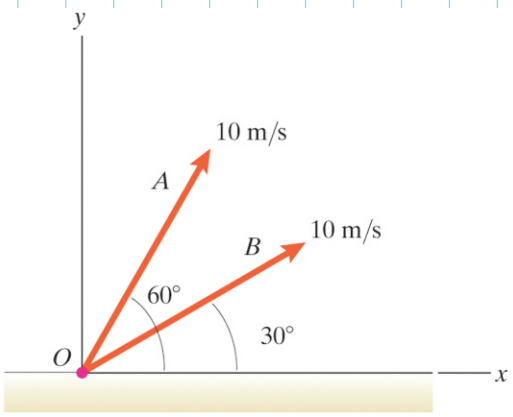
Name

Date

## Week: _____ Problem: _____

## Given:

At $t = 0$, two projectiles $A$ and $B$ are simultaneously launched from $O$ with the initial velocities and elevation angles shown. Determine the velocity of projectile $A$ relative to projectile $B$ (a) at $t = 0.5$ s and (b) at $t = 1$ s.




## Required:

## Solution:

**Solution:**

$\mathbf{v}_A = -(9.81\ \text{m/s}^2\mathbf{j})t + (10\ \text{m/s})(\cos 60^\circ \mathbf{i} + \sin 60^\circ j)$

$\mathbf{v}_B = -(9.81\ \text{m/s}^2\mathbf{j})t + (10\ \text{m/s})(\cos 30^\circ \mathbf{i} + \sin 30^\circ j)$

$\mathbf{v}_{A/B} = \mathbf{v}_A - \mathbf{v}_B = (10\ \text{m/s})(-0.366\mathbf{i} + 0.366\mathbf{j})$

$\mathbf{v}_{A/B} = (-3.66\mathbf{i} + 3.66\mathbf{j})\ \text{m/s}$

Since $\mathbf{v}_{A/B}$ doesn't depend on time, the answer is the same for both times

$$\boxed{\mathbf{v}_{A/B} = (-3.66\mathbf{i} + 3.66\mathbf{j})\ \text{m/s}}$$