Questions 3

1.

a) Using its mass and radius, calculate an average density for the Sun.

b) Most white dwarf stars have a mass of about 0.6 $M_\odot$ and a radius similar to the Earth. What is their average density?

c) Most neutron stars have a mass of about 1.4 $M_\odot$ and a radius of about 10 km. What is their average density? Compare to the typical density of nuclear material.

d) An effective size – the so-called Schwarzschild radius, R_S - for a black hole of mass M can be derived by equating its escape speed to the speed of light. Derive the formula for the Schwarzschild radius and evaluate it for a 10 $M_\odot$ black hole? How does it compare to the neutron star?