

## 2-Dimensional - Projectile Motion

•  $\updownarrow$  (freefall) vertical  $d = \frac{1}{2}at^2$  vertical motion with constant acceleration "rise & fall"

•  $\leftarrow \rightarrow$  horizontal  $d_2 = vt$  horizontal motion with constant velocity

- projectile motion - motion under the influence of gravity

1. A ball is thrown horizontally at 15 m/s from the top of a building 140 m tall. How far from the base of the building will the ball land?

2. Janet jumps off a high-diving platform with a horizontal velocity of 2.8 m/s and lands in the water 2.6 s later. How high ~~from~~ is the platform, and how far from the base of the platform does she land?

3. Divers in Acapulco dive from a cliff that ~~is 61.0 m high~~ is 61.0 m high. Down at water level, the rocks directly below the cliff extend outward for 23 m. What is the minimum horizontal velocity a diver must have to clear the rocks by 0.5 m?

2-Dimensional - Projected Motion

$$y = \frac{1}{2}at^2 + v_y t + y_0$$

$$y = v_y t + y_0$$

vertical motion with constant acceleration

horizontal motion with constant velocity

- but the motion depends on the influence of gravity

1. A ball is thrown horizontally at 10 m/s from the top of a building 100 m tall. How far from the base of the building will the ball land?

2. Janet jumps off a high-diving platform with a horizontal velocity of 9.8 m/s and lands in the water 2.5 later. How high is the platform, and how far from the base of the platform does she land?

3. Divers in Acapulco dive from a cliff that is 11.0 m high. Down at water level, the rocks directly below the cliff extend outward for 9.3 m. What is the minimum horizontal velocity a diver must have to clear the rocks? 0.2 m?