

Solutions

2.1 A For a point mass or outside a spherical mass, field strength follows an inverse-square distance dependence. Use distance from the centre, not height above the surface alone.

2.2 Inverse-square field at $3r=18/3^2=2$ units.

2.3 False. Weightlessness in an orbiting spacecraft means apparent weight is small in free fall, not that there is no gravitational field.

2.4 gravitational field. gravitational field means A description of gravitational force per unit mass.

3.1 Field becomes 3 units, one quarter; force becomes one half because test mass doubles. Field is independent of test mass; the inverse-square model applies outside the spherical source.