

## Exercise 2

Let  $\phi(\mathbf{x})$  be any  $C^2$  function defined on all of three-dimensional space that vanishes outside some sphere. Show that

$$\phi(\mathbf{0}) = - \iiint \frac{1}{|\mathbf{x}|} \Delta \phi(\mathbf{x}) \frac{d\mathbf{x}}{4\pi}.$$

The integration is taken over the region where  $\phi(\mathbf{x})$  is not zero.