

**Quiz January 19**  
**Physics 2 Recitation Notes**  
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**Section B:**

$$\bar{x}_1 = \langle 1, 2, 3 \rangle \quad \bar{x}_2 = \langle 6, 5, 4 \rangle$$

**Section C:**

$$\bar{x}_1 = \langle 1, 2, 3 \rangle \quad \bar{x}_2 = \langle 8, 6, 4 \rangle$$

**Problem: Find  $\hat{r}$  with respect to  $\bar{x}_1$ .**

Solution: Divide by the norm of the vector displacement.

$$\hat{r} = \frac{1}{\sqrt{\bar{r} \cdot \bar{r}}} \bar{r}$$

$$\bar{r} = \bar{x}_2 - \bar{x}_1$$

**Section B:**

$$\bar{r} = \langle 6, 5, 4 \rangle - \langle 1, 2, 3 \rangle = \langle 5, 3, 1 \rangle$$

$$\hat{r} = \frac{1}{\sqrt{5^2 + 3^2 + 1^2}} \langle 5, 3, 1 \rangle = \frac{1}{\sqrt{35}} \langle 5, 3, 1 \rangle = \left\langle \frac{5}{\sqrt{35}}, \frac{3}{\sqrt{35}}, \frac{1}{\sqrt{35}} \right\rangle = \frac{5}{\sqrt{35}} \hat{i} + \frac{3}{\sqrt{35}} \hat{j} + \frac{1}{\sqrt{35}} \hat{k}$$

Any of the above answers are acceptable.

**Section C:**

$$\bar{r} = \langle 8, 6, 4 \rangle - \langle 1, 2, 3 \rangle = \langle 7, 4, 1 \rangle$$

$$\hat{r} = \frac{1}{\sqrt{7^2 + 4^2 + 1^2}} \langle 7, 4, 1 \rangle = \frac{1}{\sqrt{66}} \langle 7, 4, 1 \rangle = \left\langle \frac{7}{\sqrt{66}}, \frac{4}{\sqrt{66}}, \frac{1}{\sqrt{66}} \right\rangle = \frac{7}{\sqrt{66}} \hat{i} + \frac{4}{\sqrt{66}} \hat{j} + \frac{1}{\sqrt{66}} \hat{k}$$

Any of the above answers are acceptable.