How does the gravitational acceleration changes outside the Earth as a function of distance to the center of the Earth (r>rE)?

A $g \sim r$ A 0 ×

B $g \sim 1/r$ B 0 ×

C $g \sim \sqrt{r}$ C 0 ×

D $g \sim 1/r^2$ D 0 ✓

What is the gravitational acceleration at the altitude of the ISS (~400 km)? (In m/s2)

A	0	0	✗
B	8.7	0	✓
C	9.8	0	✗
D	1.4	0	✗

What is the escape velocity?

A The velocity at distance r from the centre of mass needed to reach infinity at zero speed 0 ✓

B The minimum velocity of a rocket to reach orbit 0 ✗

C $V_{esc} = \sqrt{\frac{2\mu}{r}}$ C 0 ✓

D the velocity needed to reach the Sun 0 ✗

E $\sqrt{\frac{\mu}{r}}$ E 0 ✗

What is the circular velocity?

A The velocity at distance r from the centre of mass needed to reach infinity at zero speed 0 ✗

B The minimum velocity of a rocket to reach orbit 0 ✗

C $\sqrt{\frac{\mu}{r}}$ D 0 ✓

D The velocity needed to orbit a massive object 0 ✓

What is the typical velocity and orbital period in LEO?

A	7.5 m/s | 60 min	0	✗
B	7.7 km/s | 90 min	0	✓
C	7.7 km/h | 90 s	0	✗
D	9.0 km/s | 77 min	0	✗

The mean solar time...

A	Varies only on timescales of millennia	0	✗
B	varies because of the eccentricity and axial tilt of Earth's orbit	0	✓
C	is constant	0	✗

A sidereal day is...

A	the same as the solar day	0	✗
B	is the time for a full rotation wrt the stars	0	✓
C	is the time for a full rotation wrt the Sun	0	✗
D	is 4 min longer than the mean solar day	0	✗

The gravitational force depends on...

A $F \sim r$ A 0 ✗

B $F \sim 1/r$ B 0 ✗

C $F \sim 1/r^2$ C 0 ✓

D $F \sim 1/r^3$ D 0 ✗

Kepler’s 1st law says...

A	The orbits are conics and the massive object is at one of the foci	0	✓
B	a satellite cannot escape the gravitational well of an object	0	✗
C	the orbital period does not depend on the mass of the massive object	0	✗

Kepler 2nd law says...

A	the gravitational force depends on the distance	0	✗
B	two equal areas of an orbit are swept in equal time	0	✓
C	the rate of change of the true anomaly is always constant	0	✗

Kepler 3rd law says...

A $T = 2\pi\sqrt{\frac{a^3}{\mu}}$ A 0 ✓

B the gravitational force depends on the distance 0 ✗

C the orbital period does not depend on the mass of the massive object 0 ✗

Which text about the specific energy is wrong?

A $\varepsilon = -\frac{\mu}{2a}$ A 0 ✗

B the energy is <0 for bounded orbits 0 ✗

C The energy is positive for elliptical orbits 0 ✓

D the energy only depends on the semi-major axis 0 ✗