



The International Space Station is a 400-ton, \$160 billion platform that supports an international team of 3-5 astronauts for tours of duty lasting up to 6 months at a time. Like all satellites that orbit close to Earth, the atmosphere causes the ISS orbit to decay steadily every day, so the ISS has to be 're-boosted' every few months to prevent it from burning up in the atmosphere.

**Problem 1** - Based on the following information, what is the altitude of the ISS by April 2009?

*"In January, the altitude was 340 kilometers. By March it has lost 8 kilometers before the Progress-59 supply ship raised its altitude by 5 kilometers. In May, the ISS lost 4 1/2 kilometers and was re-boosted by the Progress-60 supply ship by 5 1/2 kilometers. Again the ISS continued to lose altitude by 5 1/2 kilometers by July when the Progress-61 supply ship raised its orbit by 9 1/2 kilometers. The ISS altitude then fell by 3 kilometers by October when the Soyuz TMA-11 mission re-boosted the station by 5 kilometers. The ISS continued to lose altitude until late December, 2007 when it had lost a total of 8 1/2 kilometers since its last re-boost by Soyuz. Since December 2007, the total of all the declines and re-boosts added up to a net change of + 11 1/2 kilometers by April 2009. "*

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Answer: 340 kilometers - 8 kilometers + 5 kilometers - 4 1/2 kilometers + 5 1/2 kilometers - 5 1/2 kilometers + 9 1/2 kilometers - 3 kilometers + 5 kilometers - 8 1/2 kilometers + 11 1/2 kilometers = **347 1/2 kilometers.**

**Note to Teacher:** The figure below shows the altitude changes between November 1998 and July 2008.

