<u>Problems</u>:

① State the quadratic surface and describe the trace obtained by intersecting with the given plane

a) $x^2 + \left(\frac{y}{4}\right)^2 + z^2 = 1$, $y = 0$

b) $\left(\frac{x}{3}\right)^2 + \left(\frac{y}{5}\right)^2 - 5z^2 = 1$, $y = 1$

c) $y = 3x^2$, $z = 27$

② Sketch the given surface (and identify it)

a) $x^2 + y^2 - z^2 = 1$

b) $z = \left(\frac{x}{4}\right)^2 + \left(\frac{y}{5}\right)^2$

c) $z^2 = \left(\frac{x}{4}\right)^2 + \left(\frac{y}{8}\right)^2$

③ Sketch contour map for $f(x,y)$, show at least 5 level curves

a) $f(x,y) = x + y$ b) $f(x,y) = x^2 - y$ c) $f(x,y) = xy$

④ Sketch level surfaces for:

$$f(x,y,z) = x^2 + y^2 - z^2, \quad T = 0, 1, 2, -1, -2$$