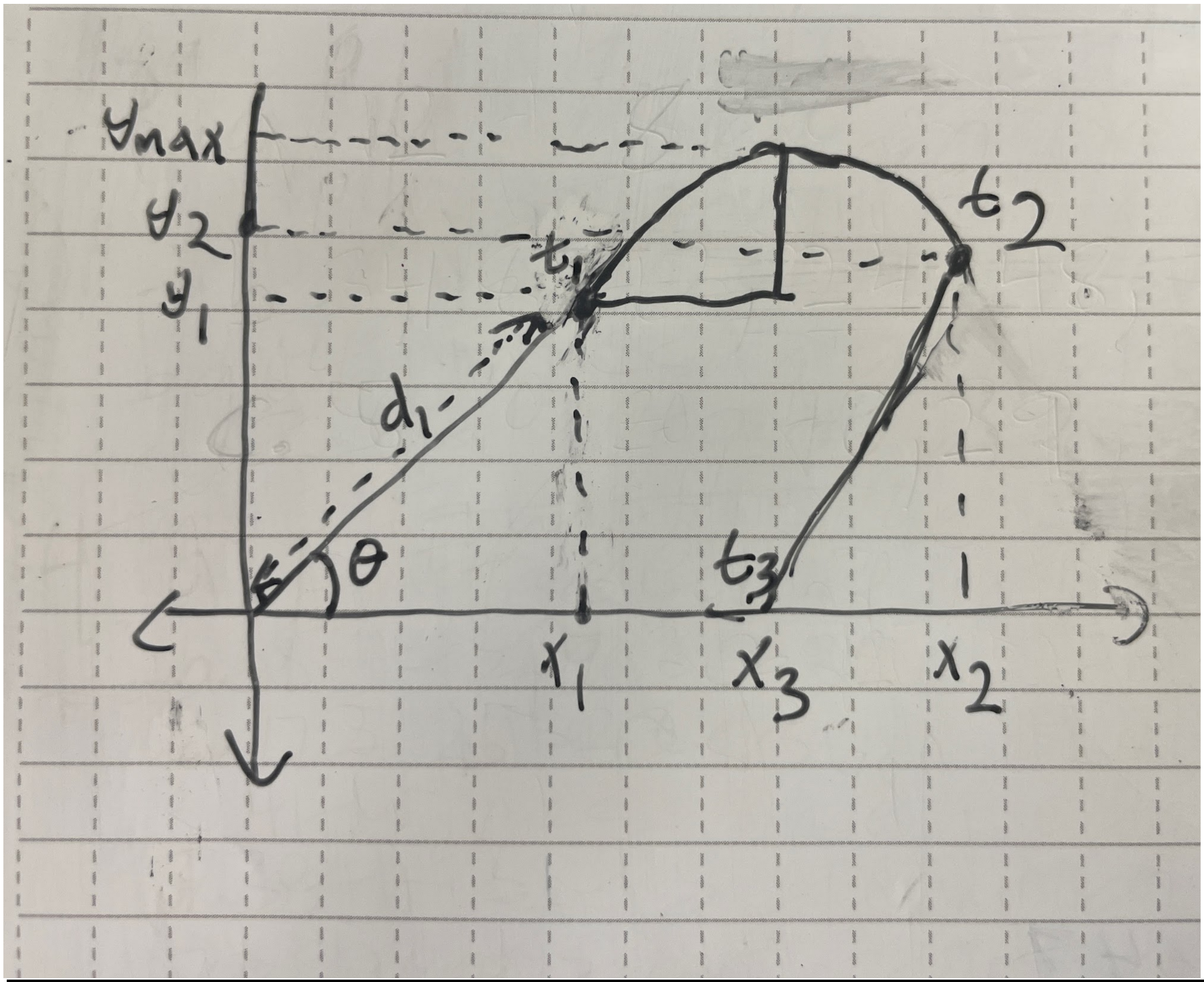
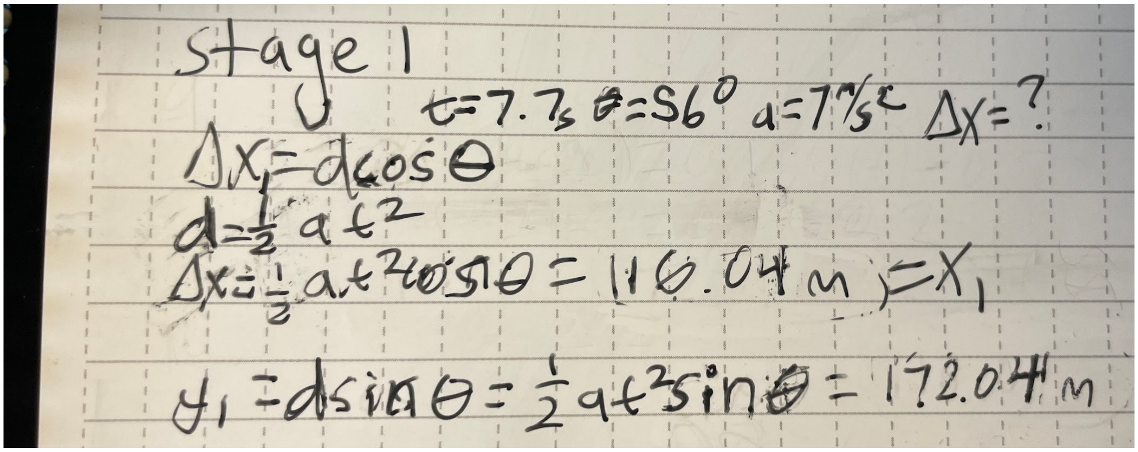
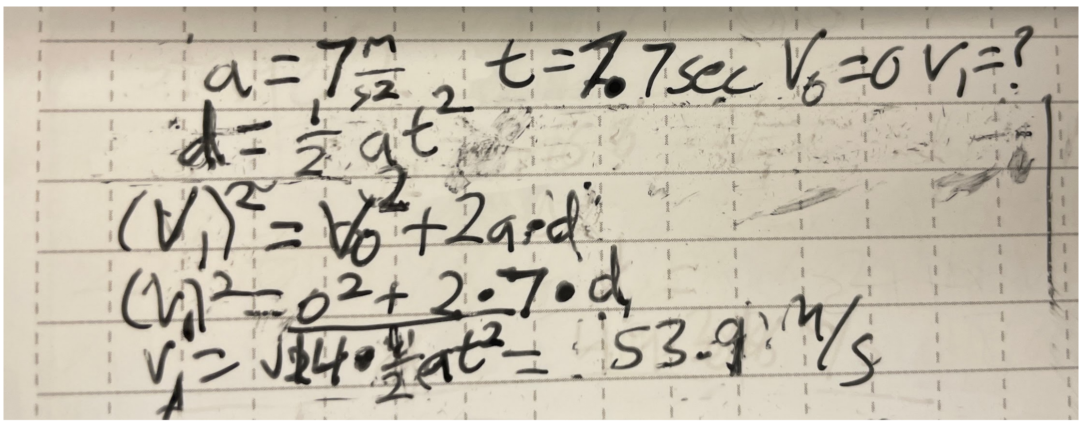


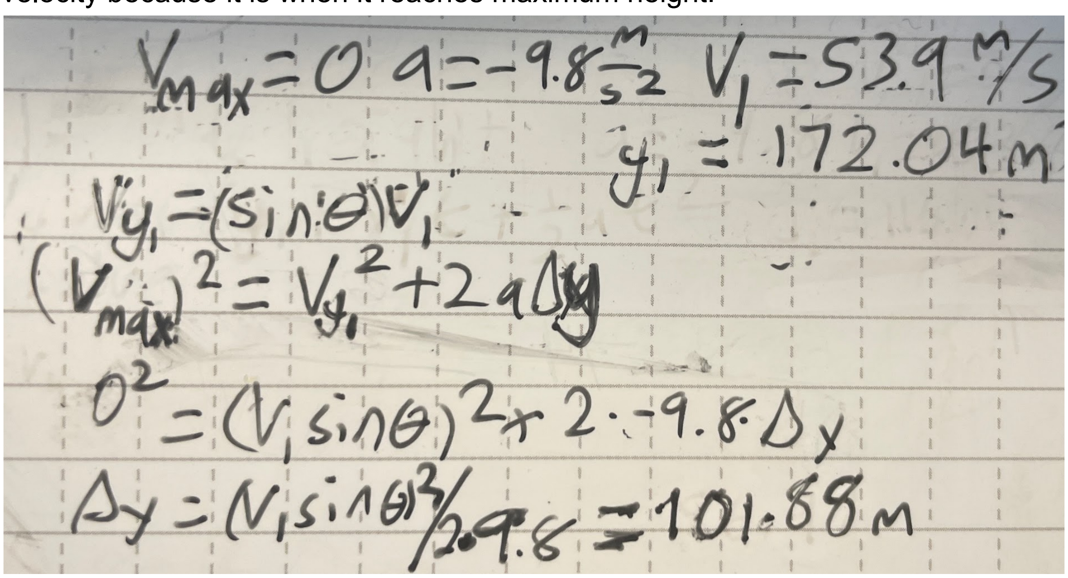
Launch Angle	56°
Engine Burn Time	7.7 sec
Net Acceleration of Rocket while Engine Burns	7.0 m/s^2
Vertical Distance Rocket Falls from Max Height Before Parachute Opens	88m
Rocket with Parachute Constant Vertical Speed	11 m/s
Wind and Rocket with Parachute Constant Horizontal Speed	13 m/s

Steps:

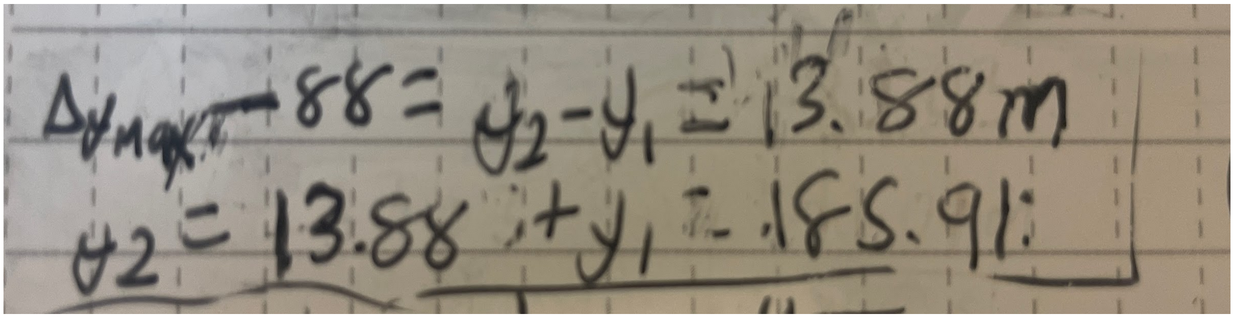
- First I found the position the rocket reaches at t_1 I used the equation $x=x_0+v_0t+.5at^2$ with a starting velocity of 0 as the rocket starts from a standstill, and solving for the distance it has traveled using the variable "d" instead of "x" to get $d= \frac{1}{2} at^2$. I then found the two legs with d as the hypotenuse using trigonometry to find x_1 and y_1.

- 

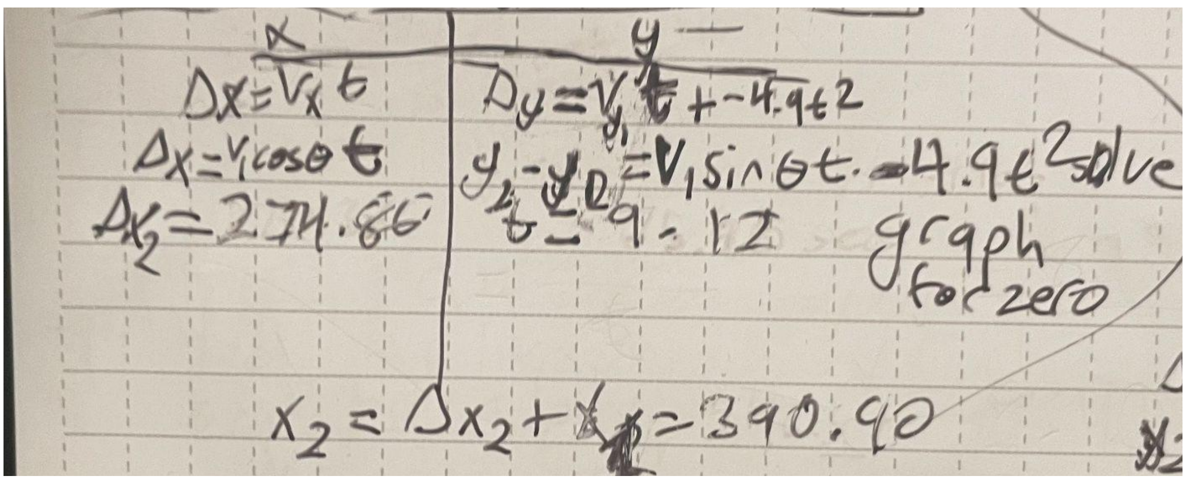
- Stage 2:
- Next I found the speed at which the rocket was traveling at t_1 seconds (V_1), using $V^2=V_0^2+2a\Delta x$, with V_1 as the final velocity and d as Δx.
- 

- I used Δy to show y_{max} - y_1 or the change in y from t_1 to where the rocket reached its maximum height. I used $V^2=V_0^2+2a\Delta y$ to with V_1 as the initial velocity, and 0 for the final velocity because it is when it reaches maximum height.
- 

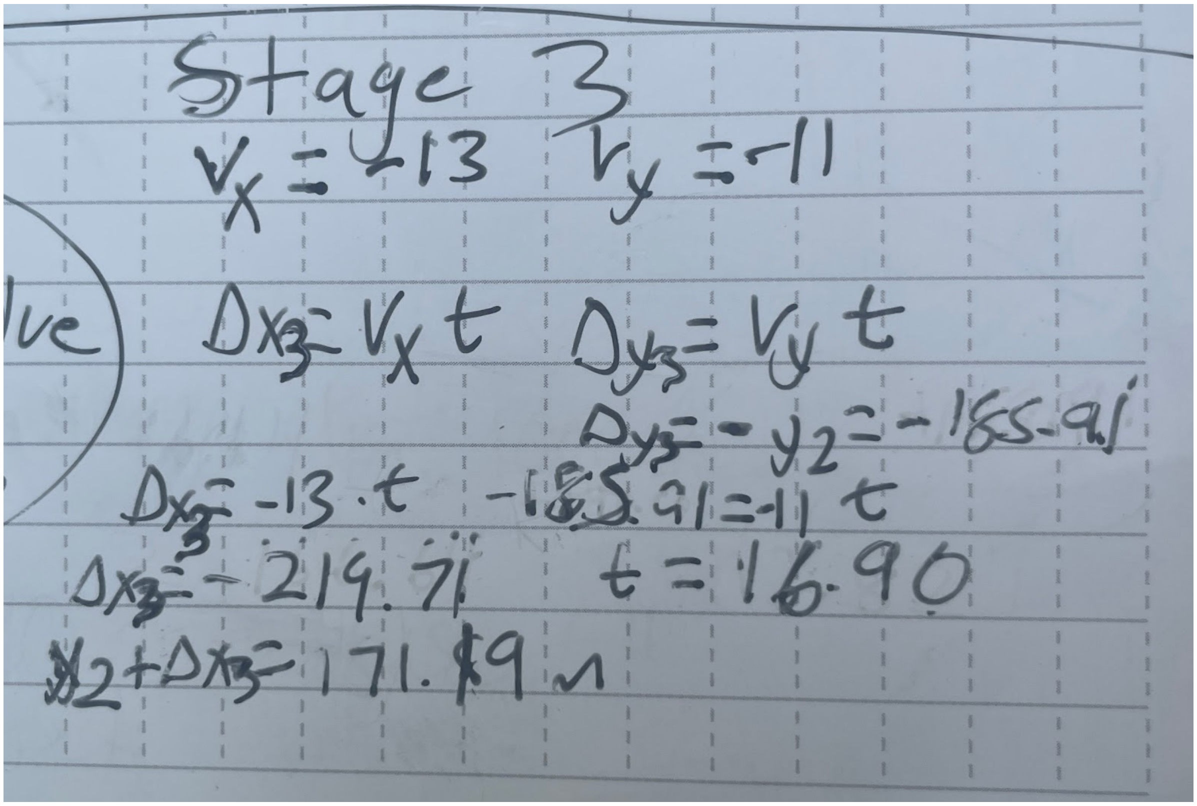
- I then found the change in y from y_1 to y_2 by subtracting the distance of 88 meters that the rocket fell from the maximum height from the change in height the rocket ascended from y_1 to the maximum height. Then added this to y_1 to find the height of the rocket at t_2



-
- To find x_2 I used $x=x_0+v_0t+.5at^2$ using acceleration of -9.8 m/s^2 of gravity, as well as the original launch angle of 56° with the y values previously found to solve for time, then used the distance formula for x to find Δx and add it to x_1 to find x_2.



-
- Stage 3:
- To find the final distance I used distance=velocity times time with the known that Δy will equal $-y_2$ to return to the ground, to solve for time. Then I used the same equation for the horizontal values to solve for the change in x from t_2 to t_3.



- I then added the change in x from t_2 to t_3 to x_2 to find the final position of **171.2 meters**

Final Answer: 171.2 meters east of the launch site.