Comet ISON was discovered on September 21, 2012, and its orbit has been calculated from many observations since then. Instead of the normal circular or elliptical paths that comets, asteroids and planets often take, Comet ISONs orbit is nearly a parabola. This means that it came from far beyond the orbit of Neptune and that this is probably the first time it has entered the inner solar system! The figure shows its calculated path through the orbits of Mercury, Venus, Earth and Mars. The table below gives the distance between Comet ISON and the inner planets for the 15th of each month from July 2013 to March 2014..

| Date	Sun	Mercury	Venus	Earth	Mars
July 15	434	497	411	586	283
August 15	365	320	430	502	168
September 15	289	326	397	389	58
October 15	204	267	300	258	48
November 15	91	45	151	135	163
December 15	104	159	76	79	201
January 15	213	255	123	101	233
February 15	299	264	270	224	322
March 15	367	422	410	348	416

Problem 1 – Create two graphs of the distance data for; A) the Comet-Sun distance and 2) the Comet-Earth distance.

Problem 2 – What is the closest distance to the Earth that Comet ISON gets? If the distance to the moon from Earth is 380,000 km, how many times the Earth-Moon distance is the closest comet distance?

Problem 3 –Which planet with Comet ISON pass the closest too, and during which month?

Problem 4 – On November 28 COMET ISON passes within 1.2 million kilometers of the sun. At the Sun's Tidal Distance, objects are often pulled apart by the sun's intense gravity. For comets, this distance is about 1 million km from the center of the sun. Is it possible that Comet ISON may break apart?

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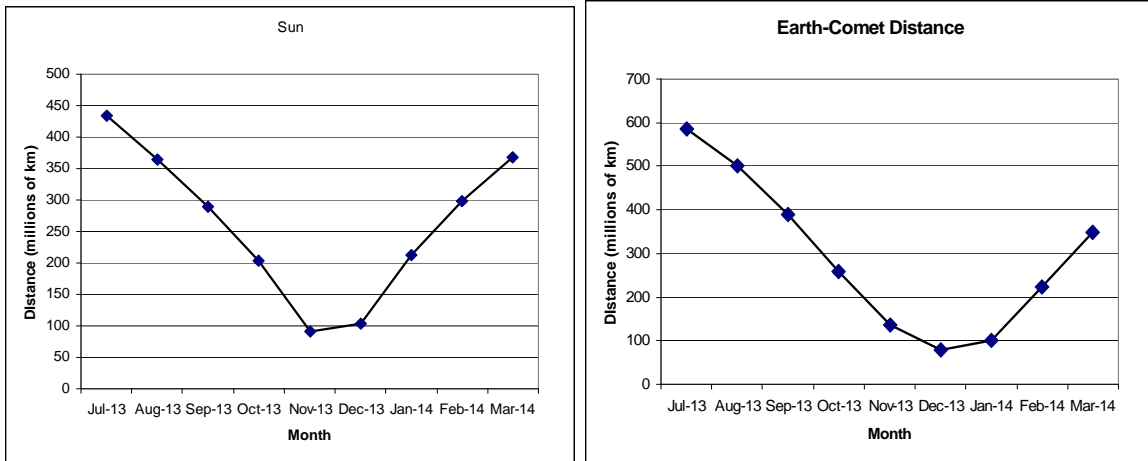
Problem 2 – What is the closest distance to the Earth that Comet ISON gets? If the distance to the moon from Earth is 380,000 km, how many times the Earth-Moon distance is the closest comet distance?

Answer: From the graph, the closest distance is near December 15, 2013 at **79 million km**. This equals 79,000,000/380,000 = **18 times the distance to the moon from Ea**rth.

Problem 3 –Which planet with Comet ISON pass the closest too, and during which month?

Answer: It comes closest to Mars around **October 15, 2013 at 48 million km**.

Problem 4 – On November 28 COMET ISON passes within 1.2 million kilometers of the sun. At the Sun's Tidal Distance, objects are often pulled apart by the sun's intense gravity. For comets, this distance is about 1 million km from the center of the sun. Is it possible that Comet ISON may break apart?

Answer: Comet ISON comes very close to the sun's TIDAL Limit on November 28, so it may suffer some fragmentation into smaller comets. Astronomers will closely watch this comet when it once again becomes visible from Earth on November 29 to see if it broke apart!

Note: Because we have given the distance to Comet ISON on the 15th of each month, this hides the fact that the Comet actually passes very close to each of these planets at a different date. SUN: November 28, 1.2 million km; Mercury: November 19, 36.3 million km. Venus: December 21, 73.4 million km; Earth: December 26, 64.2 million km and Mars: October 1, 10.9 million km. These estimates were based on the orbit known on July 29, 2013 but will change as the comet swings around the sun and its orbit changes slightly.