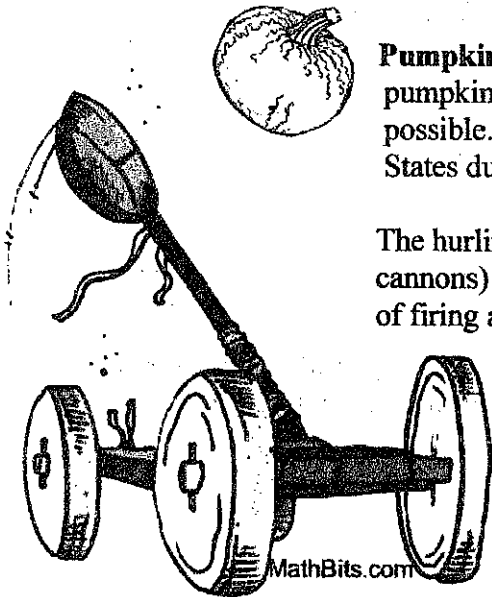


Pumpkin Chunking!!

Name _____

Directions: A graphing calculator is needed for this investigation.



Pumpkin chunking (or Punkin' Chunkin') is the art of hurling a pumpkin by means of a mechanical device to the greatest distance possible. Pumpkin chunking competitions are held throughout the United States during pumpkin harvest time.

The hurling devices (such as slingshots, catapults, and pneumatic air cannons) do not utilize electricity or explosives. Some devices are capable of firing an 8 to 11 pound pumpkin over 4,000 feet.

The pumpkin must remain whole after leaving the device for the chunking to count. Pumpkins that burst after leaving the barrel intact are referred to as "pumpkin pie in the sky".

When the pumpkin is hurled into the air, the path traveled by the pumpkin in flight is a parabolic curve. Let's examine the pumpkin parabolas generated by three different devices.

Slingshot Function:	$f(x) = -0.00113x^2 + 0.34352x + 3.89248$	All three devices are located at the origin.
Catapult Function:	$f(x) = -0.00048x^2 + 0.28992x + 6.22208$	
Pneumatic Air Cannon:	$f(x) = -0.00023x^2 + 0.22080x + 7.00800$	
NOTE: The center of a small 4 foot wide stream is located 250 feet from the launch site.		

- Using your graphing calculator, graph the parabolic pumpkin paths for each device. Use the window settings shown at the right.

```

WINDOW
Xmin=-10
Xmax=1000
Xscl=50
Ymin=-10
Ymax=80
Yscl=10
↓Xres=1
    
```

- Complete the table below showing the data for each of the pumpkin chunking devices. Round answers to the nearest foot.

DATA TABLE	At what distance above the ground was the pumpkin launched?	What was the maximum height reached by the pumpkin?	What was the horizontal distance traveled by the pumpkin?	What is the height of the pumpkin as it passes over the center of the stream?
Slingshot Function:				
Catapult Function:				
Pneumatic Air Cannon:				

3. The pumpkin chunking from each device took exactly 10 seconds from launch to landing. Determine the average horizontal speed of the pumpkins for each device:

DEVICE:	Speed in feet per second	Speed in miles per hour
Slingshot:		
Catapult:		
Pneumatic Air Cannon:		

4. When launched from a catapult following our catapult function, a defective pumpkin burst apart after traveling a horizontal distance of 32 feet. To the *nearest foot*, what was the height of the pumpkin when it blew apart?
5. An unsuspecting crow flies into the path of a pumpkin being hurled by the pneumatic air cannon following our pneumatic air cannon function. If the crow and the pumpkin attempt to occupy the same space at the same time at a height of 48 feet, how far, horizontally, does the crash occur from the launch site?
6. Another pumpkin chunking device hurls a pumpkin from a starting height of 6 feet, reaches a maximum height of 35 feet at a horizontal distance of 194 feet, and lands 400 feet from the launch site. Write a possible quadratic function to model this data. Describe how you arrived at your answer.