Homework: Compare Mie Theory for Spheres with the simple model for absorption below.

Gross Special Purpose Approximation:

$\sigma_{abs} = a[1-\exp(-D_{eq}/\delta)]$. Let $D_{eq}=v/a$. $\delta=\lambda/(4\pi n_i)$=skin depth.

$v=4\pi r^3/3$. a=average projected area=πr^2 for a sphere.
D=2r. $D_{eq}=2D/3$.

Cases in a 3 matrices for fixed n_r and variable D and n_i:
(calculate the percentage error of the model and Mie theory.)
λ= 0.5 um.

$n_r=1$, $n_r=1.33$, $n_r=1.5$

D=0.01 um, 0.1 um, 1 um, 10 um.

$n_i=0.001$, $n_i=0.01$, $n_i=0.1$, $n_i=1$.

Table for Homework (one for each real refractive index, 1.0, 1.333, and 1.5). Fill each empty table with a percentage error as defined below.

D (microns) → / n_i ↓	0.01	0.1	1	10
0.001				
0.01				
0.1				
1				

$$\%Error \equiv 100\ \frac{\sigma_{abs}^{Mie} - \sigma_{abs}^{Model}}{\sigma_{abs}^{Mie}} = 100\ \frac{Q_{abs}^{Mie} - Q_{abs}^{Model}}{Q_{abs}^{Mie}}$$