

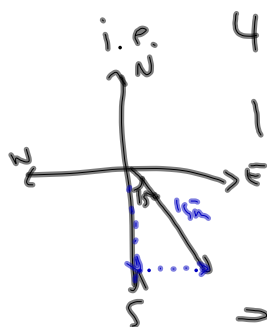
For 2-D Kinematics

- x, y directions
- Use the 3 equation for each direction
- projective motion, $a_x = 0, a_y = -g$

Vectors \rightarrow Magnitude + Direction

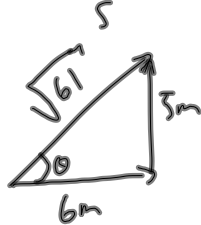
i.e. 40 m/s @ 20° above horizontal

15 m @ 15° E of S



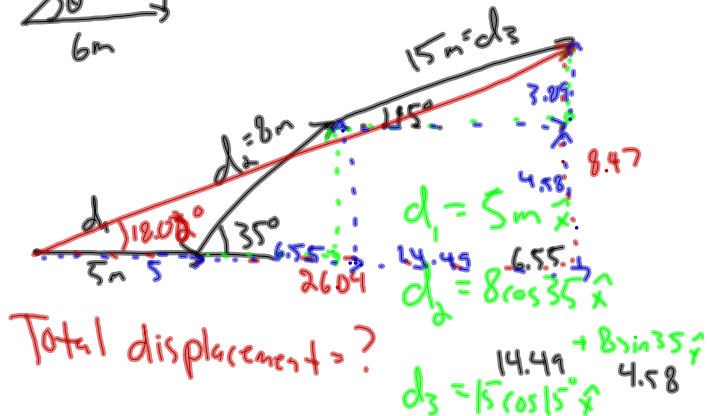
$$\Delta x = 15 \sin 15^\circ$$

$$\Delta y = -15 \cos 15^\circ$$



$$\vec{d} = 6\text{ m } \hat{x} + 5\text{ m } \hat{y} \quad \hat{z}$$

$$= 6\text{ m } \hat{i} + 5\text{ m } \hat{j} \quad \hat{k}$$



Total displacement \rightarrow ?

$$d_x = 5 + 6.55 + 14.49 = 26.04$$

$$d_y = 4.58 + 3.89 = 8.47$$

$$\vec{d} = 26.04 \hat{x} + 8.47 \hat{y}$$

$$|\vec{d}| = \sqrt{26.04^2 + 8.47^2} = 27.38\text{ m}$$

$$\theta = \tan^{-1}\left(\frac{8.47}{26.04}\right) = 18.02^\circ$$

ALWAYS BE CAREFUL OF SIGNS!