

Recall

$$R = \left( \frac{3M}{4\pi\rho} \right)^{1/3}$$

Since this looks complicated, let's find the uncertainty in two steps:

a) the uncertainty in the expression inside the parentheses - without the  $^{1/3}$  power

b) the uncertainty of the whole thing, including the  $^{1/3}$  power.

To simplify, we'll give the expression inside the parentheses a new name. How about  $Q$ ?

The quantity inside the parentheses can be called

$$Q = \frac{3M}{4\pi\rho}$$

Division rule says

$$\frac{\Delta Q}{Q} = \frac{\Delta M}{M} + \frac{\Delta \rho}{\rho}$$

$$= \frac{0.21 \times 10^7 \text{ kg}}{2.06 \times 10^7 \text{ kg}} + \frac{200 \frac{\text{kg}}{\text{m}^3}}{19,300 \frac{\text{kg}}{\text{m}^3}}$$

$$= 0.102 + 0.010$$