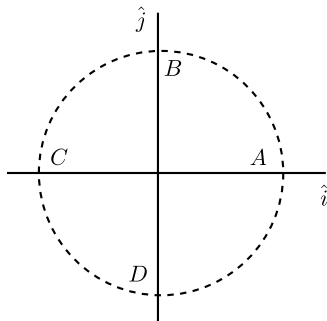


A stationary star is located at  $\langle 1, 3, 0 \rangle \times 10^{14} \text{ m}$  and a planet moving with a velocity of  $\langle 2, -1, 0 \rangle \times 10^3 \text{ m/s}$  is located at a position  $\langle -4, 1, 0 \rangle \times 10^{14} \text{ m}$ . What is the vector pointing from the initial location of the star to the planet?

$$\vec{r} = \langle \text{ } , \text{ } , \text{ } \rangle$$

The Moon orbits the Earth in a roughly circular orbit. To calculate the force the Earth exerts on the Moon, you need to know the direction of the separation unit vector ( $\hat{r}$ ) and the gravitational force unit vector ( $\hat{F}$ ). For locations A-D, find  $\hat{r}$  and  $\hat{F}$ .



At A:

$$\hat{r} = \langle \text{ } , \text{ } , \text{ } \rangle$$

$$\hat{F} = \langle \text{ } , \text{ } , \text{ } \rangle$$

At C:

$$\hat{r} = \langle \text{ } , \text{ } , \text{ } \rangle$$

$$\hat{F} = \langle \text{ } , \text{ } , \text{ } \rangle$$