P7.15

- **Finding the differential cross-section**

In[3]:= $p = \sqrt{\frac{\gamma^2 (\pi - \alpha)^2}{V^2 \alpha * (2\pi - \alpha)}};$

In[8]:= $\sigma = \frac{-p}{\text{Sin}[\alpha]} * \text{D}[p, \alpha]; \sigma$ // FullSimplify

Out[8]= $\frac{\pi^2 (\pi - \alpha) \gamma^2 \csc(\alpha)}{\alpha^2 (\alpha - 2\pi)^2 V^2}$

- **Finding the total back scattering cross section**

In[9]:= `Integrate[σ * Sin[α], {α, π / 2, π}, {ϕ, 0, 2 π}]`

Out[9]= $\frac{\pi \gamma^2}{3 V^2}$

P7.22

In[167]:= $r1 = 200; r2 = 384000; \gamma = \left((6380)^2 * .0098\right);$

$vL = \left(\frac{2 * \gamma * r2}{r1 * (r2 + r1)}\right)^{1/2} - \left(\frac{\gamma}{r1}\right)^{1/2}$

$vR = \left(\frac{\gamma}{r2}\right)^{1/2} - \left(\frac{2 * \gamma * r1}{r2 * (r1 + r2)}\right)^{1/2}$

Out[168]= 18.4823

Out[169]= 0.986334

$\sqrt{\frac{\pi^2 (r2 + r1)^3}{8\gamma}} \Big/ 3600.$

116.333