Math. 2008–2009 B, Winter 2013 – Assignment #1
Due Wednesday February 13, in the tutorial

1. Find symmetric equations for the line of intersection of the planes $z = 2x - y - 3$ and $z = 4x + 3y - 3$.

2. Find an equation of the plane that passes through the point $(1, 3, 2)$ and contains the line
$$L: \; x - 1 = \frac{y+1}{-2} = \frac{z-3}{2}.$$

3. Find the equation of the osculating circle of the curve of intersection of the parabolic cylinders $x = y^2$ and $z = x^2$ at the point $(1, -1, 1)$.

4. A ball with mass 0.6 kg is thrown northward into the air with a speed of 40 m/s at an angle of 60^o to the ground. An east wind applies a steady force of 6 N to the ball in the westerly direction. Where does the ball land and with what speed?

5. A ball rolls off a table with a speed of 2 m/s. The table is 1.5m high.
   a) Determine the point at which the ball hits the floor and find its speed at the instant of impact.

   b) Suppose the ball rebounds from the floor at the same angle with which it hits the floor, but losses 40% of its speed due to energy absorbed by the ball on impact. Where does the ball strike the floor on the second bounce?

6. Show that the following limit does not exist:
$$\lim_{(x,y)\to(-1,2)} \frac{2xy - 2x + 2}{x^2 + y^2 - 2y - 1}.$$