Consider a 12-foot ladder leaning up against a vertical wall. Imagine that there is a glowing disk half way up the ladder at 6 feet off the ground. **Scenario #1:** Imagine that the base of the ladder begins to slip away from the wall and the top slides all the way down. **Scenario #2:** With the same ladder, same wall and same glowing disk, imagine that the ladder falls over, keeping its base fixed at the juncture of the floor and the wall. If you were to watch these two scenarios in a dark room, what curve (or portion of a curve) would the glowing disk trace out in each case? In which of the two cases would the disk travel further? Justify your answers.

**A Solution:** In both cases, the curve is exactly the same, a quarter of a circle with radius 6 and center at the point where the wall and floor meet. This is entirely self-evident in scenario #2. To see that the same curve is traced out in scenario #1, consider the following diagram:
In right triangle ABC, let D be the midpoint of the hypotenuse, AB. Drop a perpendicular from D to the leg, CB. Call the foot of this perpendicular, E. Now triangle DEB is similar to triangle ACB because all three angles are congruent. Moreover, D is the midpoint of AB so DB is half the length of AB. By similarity, E must be the midpoint of CB. This makes triangle DEC congruent to triangle DEB (side-angle-side). Thus CD is congruent to DB. So, what does this have to do with sliding ladders? If AB represents the ladder and AC, the wall, then point D is the glowing disk. The picture, above, is a “snapshot” of the action at any time during the slide. It illustrates that D (the disk) must be a constant 6 feet (the common length of CD and DB) away from C, the juncture of the wall and the floor.

There was exactly one correct solver. Congratulations to Ed Grant of the Mathematics Department!