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MISSION: ARMAGEDDON

Today you will be testing and experimenting with a new weapon the military has developed – the B612 Asteroid Splitter.

The primary purpose of your experimentation will be to determine the answers to four crucial questions:

- 1) How many times must an asteroid be split to reach minimal size? (Minimal size is the size at which the B612 Asteroid Splitter is no longer able to split the asteroid.)
- 2) If we start with a fixed number of asteroids and split them one by one, how many times will we have to fire the weapon to get all the asteroids at minimal size? (This is probably the most important question since knowing the answer will allow us to determine if we have enough time to actually split all the asteroids before they get to earth. If even one asteroid that isn't minimal gets through... we are all doomed.)
- 3) If we start with a fixed number of asteroids and split them one by one until all asteroids are minimal size, how many asteroids will there be? (If there are more than 6,600 asteroids after the process the atmosphere will not be strong enough to burn them all up and Earth will still be destroyed.)
- 4) Can you think of a formula that relates the number of asteroids to the number of times the B612 has been fired?

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MISSION: ARMAGEDDON (PART II)

You did it! You were able to successfully answer the military's questions in enough time for them to calibrate and implement the B612 Asteroid Splitter Mission. Thanks to your work it looks like Earth will once and for all be safe from...uh oh. That's not good. It looks like even though you convinced the scientists that the mission will work, General Kvam is still arguing for the contingency plan to be implemented.

General Kvam says there is no reason to use the time-consuming and boring B612 project when the nuclear-powered B6100 is ready. The B6100 Asteroid DEMOLISHER splits every asteroid within range of the weapon into 5 parts but there are only a limited number of charges. The general insists that his calculations show that after using all the B6100 charges there will only be 4,117 minimal asteroids left and thus Earth's atmosphere will absorb them all.

Math to the rescue again! Help convince General Kvam that there is no way his calculations can be right. Why can there not be exactly 4,117 minimal asteroids at the end of the sequence? Keep in mind that Kvam is not really great at math and will probably need a simple explanation.

Can you think of a formula that would relate number of asteroids to the number of charges the B6100 has used? How could we use this formula to convince the general?

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