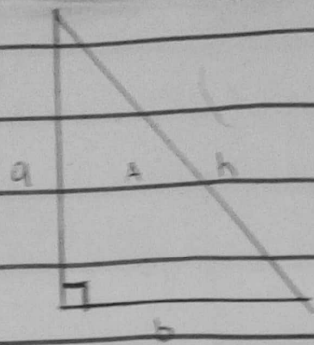


NAME: TOBY CHRISTIAN  
CHEMICAL ENGINEERING  
17/ENG01/021



Solution

$$A = \frac{1}{2} ab = \frac{ab}{2}$$

$$\delta A = \frac{\partial A}{\partial a} \delta a + \frac{\partial A}{\partial b} \delta b$$

$$\frac{\partial A}{\partial a} = \frac{b}{2}$$

$$\frac{\partial A}{\partial b} = \frac{a}{2}$$

$$\delta a = \pm \frac{1.5}{100} = \pm \frac{3}{200}$$

$$\delta b = \pm \frac{1.5}{100} = \pm \frac{3}{200}$$

$$\delta A = \left(\frac{b}{2}\right) \cdot \left(\pm \frac{3a}{200}\right) + \left(\frac{a}{2}\right) \cdot \left(\pm \frac{3b}{200}\right)$$

$$\delta A = \pm \frac{ab}{2} \left[ \frac{3}{200} + \frac{3}{200} \right] = \pm A \left[ \frac{3}{100} \right]$$

$$\delta A = \pm A \frac{3}{100}$$

$$\therefore \delta A = 3 \text{ percent of } A$$

~~2 percent of A~~

$$h = \sqrt{a^2 + b^2} = (a^2 + b^2)^{1/2}$$

$$h = F(a, b)$$

$$\delta h = \frac{\partial h}{\partial a} \delta a + \frac{\partial h}{\partial b} \delta b$$

$$\frac{\partial h}{\partial a} = a(a^2 + b^2)^{-1/2} = \frac{a}{\sqrt{a^2 + b^2}}$$

$$\frac{\partial h}{\partial b} = b(a^2 + b^2)^{-1/2} = \frac{b}{\sqrt{a^2 + b^2}}$$

$$\delta a = \left( \frac{\pm 1.5}{100} \right) \cdot \left( \frac{\pm 3}{200} \right)$$

$$\delta b = \left( \frac{\pm 1.5}{100} \right) \cdot \left( \frac{\pm 3}{200} \right)$$

$$\delta h = \frac{a}{\sqrt{a^2 + b^2}} \cdot \left( \frac{\pm 3a}{200} \right) + \frac{b}{\sqrt{a^2 + b^2}} \cdot \left( \frac{\pm 3b}{200} \right)$$

$$= \frac{a^2}{\sqrt{a^2 + b^2}} \cdot \left( \frac{a^2 + b^2}{\sqrt{a^2 + b^2}} \right)$$

$$\text{Recall } \left[ \sqrt{a^2 + b^2} = \frac{(a^2 + b^2)}{\sqrt{a^2 + b^2}} \right]$$

$$= \frac{\pm 3}{200} \sqrt{a^2 + b^2}$$

$$= \frac{\pm 3}{200} (h)$$

$$\delta h = 0.05 \text{ percent of } h$$