Summary of lecture 17

- White Dwarf stars are stars that have stopped fusing nuclei and which have collapsed under gravity to the point where the electrons become degenerate and thus exert a pressure which resists further gravitational collapse. White dwarves are typically made up of light nuclei (helium or carbon) and electrons.

- By equating the pressure due to the degenerate electrons with that due to gravity we showed that

$$P_{\text{electrons}} \sim \frac{M^{5/3}}{R^5} \qquad P_{\text{gravity}} \sim \frac{M^2}{R^4}$$

$$\text{i.e.} \quad RM^{1/3} = \text{constant}$$

- We estimated the constant to within an order of magnitude of that extracted from observational data.

- The fact that the pressure due to the electrons always wins at low R and that gravity always wins at large R means the star is stable.
  But we assumed the electrons to be non-relativistic…..what happens if this is not the case?