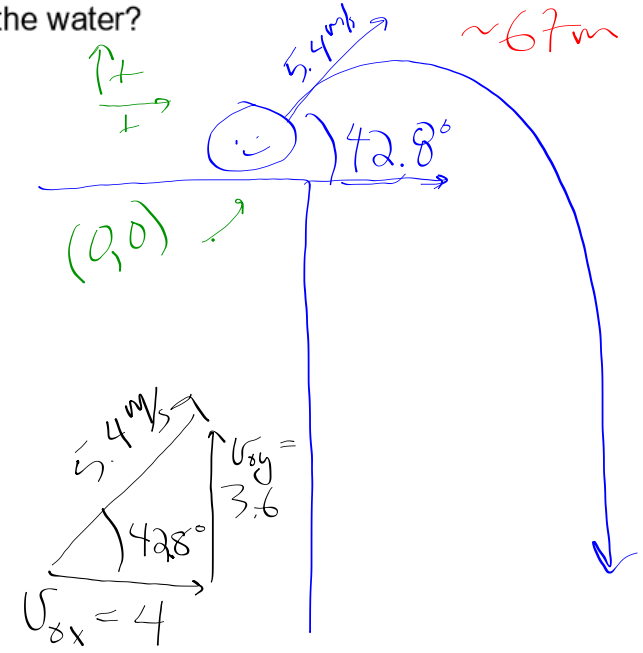
36a. A chicken jumps from a cliff with a velocity of 5.4 m/s at an angle of 42.8°. She reaches the water below 4.1 s later. How high was the cliff and how far from its base did the chicken hit the water?



$x_0 = 0$ $\quad y_0 = 0$

$x = 16.4\text{m}$ $\quad y = -67.5\text{m}$

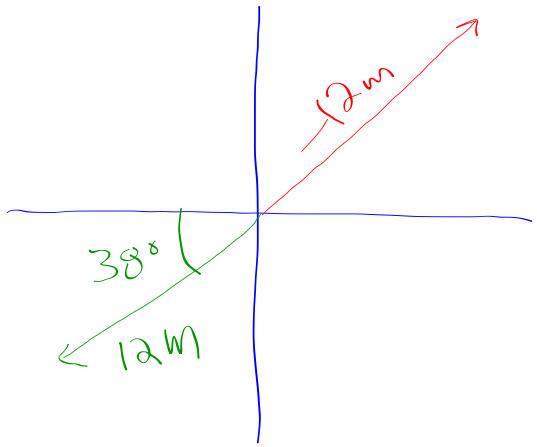
$v_{0x} \approx 4$ $\quad v_{0y} \approx 3.6$

$v_x =$ $\quad v_y =$

$a_x = 0\ m/s^2$ $\quad a_y = -9.8\ m/s^2$

$t = 4.1\text{s}$ $\quad t = 4.1\text{s}$

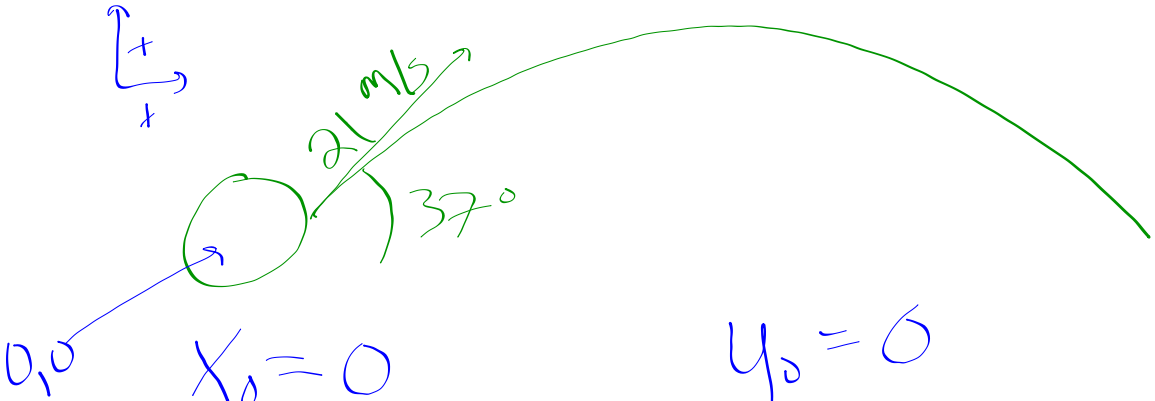
$x = x_0 + v_0 t + \frac{1}{2} a t^2$

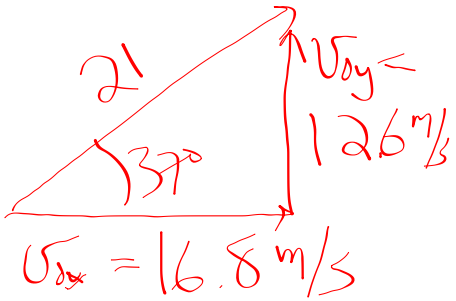


12m @ 38° below −x axis

−12m @ 38° below −x axis

41. A football is kicked with a speed of 21.0 m/s at an angle of 37° to the horizontal. How much later does it hit the ground? Ignore air resistance.





$x_0 = 0$

$x = (16.8)t$

$v_{0x} = 16.8$ m/s

$v_x = 16.8$ m/s

$a_x = 0$

$t =$ 2.58 s

$y_0 = 0$

$y = 0$

$v_{0y} = 12.6$ m/s

$v_y =$

$a_y = -9.8$ m/s^2

$t =$ 2.58 s

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

$0 = 12.6t + -4.9t^2$

$0 = t(12.6 + -4.9t)$

$t = 0$

$12.6 + -4.9t$

$t = 2.58$ s