

## 1 Problem Class, 10 Oct

### 1.1 Question 1

Is the flow

$$\mathbf{u} = (x^3y + \sin x)e^z\mathbf{i} + (-y \cos x + x^2y^2)e^z\mathbf{j} - 5x^2ye^z\mathbf{k} \quad (1)$$

incompressible?

### 1.2 Question 2

Find a streamfunction for the motion with velocity field

$$\mathbf{u} = (x + 6y)\mathbf{i} - (2x + y)\mathbf{j} \quad (2)$$

and sketch some of the streamlines. Sketch in a solid body that is compatible with this flow.

### 1.3 Question 3

Find a streamfunction for the motion with velocity field

$$\mathbf{u} = \sin x\mathbf{i} - y \cos x\mathbf{j} \quad (3)$$

and sketch some of the streamlines. Sketch in a solid body that is compatible with this flow.