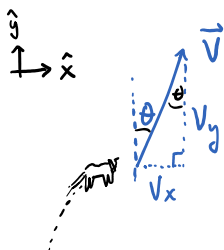


# Week 2 Quiz

Friday, October 9, 2020 2:09 PM

(a) Brody, the wonder dog, jumps onto a burning building to save UV, the kitty in distress. At one instant during his flight towards the building, Brody's velocity is at an angle of 15 degrees from vertical and the vertical component of his velocity is 10 meters per second. How fast is Brody travelling at this instant? Show your work for full credit.



Given:  $\theta = 15^\circ$ ,  $V_y = 10 \text{ m/s}$

what is  $|\vec{V}|$ ?

$$\cos\theta = \frac{|V_y|}{|\vec{V}|} \Rightarrow |\vec{V}| = \frac{|V_y|}{\cos\theta} = \underline{10.4 \text{ m/s}}$$

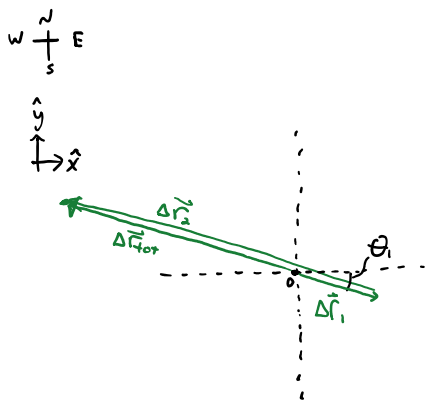
### Rubric

1 pt - Physical representation

1.5 pt - vector component analysis

0.5 pt - correct answer and units

(b) After saving UV, Brody, the wonder dog, goes for a walk. He walks from his starting position to a second location 110 meters away in a direction 30 degrees South of East. He then moves to a third location 200 meters to the North and 400 meters to the West of the second location. When standing in the third location, what is Brody's displacement from his starting position (where he started the walk)? Show your work for full credit.



$$\underline{\Delta \vec{r}_1}: \Delta r_{1x} = |\Delta \vec{r}_1| \cos\theta_1 = \underline{95.263 \text{ m}}$$

$$\Delta r_{1y} = -|\Delta \vec{r}_1| \sin\theta_1 = \underline{-55 \text{ m}}$$

$$\Delta \vec{r}_2 = \langle \underline{-400}, \underline{200} \rangle \text{ m}$$

$$\Delta \vec{r}_{\text{tot}} = \Delta \vec{r}_1 + \Delta \vec{r}_2$$

$$= \langle 95.263 + (-400), -55 + 200 \rangle \text{ m}$$

$$\boxed{\Delta \vec{r}_{\text{tot}} = \langle -305, 145 \rangle \text{ m}}$$

### Rubric

**1.5 pts - physical representation**

**2 pts - Finding x and y components of  $\Delta r_1$**

**1 pt - Components of  $\Delta r_2$**

**1 pt - Total displacement =  $\Delta r_1 + \Delta r_2$  equation**

**1 pt - Adding x and y  $\Delta r$  components**

**0.5 - Correct answer and units**