Sci 170 Homework #6 Solutions Due: Wednesday April 13th

1. [4] The Moon appears geologically inactive now, but was active in the distant past. Why did geological activity on the Moon cease?

   The moon ran out of internal heat, so the mantle solidified. Smaller bodies like the moon lose any initial heat they have faster than larger bodies. Smaller bodies would also have proportionally less radioactive material to provide additional heating.

2. [4] It is estimated Venus has an average surface age of about 500 million years old. How is that determined?

   The surface age is estimated by looking at distribution of craters on the surface. By calibrating the number and distribution of craters using the lunar data you can estimate ages for the other soild bodies in the solar system.

3. [4] On Mars, what evidence is there for water in the form of permafrost around the planet?

   Many impact craters on Mars show signs of liquid splashing or flowing out of the craters. The impact heats the permafrost below the surface melting the permafrost.

4. [4] Jupiter moons Io and Europa have no and very few impact craters on their respective surfaces. What causes the internal heating on them to power the re-surfacing?

   The internal heating of the moons is caused by the tidal forces from Jupiter. The orbits of the moons are not perfectly circular due to their interaction with each other. That means the tidal bulge that Jupiter raises on each moon it not always at the same place on the moon. The squeezing and relaxation of the bulge as it moves around heats the moons.