

① Calculate area of rectangle.

$$A = (1.2 \pm 0.05) \text{ m}, \quad \Delta A \sim 4.17\%$$

$$B = (3.72 \pm 0.005) \text{ m}, \quad \Delta B \sim 0.134\%$$

$$AB = (1.2 \pm 0.05) (3.72 \pm 0.005) \text{ m}^2$$

$$= \begin{cases} 4.65625 \text{ m}^2 & (\text{MAX}) \\ 4.464 \text{ m}^2 & (\text{MEDIAN}) \\ 4.27225 \text{ m}^2 & (\text{MIN}) \end{cases}$$

$$= (4.464 \pm 0.192) \text{ m}^2, \quad \Delta(AB) \sim \underline{\underline{4.30\%}}$$

$$AB = \boxed{4.46 \pm 0.20} \quad \stackrel{?}{=} \underline{\underline{4.5}} \\ \underline{4.45 \pm 0.2} \quad (\text{Follow usual rule.})$$

⊙ Calculate "simple" function:  $f(x) = x^2$

A)  $x = 32.7 \pm 0.1$ ,  $\Delta x \sim \underline{3.06\%}$

$$f(x) = x^2 \rightarrow \begin{cases} 1075.84 & (\text{MAX}) \\ 1069.29 & (\text{MEDIAN}) \\ 1062.76 & (\text{MIN}) \end{cases}$$

$= 1069.29 \pm 6.54$ ,  $\Delta f \sim \underline{6.12\%}$

$= \boxed{1069.3 \pm 6.6} \stackrel{?}{=} \underline{\underline{1070}}$   
(Naive rule)

B)  $x = 0.0123 \pm 0.0001$ ,  $\Delta x \sim \underline{0.813\%}$

$$f(x) = x^2 \rightarrow \begin{cases} 1.5376 \times 10^{-4} & (\text{MAX}) \\ 1.5129 \times 10^{-4} & (\text{MEDIAN}) \\ 1.4884 \times 10^{-4} & (\text{MIN}) \end{cases}$$

$= (1.5129 \pm 0.0246) \times 10^{-4}$ ,  $\Delta f \sim \underline{1.63\%}$

$= \boxed{(1.513 \pm 0.025) \times 10^{-4}}$

$\stackrel{?}{=} \underline{\underline{1.51 \times 10^{-4}}}$  (Naive rule)

© Calculate trig function:  $F(\theta) = \tan \theta$

A)  $\theta = 3.5^\circ \pm .1^\circ$ ,  $\Delta\theta \sim \underline{2.86\%}$

$$f(\theta) = \tan \theta \rightarrow \begin{cases} 0.0629147 & (\text{MAX}) \\ 0.0611626 & (\text{MEDIAN}) \\ 0.0594109 & (\text{MIN}) \end{cases}$$

$$= 0.0611626 \pm 0.0017519, \Delta f \sim \underline{2.86\%}$$

$$= \boxed{0.0612 \pm 0.0018} \stackrel{?}{=} \underline{\underline{0.061}} \\ (0.061 \pm 0.002) \quad (\text{Naive rule})$$

B)  $\theta = 89.4^\circ \pm .1^\circ$ ,  $\Delta\theta \sim \underline{0.112\%}$

$$f(\theta) = \tan \theta \rightarrow \begin{cases} 114.589 & (\text{MAX}) \\ 95.489 & (\text{MEDIAN}) \\ 81.847 & (\text{MIN}) \end{cases}$$

$$= 95.489 \pm 16.371, \Delta f \sim \underline{\underline{17.1\%}}$$

$$= 95.5 \pm 16.4$$

$$= \boxed{95.5 \pm 17} \stackrel{?}{=} \underline{\underline{95.5}} \quad (\text{Naive rule})$$