

**Special Problem 2-4.10**

Consider the vector field  $\mathbf{A}(\bar{\mathbf{r}})$ :

$$\mathbf{A}(\bar{\mathbf{r}}) = \rho^3 \hat{\mathbf{a}}_\rho + (\rho - z) \hat{\mathbf{a}}_\phi + \rho z \phi \hat{\mathbf{a}}_z$$

The value of this vector field, at the point denoted by position vector  $\bar{\mathbf{r}}_1$ , is:

$$\mathbf{A}(\bar{\mathbf{r}}_1) = 27 \hat{\mathbf{a}}_\rho + 2 \hat{\mathbf{a}}_\phi + \pi \hat{\mathbf{a}}_z$$

Determine position vector  $\bar{\mathbf{r}}_1$  (in terms of Cartesian base vectors).