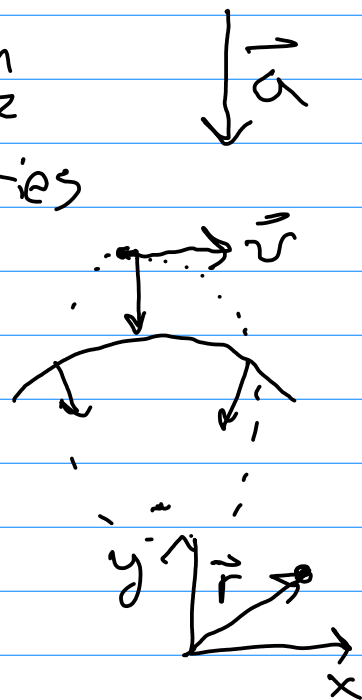


Projectile Motion

- * A special case of 2D motion in which $\vec{a} = 0\hat{i} - 9.8\hat{j} \text{ m/s}^2$
- * Objects follow parabolic trajectories
- * We ignore air resistance
- * " " curvature of Earth



* Free Fall!

* Recall 2-D motion

$$\vec{r}(t) = x(t)\hat{i} + y(t)\hat{j}$$

For projection:

$$x(t) = x_0 + v_{0x}t$$

$$y(t) = y_0 + v_{0y}t + \frac{1}{2}a_y t^2$$

$$\text{So } \vec{r}(t) = \vec{r}_0 + \vec{v}_0 t + \frac{1}{2}\vec{a} t^2$$

$$\text{where } \vec{r}_0 = x_0\hat{i} + y_0\hat{j}, \quad \vec{v}_0 = v_{0x}\hat{i} + v_{0y}\hat{j}$$

$$\vec{a} = 0\hat{i} - g\hat{j}$$

Visualize [See blue powerpoint slides 8-10]