

(a) Many people mistakenly believe that the astronauts who orbit the earth are "above gravity". Calculate g for space shuttle territory, that is 200 kilometers above the earth's surface. Given the earth's mass is 6×10^{24} kg, radius is 6.38×10^6 m. Express your answer in percentage of g on the ground. (10 marks)

(b) To better comprehend the magnitude of the gravitational force between the earth and the sun, pretend gravity is turned off and the pull replaced by the tension in a steel cable joining them. How thick would such a cable need to be? You can estimate the diameter by knowing the tensile strength of steel cable is about 5.0×10^8 N/m² (each square meter cross section can support a 5.0×10^8 -newton force).