(1) Find an equation for the sphere, centered at the point \( \langle 1, 2, 3 \rangle \) and tangent to the \( xz \)-plane.

\[
(x - 1)^2 + (y - 2)^2 + (z + 3)^2 = 4
\]

(2) There is just one level curve (= contour) for the function \( f(x, y) = 3x^2 + y - 2 \) that goes through the point \( \langle 1, 3 \rangle \). Give an equation for, and sketch, this level curve.

This is the level curve corresponding to the \( z \)-value \( f(1, 3) = 4 \), and thus has equation \( 4 = 3x^2 + y - 2 \), or \( y = 6 - 3x^2 \). This is the parabola whose \( y \)-intercept is \( \langle 0, 6 \rangle \), and whose \( x \)-intercepts are \( \langle \pm \sqrt{2}, 0 \rangle \).