceleration, \(\vec{a}(t)\), at time \(t = 1\).

4. The following are contour plots of 
\(z = xy, z = x^2 + y^2, z = x^2 + y^2, z = 4x^2 + y^2, z = x^2, z = y^2, z = x + y, z = x - y\) and \(z = x^2 - y^2\). Match the plot to the function.

5. For the curve \(\vec{r}(t) = \langle \sin(t), \cos(t), t\sqrt{3} \rangle\), find the vectors \(\vec{T}, \vec{N}\) and \(\vec{B}\) at the point \((1/\sqrt{2}, 1/\sqrt{2}, \pi\sqrt{3}/4)\).
   [Since we are at a point, the final vectors \(\vec{T}, \vec{N}\) and \(\vec{B}\) should be independent of \(t\).]