Discussion Week 1 Problem 1

You are hired to be the science consultant for the new dystopian *Star Trek* spinoff, *The Final Generation*. It is stated early in the premiere episode that the $2.0*10^9$kg *U.S.S. Enterprise-ZZZ* carries a charge when the shields are raised. The script describes a scene where the *Enterprise-ZZZ* approaches a rouge $3.2*10^{10}$ kg Starfleet space station, *Deep Space 9000*. When the Enterprise is 100km away from the station, *DS9000* raises its shields producing the same charge as the *Enterprise-ZZZ*'s shields. When this happens, the Enterprise's experiences an acceleration of 1.5g. The script writers want you to tell them the acceleration the chief engineer should say *DS9000* experiences and the magnitude of charge the Vulcan science officer should report the shields create.

Discussion Week 1 Problem 2

Star Trek: The Final Generation's writer's room has now delivered to you the midseason cliff hanger. In the end of the episode, president Odo of the Dominion-Section 31 alliance has discovered that the Borg built a Caplan Thruster to reposition the Ferenginar Sun into a Dyson Sphere with an inner radius of $3.0*10^{10}$m to power the new Borg invasion fleet upon the warring Alpha Quadrant. The Dyson Sphere will absorb $7*10^{2}$ electrons on each square kilometer every second. Assuming Borg technology has near 100% efficiency, how much current should Section 31 report to Odo the surface of the Borg Dyson Sphere produces?

Discussion Week 1 Problem 3

It is now time to review ST: The Final Generation's Season 1 finale! It is all out war across the alpha quadrant between the mass Borg assimilation, the rebellion, the rebellion within the rebellion, Starfleet, the Orginalists, Species 8472, the Mirror Universe Enterprise, and the Dominion-Section 31. Each of the 8 fractions have sent their flag ship to a final battel towards the Sol System, all shields raised producing a negative charge of $8*10^{6}$C. In a moment of symmetry, all ships stop at the corners of a perfect cube with side length of $2*10^{2}$km. Only one being can save the day, the immortal emissary of the prophets, the Sisko. The 89kg Sisko appears in the center of this cube with a positive charge of $8*10^{6}$C. Suddenly, the Enterprise-ZZZ explodes. With only 7 ships left, what is the magnitude of the electric force on the Sisko?