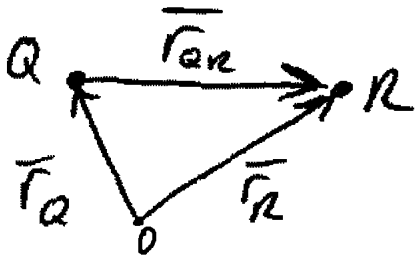
PE1.2 Given points $P(1, -3, 5)$, $Q(2, 4, 6)$, and $R(0, 3, 8)$, find (a) the position vectors of P and R, (b) the distance vector $\bar{r}_{QR}$, and (c) the distance between Q and R.

- Assume units of meters.

a) $\bar{r}_P = 1\hat{a}_x - 3\hat{a}_y + 5\hat{a}_z$ (m)

$\bar{r}_R = 3\hat{a}_y + 8\hat{a}_z$ (m)

b)



$\bar{r}_{QR} + \bar{r}_Q = \bar{r}_R \Rightarrow \bar{r}_{QR} = \bar{r}_R - \bar{r}_Q$

$\bar{r}_{QR} = (3\hat{a}_y + 8\hat{a}_z) - (2\hat{a}_x + 4\hat{a}_y + 6\hat{a}_z)$

$\bar{r}_{QR} = -2\hat{a}_x - \hat{a}_y + 2\hat{a}_z$ (m)

c) the distance between Q and R

$\text{distance} = |\bar{r}_{QR}| = \sqrt{(-2)^2 + (-1)^2 + (2)^2} = \sqrt{9}$

$|\bar{r}_{QR}| = 3$ (m)