$$C = \sqrt{A^2 + B^2}$$

$$A = \ \ 5.3 \pm 0.2 \text{ cm}$$
$$B = 15.4 \pm 0.3 \text{ cm}$$

if $\quad C = \sqrt{A^2 + B^2} \quad$, what is $\quad \Delta C$?

$$\frac{\Delta A^2}{A^2} = \frac{\Delta A}{A} + \frac{\Delta A}{A}$$
$$= \frac{0.2}{5.3} + \frac{0.2}{5.3}$$
$$= 0.075$$

$$\Delta A^2 = 0.075 A^2 = 2.1 \text{ cm}^2$$

$$A^2 = 28.1 \pm 2.1 \text{ cm}^2$$

$$B^2 = 237.2 \pm 9.2 \text{ cm}^2$$

$$C^2 = A^2 + B^2 = 265.3 \pm 11.3 \text{ cm}^2$$

$$\frac{\Delta C^2}{C^2} = \frac{11.3}{265.3} = 0.043$$

$$\frac{\Delta C}{C} = \frac{1}{2}\frac{\Delta C^2}{C^2}$$
$$= 0.021$$

$$\Delta C = 0.021\, C = 0.021\, (16.3 \text{ cm}) = 0.3 \text{ cm}$$

$$C = 16.3 \pm 0.3 \text{ cm}$$

$$\Delta C = \left( \frac{\Delta A\, |A| \ + \ \Delta B\, |B|}{|C|} \right)$$

$$C = (C^2)^{\frac{1}{2}}$$

$$\frac{\Delta C}{C} = \frac{1}{2}\ \frac{\Delta (C^2)}{C^2}$$

$$\Delta C \quad = \quad \frac{1}{2}\, C\, \frac{\Delta(C^2)}{C^2} \quad = \quad \frac{1}{2}\, C\, \frac{(2\Delta A\,|A| \ + \ 2\Delta B\,|B|)}{C^2}$$

$$\Delta C \quad = \quad \frac{(\Delta A\,|A| \ + \ \Delta B\,|B|)}{C}$$