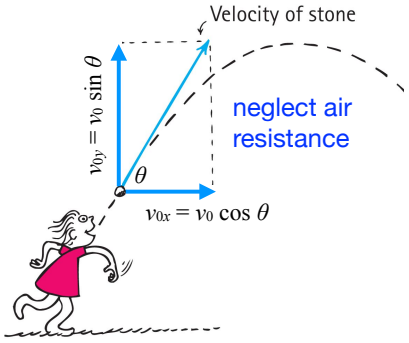
Projectile Motion



Horizontal Motion

$$v_x = v_{0x} + \cancel{a_x}\Delta t$$

$$x_f = x_i + v_{0x}\Delta t + \cancel{\tfrac{1}{2}a_x}(\Delta t)^2$$

$\Delta x =$
$v_{0x} =$
$v_x = v_{0x}$
$a_x = 0$
$\Delta t =$

Vertical Motion

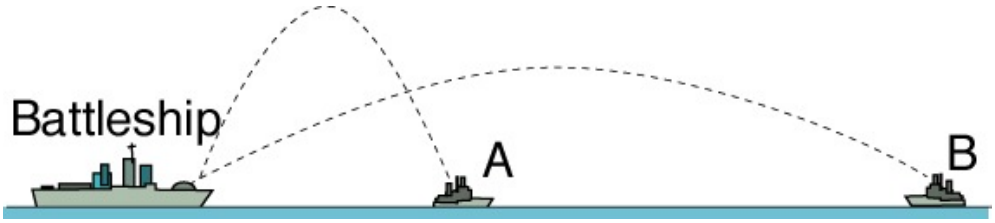
$$v_{fy} = v_{0y} + a_y\Delta t$$

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

$$v_y^2 = v_{0y}^2 + 2a_y\Delta y$$

$\Delta y =$
$v_{0y} =$
$v_y =$
$|a_y| = g$
$\Delta t =$

1. **Battleship:** A battleship simultaneously fires two shells toward two enemy ships, one close by (A), and one far away (B). The shells leave the battleship at different angles and travel along the indicated parabolic trajectories. Which enemy ship is hit first?



2. More Projectiles
   a. A projectile is launched off a cliff with an initial speed of 36.1 m/s at an angle of 33.7° from the horizontal, and hits the ground 5 s later. The distance it lands from the base of the cliff is closest to…? (Round to nearest integer.)

   b. A projectile is launched off a cliff with a velocity of (30, 20) m/s. At the top of the trajectory, its speed is closest to…?

   c. A projectile is launched off a cliff with an initial speed of 36.1 m/s at an angle of 33.7° from the horizontal, and hits the ground 5 s later. The height of the cliff is closest to…? (Round to nearest integer.)

   d. A projectile is launched off a cliff with an initial speed of 36.1 m/s at an angle of 33.7°. The instant right before it hits the ground 5 s later the magnitude of the velocity (speed) is closest to…? (Round to nearest integer.)