Extra Credit Project: Linear Functions

9/9/2010

In this project you'll be investigating the cost of a hand dryer versus the cost of continually using paper towels. The problem with most hand dryers is that they don't work (or at least, they don't work very well or very quickly). This is why we would like a Dyson Air Blade; it's an energy efficient hand dryer which literally squeegees the water from your hands (like a windshield wiper) with a powerful "blade" of air. The downside is that a Dyson unit costs around \$1,250 (tax included). Even so, it would be nice to have an environmentally friendly hand dryer that actually works.

With that said, your assignment is to (1) come up with a **linear** cost function $C(x)$ which gives the cost $C(x)$ of having used x cases of paper towels, (2) determine how many cases of paper towels we' have to go through to equal the cost of a Dyson (plot your cost function on a graph and show us where the cost crosses the horizontal line $y = 1,250$), (3) estimate how many cases we use per day (consider the number of students, the number times a student washes their hands, and the number paper towels it takes to get their hands dry), and finally (4) see how many school days it would take us to go through enough cases to equal the cost of a Dyson (compare this to the fact the a Dyson has a five year warranty). The project is due one week from today. I.e., the project is due on 9/16/2010.

A few remarks are in order... your cost function should have a "fixed cost" = the cost of the crummy metal paper towel dispenser (shouldn't be more than \$30) and a "variable cost" = the cost of one case of paper towels. You'll need to do some research to figure out what these are. I can tell you that we use Envision single-fold paper towels and we mean that a case has 4,000 paper towels (16 packs of 250). Lastly, this should be treated like a lab. We want a typed report of your results with complete sentences and thoughtful analysis. You can ask us questions, but since it's extra credit we won't give away too much. You can take this deeper for even more extra points if you factor in the amount of energy that a hand dryer would use per day.