

Algebra II/Trig: Asteroid Encounters

1 Parabolic Trajectories

When an asteroid or other object in space flies by the Earth, its orbit follows a **parabola**. Since we want to know if an asteroid is going to hit Earth, we want to know how close the orbit is going to get.

1.1 Asteroid flyby

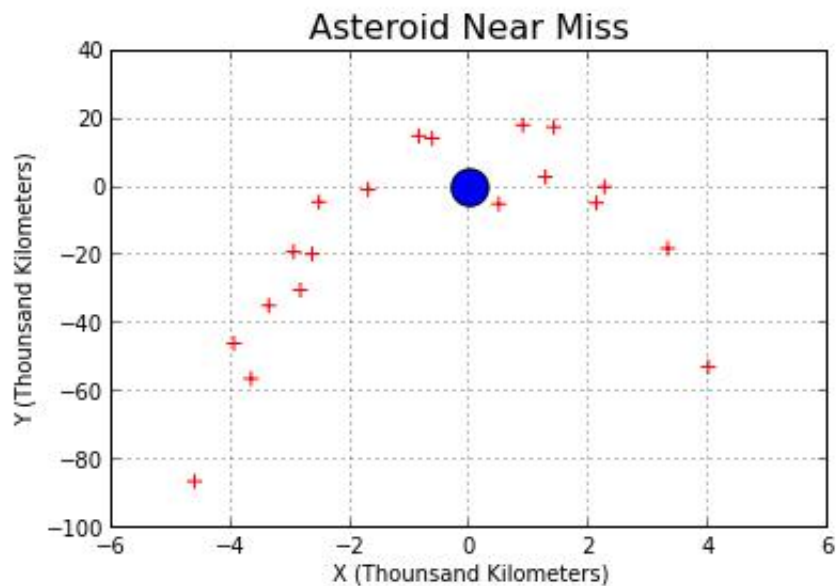


Figure 1: A hypothetical asteroid as it's tracked close to Earth.

Table 1: Position data of a hypothetical asteroid swinging around Earth.

X (thousand kilometers)	Y (thousand kilometers)
-4.6	-86.3
-4.0	-45.8
-3.7	-56.1
-3.4	-34.6
-3.0	-18.8
-2.8	-30.1
-2.6	-19.5
-2.5	-4.2
-1.7	-0.5
-0.9	15.2
-0.6	14.5
-0.1	1.3
0.5	-4.8
0.9	18.4
1.3	3.2
1.4	17.8
2.1	-4.5
2.3	0.2
3.3	-17.8
4.0	-52.6

- Using your calculator, fit the data to a parabola
- Write down the values of the coefficients below:

$$y = A \cdot x^2 + B \cdot x + C$$

- $A =$
- $B =$
- $C =$

- Using your parabola, what is the distance of closest approach (i.e. how close does the asteroid get to the Earth)?
- If the Earth's radius is 6.5 million kilometers, how close was the asteroid to the surface of the Earth?