National Convention 2014 Mu Ciphering Solutions

Q#0- The position at t>0 of a particle moving on the x-axis is given by. At the first instant when the acceleration is 1 unit/second squared, the particle has velocity (in units/sec)?





Q#1-

Q#2-Draw a picture: Area of triangle is: 





Q#3-Draw a picture and set up similar triangles. If you call the inner cone's height "10-h". Using similar triangles we start with: 



Q#4-

Q#5-Solve for the height of the triangle in terms of "s" and you get: 



Q#6-Integration by parts(twice) 





Q#7-Draw yourself a picture and find the area under the curves. What you are looking for are:



Q#8. Much easier to use shell method here:



Q#9-Integrate both sides using separation of variables and then solve for C.



Q#10-I would use trig substitution here:



Answers:

