Monday 10/7/02   Names:_____

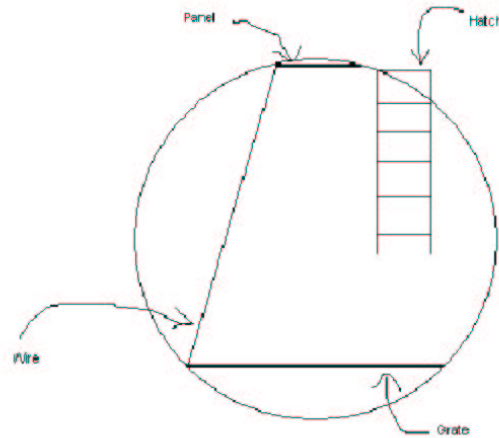   _____

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Mario Never Had to Do This!

You're building an underground tunnel made of a cylindrical concrete pipe with diameter 10 feet. (Hints: Do all calculations in feet. Don't worry about inches. The goal here is to think about these things as lines (except the hatch) and work with them like that.)

1. An 8 foot wide metal grill will be laid flat as a walkway at the bottom of the pipe. The sides will lie up against the walls of the pipe. Impose a coordinate system on a cross section of the tunnel (try putting the origin at the center), and use it to:
a) Figure out the coordinates of the edges of the grill.
b) How far from the bottom of the pipe is the grill?
c) Figure out the equation for the line the grill lies on.

2. A set of flat lighting panels is to be placed along the roof of the tunnel. There needs to be a .3-foot gap between the panels and the top of the tunnel to string wiring. How wide should the panels be?

3. A 2-foot wide (horizontally) access hatch needs to be built into the roof of the pipe, with a ladder leading down, on the **right** side of the tunnel like in the picture. The following conditions need to be satisfied: (i) the hatch must be directly over the grate, and (ii) The hatch must not be over the lighting fixture. Translate (i) and (ii) to find
a) The farthest right (x-value) the right side of the hatch can go
b) The farthest left (x-value) the left side of the hatch can go.
c) The range of x-values where you can put the center of the hatch.

4. A wire is to hang between the left edge of the lighting panel and the left edge of the grate. Find an equation for the line the wire lies along, according to your coordinate system.