Quiz 2 (20 points)

1 How did ancient peoples tell stars apart from planets?

Planets (and this included the Moon and the Sun) would appear to move in an easterly direction relative to the rest of the stars over the course of many nights. This is why they are “wanders”.

2 Which type of light travels faster? Infrared or X-rays?

Neither. All light travels at the same speed, the speed of light, c. Infrared light will have a longer wavelength and lower frequency than the more energetic X-rays.

3 True or False: Rockets work by pushing against the ground. Please explain.

False. Rockets work by pushing against the combustive gas they are expelling. The gas is pushed out from the rocket and Newton's 3rd law says there must be an equal and opposite force from the gas pushing on the rocket. This is how rockets move in space even when there is no ground.

4 Kepler's 2nd law is the law of equal areas in equal time. Explain what this means, use pictures.

If a line connecting a planet and the Sun will sweep out equal areas in equal time no matter whether that planet is far from the Sun or close to it, then the planet must go different speeds at different parts in it's orbit. This means the the planet goes fast when close to the Sun to make a short, squat shape that is equal to the long, skinny shape it makes while going slowly when far from the Sun.

5 What causes aurora?

Aurora are cause by charged particles following the Earth's Magnetic field down to the atmosphere of the Earth and collisionally exciting those particles into emitting light. Short story: magnetic field causes charged particles to crash into Earth's atmosphere.