Dear Calculus Student,

My name is John Mekkstosi, and I will be selling balloons at the Levky county fair. It may sound trivial, but in fact it is highly profitable... the demand is so high, that I sell them as fast as I can inflate them. I even have a machine that inflates them for me! Of course, one is led to believe that I should blow them up as fast as possible.

However, not even the life of a balloon salesman is without complications. If I inflate them too fast, they explode, and I lose profit. In particular, the manufacturer's label on the balloons state that if the surface area of a balloon increases faster than 10 ft^2/sec at any given instant, then the balloon will burst. The balloons are spherical in shape, start at a radius of 3 inches, and I inflate them to a radius of 1 foot.

My balloon-inflating machine has 4 speeds at which it can pump air into a balloon:
0.5 ft^3/sec, 1.0 ft^3/sec, 1.5 ft^3/sec, or 2.0 ft^3/sec. I don't want to waste precious balloons by guessing and checking. I was hoping you could tell me which setting I should use so that the balloons are inflated as rapidly as possible, but do not burst.

Warmest regards,

John Mekkstosi

John Mekkstosi