Name ____ Hour _________________

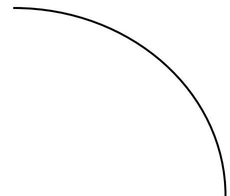
Projectiles Shot at an Angle

Review of Horizontal Projectiles:

v_x remains ________________________ because we: ____________________________

v_y ________________ as an object falls due to ____________ which is a_y= _________

An object moves in the shape of a half parabola because it has velocity in the x-direction and gravity pulls it down in the y-direction.



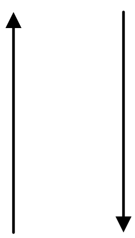
Joey pushes Mike horizontally off a cliff at 5 m/s. What is Mike's:

v_x= ______ v_{iy}= ______ a_y=______

Projectiles shot at an ANGLE:

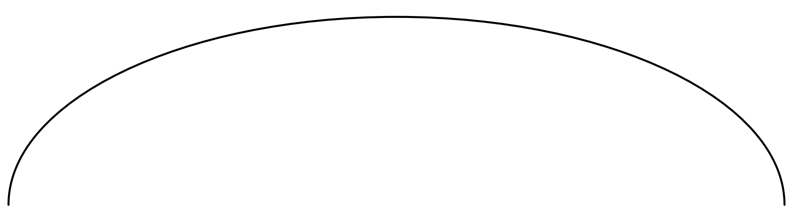
1. The horizontal velocity (v_x) still remains _______________________
2. The vertical velocity (v_y) __________________________________

Think of the v_y if it only went up and down. What happens to the v_y?



TIP: The y velocity at the top = _________

Now apply a horizontal component to it. **The v_x DOES NOT CHANGE the v_y!**



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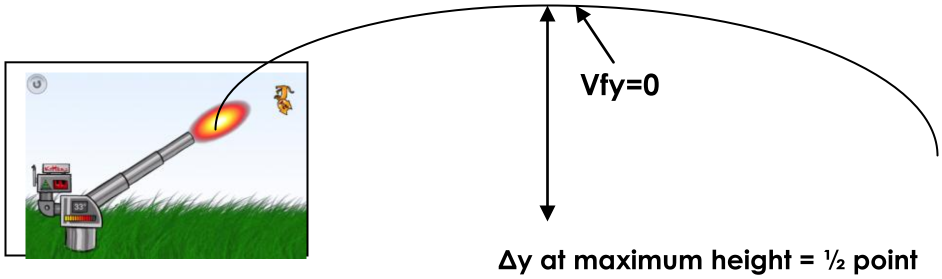
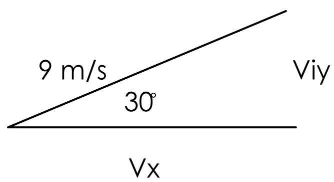


Δy at maximum height = ½ point

Example: A cat tries to launch itself out of a cannon at 30° N of E. He leaves the cannon with a velocity of 9 m/s (**This is a combination of his vertical and horizontal velocity**!). What will be his maximum height (Δy), AND will he make it across a 10 m wide road? (Solve Δx)

The components of velocity:



V_x:

V_{iy}:

To use either equation, we need to find the **time** (Δt) the cat was in the air.

$a = \frac{V_f - V_i}{\Delta t}$ becomes:

You can solve for the time at the top of the parabola because the y-velocity = _______
So…V_{fy} = __________ at the top (which is ½ way through the flight).

Δt = __________ This is the time ____, so the

TOTAL time of the flight = __________________

Now that we have Δt…back to our other equations

Maximum Height: (Δy) Total Distance (Δx)