real-world-physics-problems.com
Jan. 27, 2020

This is a 2-D problem involving position and displacement.

A particle has the following coordinates initially: $x = 4.5\ m$, $y = -3.5\ m$. Some time later the coordinates are: $x = -1.5\ m$, $y = 2.0\ m$.

(a) Find the displacement vector of the particle.

(b) Sketch the initial, final, and displacement vector of the particle.

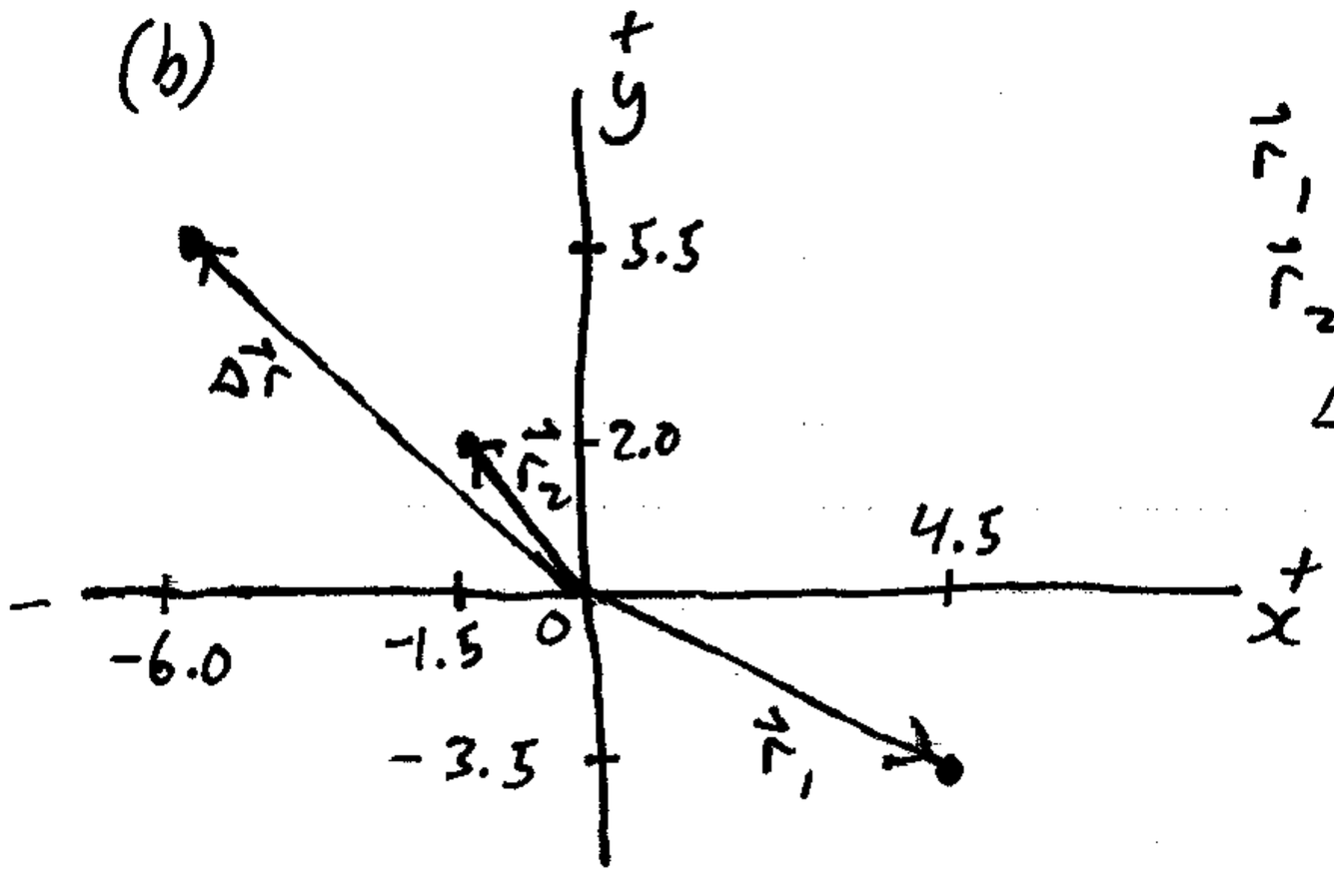
Solution:

(a) $\Delta\vec{r} = \vec{r}_2 - \vec{r}_1$,

$\Delta\vec{r} = -1.5\,\hat{i} + 2.0\,\hat{j} - (4.5\,\hat{i} - 3.5\,\hat{j})$ (units in m)

$\Delta\vec{r} = -6.0\,\hat{i} + 5.5\,\hat{j}$ (answer)

(b)



$\vec{r}_1 = 4.5\,\hat{i} - 3.5\,\hat{j}$

$\vec{r}_2 = -1.5\,\hat{i} + 2.0\,\hat{j}$

$\Delta\vec{r} = -6.0\,\hat{i} + 5.5\,\hat{j}$