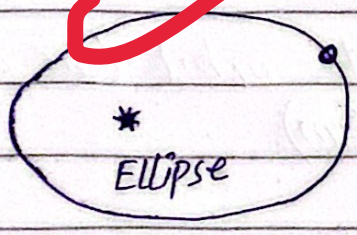
What are Kepler laws related to the motion of planets?

Johannes Kepler formulated three fundamental laws that describe the motion of planets around the Sun. These laws were derived based on the meticulous observations made by Tycho Brahe. Here's a brief overview of each of Kepler's laws:

1- Kepler's First Law (Law of Ellipses)

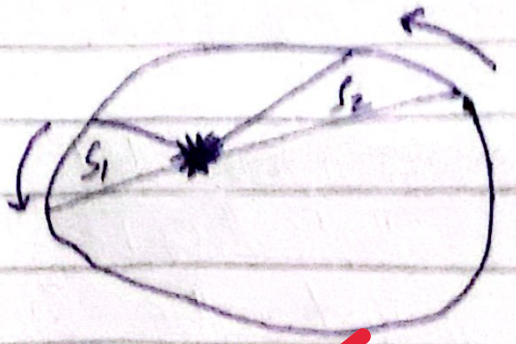
This law states that all planets move about the Sun in elliptical orbits, having the Sun as one of the foci.



1st law

2- Kepler's Second Law (Law of Equal Areas)

A line segment (the radius vector) joining a planet and the Sun sweeps out equal areas in equal intervals of time.



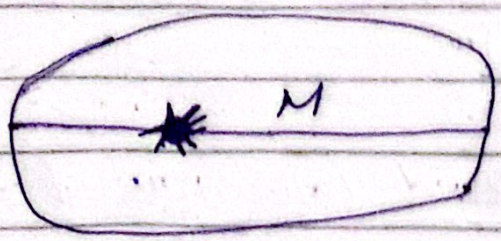
2nd law

Equal area in the same time

area S_1 = area S_2

3- Kepler's Third law (law of Harmonies)

This law states that the square of the orbital period of a planet (the time it takes for a planet to complete one orbit around the Sun) is directly proportional to the cube of the semi-major axis of its orbit (the average distance from the Sun).



3rd law

P: period (the time for one cycle)

M: length of the major axis

P^2/M^3 is the same for all planets

These laws fundamentally changed the understanding of planetary motion and laid the groundwork for Newton's theory of gravitation.

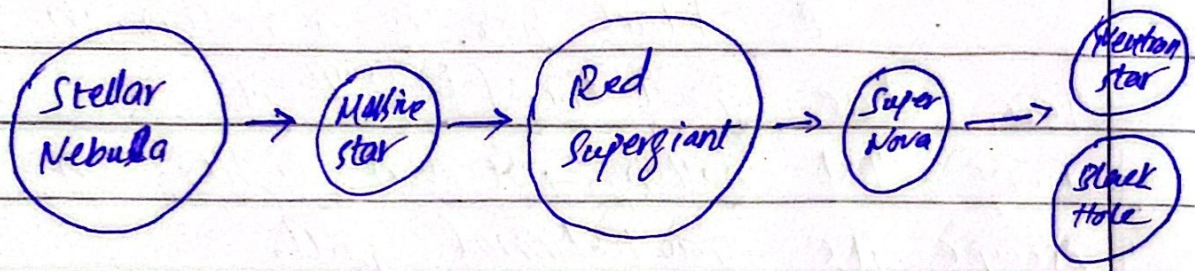
4

Good attempt!!

Define the term Black Hole. What's expected inside it?

Definition:

A black hole is a space region in space where gravitational forces are so strong that nothing, not even light, can escape its gravitational pull



What's inside a black hole?

Inside a black hole, we expect:

1- Singularity: A point of infinit density where all the black hole's mass is concentrated.

2- Event Horizon: The boundry beyon which nothing can escape, not even light.

3- Extreme Gravity: Gravity is so strong that it warps space and time.

The exact nature of the interior remains

unknown due to the limitations of current physics. (3)