No sketch needed: this is a purely mathemaical exercise.

1)

a) $\vec{\nabla} \times \vec{F} = \begin{vmatrix} \hat{x} & \hat{y} & \hat{z} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ x & y & z \end{vmatrix} = 0$ thus F is conservative and a potential exists

b) $\vec{F} = -\vec{\nabla} V \rightarrow$

$$\frac{\partial}{\partial x} V = -x \rightarrow V = -\frac{1}{2}x^2 + f(y,z)$$
$$\frac{\partial}{\partial y} V = -y \rightarrow V = -\frac{1}{2}y^2 + g(x,z)$$
$$\frac{\partial}{\partial z} V = -z \rightarrow V = -\frac{1}{2}z^2 + h(x,y)$$

Thus, we can take: $V(x,y,z) = -\frac{1}{2}x^2 - \frac{1}{2}y^2 - \frac{1}{2}z^2 + C$

With C any constant we like.

2)

a) $\vec{\nabla} \times \vec{F} = \begin{vmatrix} \hat{x} & \hat{y} & \hat{z} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ y & x & z \end{vmatrix} = 0\hat{x} - 0y + \left(\frac{\partial}{\partial x}x - \frac{\partial}{\partial y}y\right)\hat{z} = 0$

thus F is conservative and a potential exists.

b) $\vec{F} = -\vec{\nabla} V \rightarrow$

$$\frac{\partial}{\partial x} V = -y \rightarrow V = -xy + f(y,z)$$
$$\frac{\partial}{\partial y} V = -x \rightarrow V = -xy + g(x,z)$$
$$\frac{\partial}{\partial z} V = -z \rightarrow V = -\frac{1}{2}z^2 + h(x,y)$$

Thus, we can take: $V(x,y,z) = -xy - \frac{1}{2}z^2 + C$

With C any constant we like.

