PRACTICAL 3: GRAVITY EXERCISE

A Worden gravimeter was used to measure the difference in gravity between the basement and top floor of South Wing.

(1) Meter dial reading in basement = 402.8 divisions

(2) Meter dial reading on top floor = 391.6 divisions

(3) Difference in dial reading =   divisions

(4) Meter's conversion factor = 0.4501 mgal/division

(5) Gravity difference =   mgal

(i) What is the gravity difference in gravity units (g.u.)?
    You may need to check your notes for the conversion factor from milligals (mgal) to gravity units (g.u.).

(ii) Estimate the height of the top floor above the basement from this difference.
    The elevation correction is 3.086 g.u. per metre.

SOME QUESTIONS ON GRAVITY

(a) With what accuracy must differences in elevation be measured to provide gravity measurements accurate to 0.1 g.u.?

(b) Estimate the mass of the Earth from the acceleration of gravity g. Assume that the Earth is a non-rotating spherically symmetric sphere. The formula required is in your notes. *Warning: watch your units.*
    DATA: Acceleration of gravity = g = 9.80 ms^{-2}.   Mean radius of the Earth = 6371 km.
        Gravitational Constant = G = 6.67×10^{-11}m^{3}kg^{-1}s^{-2}.

(c) How would the Bouguer correction be modified for gravity measurements made down a mine?