

9. Calculating a unit vector in VPython

Students in your class are continuing to model the motion of Triton (one of Neptune's 13 moons) around Neptune, but now using VPython. The code your class has received contains the following snippet of VPython code.

```
Neptune = sphere(pos=vector(100,200,300), radius=1)
Trion = sphere(pos=vector(10,20,30), radius=2)
```

(a) From this snippet, which of the following lines of code might your group write to describe the separation vector pointing from Neptune to Triton?

- ☐ `rvec = Triton.pos - Neptune.pos`
- ☐ `rvec = Neptune.pos - Triton.pos`

(b) Several groups have written different lines of code to calculate the magnitude of the separation vector; some are correct and some are not. From your understanding of the line(s) of code below, which of them correctly represent the magnitude of the separation vector?

- ☐ `rmag = mag(Neptune.pos) - mag(Triton.pos)`
- ☐ `rmag = mag(Triton.pos - Neptune.pos)`
- ☐ `rmag = sqrt((Triton.pos.x - Neptune.pos.x)**2
+ (Triton.pos.y - Neptune.pos.y)**2
+ (Triton.pos.z - Neptune.pos.z)**2)`
- ☐ `rmag = sqrt((Neptune.pos.x - Triton.pos.x)**2
+ (Neptune.pos.y - Triton.pos.y)**2
+ (Neptune.pos.z - Triton.pos.z)**2)`
- ☐ `rmag = mag(Neptune.pos - Triton.pos)`
- ☐ `rmag = mag(Triton.pos) - mag(Neptune.pos)`