3.  (20 pts.)  A 3kg object is subject to two forces, $\vec{F}_1 = 4$N at $30°$ and $\vec{F}_2 = 7$N at $75°$, where all angles are measured from the $x$ axis.  The object is at rest at the origin at time $t = 0$s.  Where is the object at $t = 5$s?
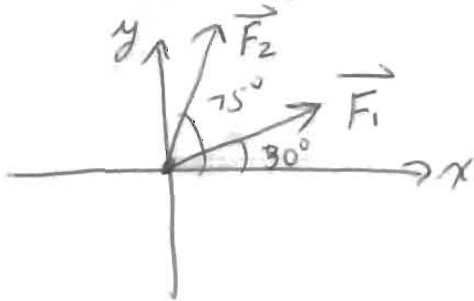
3. (20 pts.) A 3kg object is subject to two forces, $\vec{F}_1 = 4\text{N}$ at $30°$ and $\vec{F}_2 = 7\text{N}$ at $75°$, where all angles are measured from the $x$ axis. The object is at rest at the origin at time $t = 0\text{s}$. Where is the object at $t = 5\text{s}$?



use $\Sigma \vec{F} = m\vec{a}$
break into components.
Find $a_x, a_y$, get $x, y$.

$x$-components: $\Sigma F_x = m a_x$

$$F_1 \cos 30° + F_2 \cos 75° = (3) a_x$$

$$4 \cos 30 + 7 \cos 75 = 3 a_x$$

$$a_x = 1.76 \, m/s^2$$

$y$-components $\Sigma F_y = m a_y$

$$F_1 \sin 30° + F_2 \sin 75° = 3 a_y$$

$$2.92 \, m/s^2 = a_y$$

Now, for $t = 5s$

$$x = x_0 + v_{0x} t + \tfrac{1}{2} a_x t^2$$

$$x = 0 + 0 + \tfrac{1}{2}(1.76)(5)^2 = 22 \, m$$

$$y = y_0 + v_{0y} t + \tfrac{1}{2} a_y t^2$$

$$y = 0 + 0 + \tfrac{1}{2}(2.92)(5)^2 = 36.5 \, m$$