It was only 300 meters in diameter, but on June 18, 2013 it was discovered by the Pan-STARRS-1 survey telescope in Hawaii (top image), making it the 10,000th Near Earth Object (NEO).

NASA estimates that there are 15,000 asteroids that are 140-meters or larger with orbits close to Earth. We have now discovered 30% of them according to statistical estimates based on the rate of discovery of these NEOs. Objects of this size or larger are considered severe hazards should they impact near cities. The February 2013 'Russian' meteor was 17 meters in diameter, yet it injured over 3000 people, though it left no crater. A 140-meter asteroid impact would produce a 25-meter crater and the atmospheric shock wave would damage thousands of buildings.

The orbit is shown in the left. The figure to the left. The orbit is tilted nearly 45° to Earth's orbit plane.

The distance from Earth to 2013 MZ5 is given in the table below, every 10 days, and in units of millions of kilometers.

Date	Distance	Date	Distance	Date	Distance
May 22	115	July 1	71	August 9	82
June 1	100	July 10	69	August 19	89
June 11	88	July 20	71	August 29	97
June 21	77	July 30	76	September 8	104

Problem 1 – Graph the tabulated distance function and connect the points with a smooth curve.

Problem 2 – On what date is the asteroid closest to Earth?

Problem 3 – The approximate formula for the approach speed of the asteroid to Earth in km/hr is given by $S = 1100 T - 62000$, where T is the elapsed days from May 22. How fast was it approaching Earth on June 18, the day of its discovery?
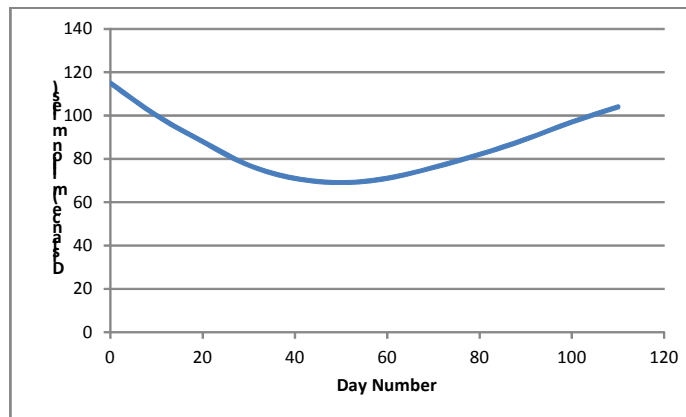
Orbit - http://ssd.jpl.nasa.gov/sbdb.cgi?sstr=2013%20MZ5;orb=1;cov=0;log=0;cad=0#orb

Data - http://ssd.jpl.nasa.gov/sbdb.cgi?sstr=2013%20MZ5

http://www.nasa.gov/centers/jpl/news/neo20130624.html
NASA - Ten Thousandth Near-Earth Object Unearthed in Space
June 24, 2013.

Problem 1 – Graph the tabulated distance function and connect the points with a smooth curve. Answer: **See graph below**.

Problem 2 – On what date is the asteroid closest to Earth?

Answer: The table shows that on **July 10 (Elapsed day 50)** it reached its minimum distance of 69 million kilometers.

Problem 3 – The approximate formula for the approach speed of the asteroid to Earth in km/hr is given by S = 1100 T – 62000, where T is the elapsed days from May 22. How fast was it approaching Earth on June 18, the day of its discovery?

Answer: June 18 is elapsed day 27, so T = 27 and so S = 1100(27)-6200 = **-23,500 km/hr**. The negative sign means that the distance to Earth was decreasing.