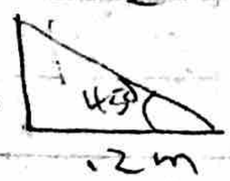
Module 7

1. For each wedge $g_{comp} = \frac{\pi}{2} G\rho R(1-\cos\theta)$

$G = 6.67\times10^{-11}$, for θ: 

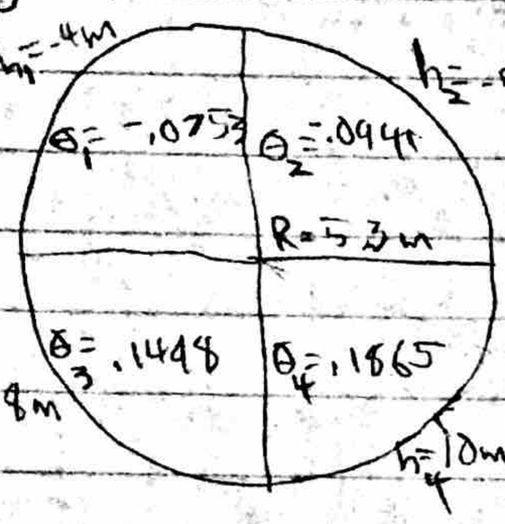
$45° = \frac{\pi}{4}$, use $R = 1m$ to approximate a curb and sidewalk

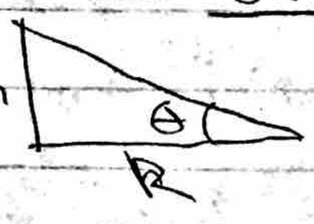
$\rho = 2400 kg/m^3$ average concrete density

so for a 90° wedge, $g_{comp} = 2\left(\frac{\pi}{2}\right)(6.67\times10^{-11})(2400)(1)(1-\cos\frac{\pi}{4})$

$g_{comp} = 1.4729\times10^{-7} m/s^2 = \underline{0.01473 mGal}$

$\tan\theta = \frac{h}{R} \rightarrow \theta = \arctan\frac{h}{R}$

2. 

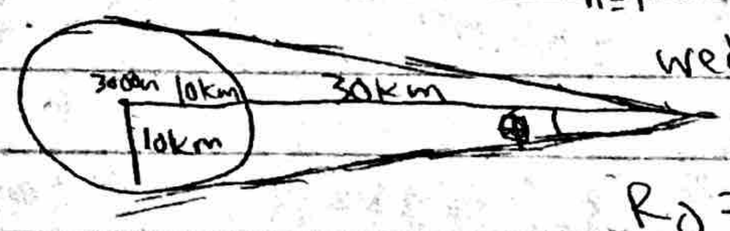


so using $g_{comp} = \frac{\pi}{2} G\rho R(1-\cos\theta)$ for each wedge with same constants as above

$g_1 = .000143 mGal$ $g_2 = .000222 mGal$

$g_3 = .000563 mGal$ $g_4 = .000872$

total correction for $\sum_{n=1}^{4} g_n = \underline{0.00107 mGal}$

3. 

wedge angle $= 2\theta = 2\arctan\left(\frac{10}{40}\right) = .489937$

so this is the wedge angle

$R_o = 50km$. $R_i = 30km$. & $h = 3000m$

Average andesite $\rho = 2770 kg/m^3$

$g_{comp} = G\rho\Delta\theta\left[R_o - R_i + \sqrt{R_i^2+h^2} - \sqrt{R_o^2+h^2}\right]$

$g_{comp} = (6.67\times10^{-11})(2770)(.489957)\left[50000-30000+\sqrt{30000^2+3000^2}-\sqrt{50000^2+3000^2}\right]$

$\underline{g_{comp} = 0.5268 mGal}$