

**M20550 Calculus III Tutorial  
Worksheet 2**

1. Find an equation of the plane passes through the point  $(1, 1, -7)$  and perpendicular to the line  $x = 1 + 4t$ ,  $y = 1 - t$ ,  $z = -3$ .
2. Let  $\ell$  be the line of intersection of the planes given by equations  $x - y = 1$  and  $x - z = 1$ . Find an equation for  $\ell$  in the form  $\mathbf{r}(t) = \mathbf{r}_0 + t\mathbf{v}$ .
3. How many times does the particle  $\mathbf{r}(t) = \langle t^2 + 1, 2t^2 - 1, 2 - 3t^2 \rangle$  hit the plane  $2x + 2y + 3z = 3$ ? What is the point(s) of intersection?
4. Let  $P$  be a plane with normal vector  $\langle -2, 2, 1 \rangle$  passing through the point  $(1, 1, 1)$ . Find the distance from the point  $(1, 2, -5)$  to the plane  $P$ .
5. Find an equation of the plane that passes through the point  $(1, 2, 3)$  and contains the line  $\frac{1}{3}x = y - 1 = 2 - z$ .
6. Find a vector function that represents the curve of intersection of the cylinder  $x^2 + y^2 = 9$  and the plane  $x + y - z = 5$ .