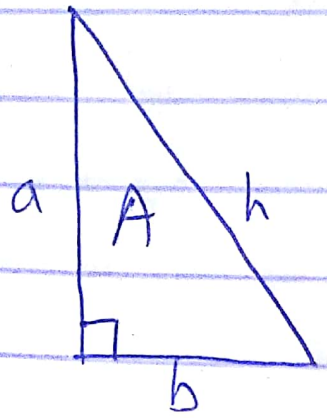
OKPALA CHARLES . C.
CIVIL ENGINEERING
17/ENG03/040
ENGINEERING MATHEMATICS

1.



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

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

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

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

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

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

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

$\therefore \delta A =$ 3 percent of A.

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

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

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

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

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

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

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

$$= \frac{a^2}{\sqrt{a^2+b^2}}\cdot\frac{(a^2+b^2)}{\sqrt{a^2+b^2}}$$ Recall $\sqrt{x}\sqrt{x} = x$

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

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

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

$\delta h =$ 0.05 percent of h