

C 1) The center of mass (CM) of an object or group of objects:

- A) is a point where there is always a mass.
- B) is always at the exact geometric center of an object.
- C) is a coordinate, not a mass.
- D) has nothing to do with how gravity operates on a mass.
- E) only needs to be calculated in one dimension.

B 2) The center of mass (CM) of an object or group of objects:

- A) depends on where you place your coordinate origin.
- B) is the same as the CM of the CM's of any pieces of the object.
- C) can very rarely be determined by symmetry.
- D) can be moved by explosions inside the object.
- E) cannot be calculated unless the objects are points.

A 3) I have a 1-kg ball, at $x=1$, a 2-kg ball at $x=2$, and a 3-kg ball at $x=3$. The CM is at:

- A) $\frac{7}{3}$
- B) $\frac{7}{2}$
- C) $\frac{6}{7}$
- D) $\frac{8}{3}$
- E) $\frac{14}{5}$
- F) $\frac{5}{2}$

E 4) You are moving about a space capsule which is in orbit around the Earth. The CM of you plus the rest of the space capsule:

- A) cannot be moving at all.
- B) moves with you as you move about.
- C) moves opposite to your direction as you move about.
- D) cannot wobble up and down (relative to the Earth), but can wobble back and forth.
- E) continues to orbit the Earth in a circle as though you are not moving.

D 5) The clown toy that I showed you in class is capable of balancing on a string because:

- A) the string runs perfectly below the CM of the clown.
- B) the string is attached to the toy's wheels.
- C) circus forces unknown to science keep it upright.
- D) two lead balls place its CM below the string.
- E) the clown toy is very light.