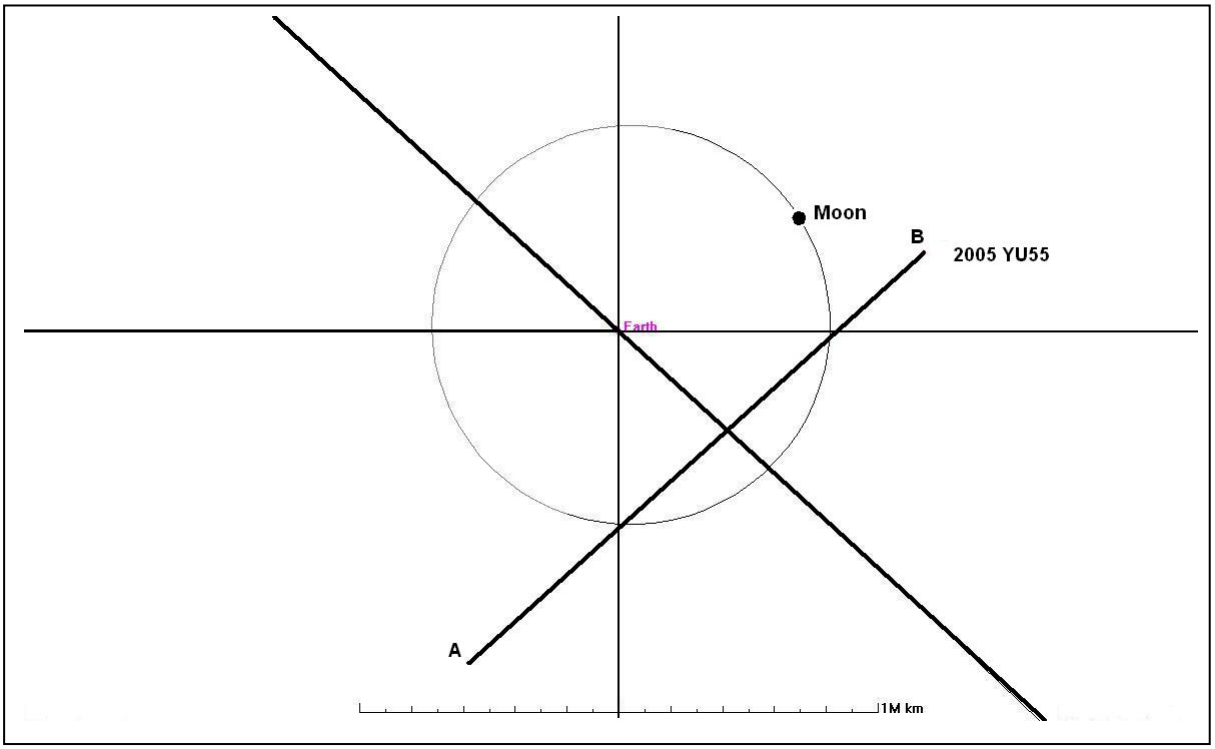

The Asteroid 2005 YU55 passed inside the orbit of our moon between November 8 and November 9, 2011. The diagram shows the lunar orbit as a circle center on Earth. The diagonal line is the orbit of Earth around the sun. The line segment AB is a portion of the orbit of the asteroid. The horizontal line at the bottom of the page is 1 million kilometers long at the scale of the figure. Point A is the location of the asteroid on November 8.438. Point B is its location one day later on November 9.438, where we have used digital days to indicate a precise hour and minute within each endpoint date in terms of Universal Time (UT). For example: 9.500 is 12:00 UT on November 9.

Problem 1 - To the nearest minute, what is the Universal Time hour and minute for each of the endpoint dates?

Problem 2 - Using a millimeter ruler, what is the scale of this diagram in kilometers per millimeter?

Problem 3 - To the nearest 100 km, how far will the asteroid travel between the endpoint times?

Problem 4 - How fast will the asteroid be traveling in kilometers per hour?

Problem 5 - On what date and Universal Time will the asteroid be closest to Earth, and what is this distance?

The line segment AB is a portion of the orbit of the asteroid. The horizontal line at the bottom of the page is 1 million kilometers long at the scale of the figure. Point A is the location of the asteroid on November 8.438. Point B is its location one day later on November 9.438, where we have used digital days to indicate a precise hour and minute within each endpoint date in terms of Universal Time.

Problem 1 - What is the Universal hour and minute for each of the endpoint dates?

Answer - 0.438 days = 0.438 x 24hrs = 10.512h and (10.512-10)x60m = 31 m, so the time is 10:31 UT, then Point A is **November 8 at 10:31 UT** and Point B is **November 9 at 10:31 UT**.

Problem 2 - Using a millimeter ruler, what is the scale of this diagram in thousands of kilometers per millimeter?
Answer - 1 million km / 81 millimeters = **12346 km/mm**.

Problem 3 - How far will the asteroid travel between the endpoint times?
Answer - The distance is 81 mm or **1 million km**.

Problem 4 - How fast will the asteroid be traveling in kilometers per hour?
Answer - 1 million km / (9.438-8.438) = 1 million km/day or **41,667 km/hr**.

Problem 5 - On what date and Universal Time will the asteroid be closest to Earth?

Answer - This happens 46 mm from Point A.
D = 46 x 12346 km = 567,916 km.

The speed is 41,667 km/hr so T = 567,916 / 41667 = 13.63 hours from Point A.
This equals 0.568 days.

Then 8.438 + 0.568 = 9.006 which is **00:09 UT on November 9**.