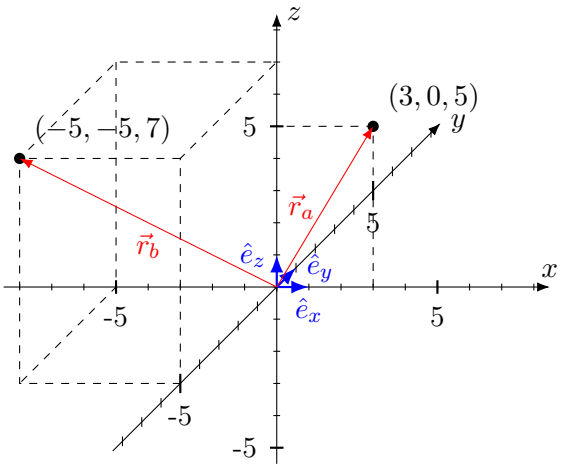
Position vector

If you are able to solve these problems on your own, then you can assume that you have the minimum knowledge about these topics.

The problems marked with (*) have additional difficulties. Don't hesitate about seeking help from teachers and your classmates if you are not able to complete them.

1. **Addition of positions**



   (a) Save in a variable called `a_r` a vector that indicates the position $\vec{r}_a = 3\hat{e}_x + 0\hat{e}_y + 5\hat{e}_z$.

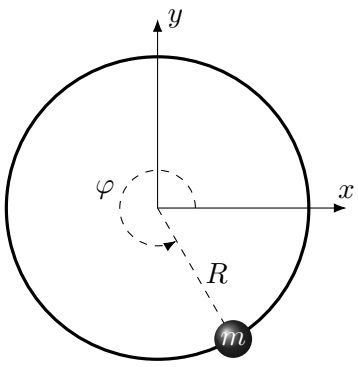
   (b) Save $\vec{r}_b = -5\hat{e}_x + (-5)\hat{e}_y + 7\hat{e}_z$ in `b_r`.

   (c) Subtract the corresponding variables to find $\Delta\vec{r}_{a\to b} = \vec{r}_b - \vec{r}_a$ and save the result in `ab_deltaR`.

   (d) Save in `c_r` the result from $\vec{r}_a + \Delta\vec{r}_{a\to b}$.

   (e) To verify that you did a good work, it's sufficient to display `c_r` and check that $\vec{r}_c = \vec{r}_b$.

2. (*) **Position as a function of a variable**



   A particle of mass m is attached to a ring of radius R, and therefore its radius measured from the center of the ring is constant. Then it's enough to know the angle φ to describe its position.

   (a) Write it using cartesian coordinates.

   (b) Calculate the velocity of this particle.