INTERSECTIONS & TANGENTS

For each problem below, graph in two dimensions the cross-section of the given surface and plane. Next, at the indicated point, find the equation for the tangent line and add it to your graph. Label your horizontal and vertical axes and the point P appropriately.

1. $z = f(x, y) = x^2 + y^2$
   $x = 2$
   $P = (1,5)$

2. $z = f(x, y) = x^2 + y^2$
   $y = 1$
   $P = (2,5)$

3. $z = f(x, y) = x^2 - y^2$
   $x = 2$
   $P = (-1,3)$

4. $z = f(x, y) = x + 2y + 3$
   $y = -1$
   $P = (0,1)$

5. $z = f(x, y) = x^2 y^3$
   $y = 1$
   $P = (1,1)$