Part 3

1. I have plotted a line of best fit taking into account all celestial bodies within 10 AU of the sun but disregarding the moon and Mercury. Doing so, according to my line the uncompressed density of a planet near Mercury's position (0.4AU) would have a value of 3900kg/m^3 which is actually quite reasonable and falls within Hughes assumptions when he created his mean horizontal lines on figure 2.

2. Using the uncompressed density of the hypothetical planet that was found via trend line of best fit, the following formula was used:

   $x = (P_{total} - P_{rock} / P_{Fe} - P_{rock})x100$

   where P_{total} is the uncompressed density that was found, P_{rock} is the crust rock given as 2700kg/m^3 and P_{Fe} is 7000kg/m^3. Plugging into the formula, x is equalled to 27.9%. This percentage represents the value of iron making up this hypothetical planet.

3. Similarly, using the same formula as above but using the uncompressed density of Mercury (5300 kg/m^3), x is equalled to 60.5%. This percentage represents the value of iron making up Mercury. Comparing these two values, it is clear that Mercury has the higher iron content. This is because its uncompressed density is higher than expected by Hughes since it was heavily bombarded by asteroids, leading to the loss of most of its crust. Since it is largely compared of an iron rich core, it is a very dense planet and as such, has a high iron percentage.