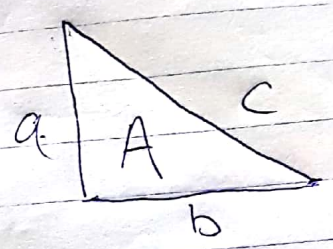
ENG 281 Assignment

Name: AJANI Kehinde Patrick

Department: Petroleum Engineering

Matric NO: 17/ENG07/005



a Let A be denoted as the area of the triangle

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

b is the base

h is the height denoted as a

$\therefore A = \frac{1}{2} ba$

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

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

$\delta a = \pm \frac{1.5}{100}$ of $a = \frac{1.5a}{100}$

$\delta b = \pm \frac{1.5}{100}$ of $b = \frac{1.5b}{100}$

$$\delta A = \frac{b}{2}\left[\pm \frac{1.5a}{100}\right] + \frac{a}{2}\left[\pm \frac{1.5b}{100}\right]$$

$$\delta A = \pm \frac{ab}{2}\left[\frac{1.5}{100}\right] \pm \frac{ab}{2}\left[\frac{1.5}{100}\right]$$

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

$A = ab$

δ

$\therefore \delta A = A\left[\frac{3}{100}\right]$

$\rightarrow$ 3% of A

b $C^2 = a^2 + b^2$ ... [Pythagoras theorem]

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

$\frac{\partial c}{\partial a} = \frac{1}{2}(a^2+b^2)^{-1/2} \cdot (2a) = a[a^2+b^2]^{-1/2}$

$\frac{\partial c}{\partial b} = \frac{\partial c}{\partial m} \times \frac{\partial m}{\partial b}$. let $m = a^2+b^2$

$\therefore \frac{\partial m}{\partial b} = 2b$, $\frac{\partial c}{\partial m} = \frac{1}{2}(m)^{-1/2}$

$= \frac{1}{2}[a^2+b^2]^{-1/2}$

$\frac{\partial c}{\partial b} = \frac{1}{2}[a^2+b^2]^{-1/2} \cdot [2b]$

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

$\delta a = \frac{\pm 1.5a}{100}$ and $\delta b = \frac{\pm 1.5b}{100}$

$\delta c = \frac{a}{\sqrt{a^2+b^2}}\left[\frac{\pm 1.5a}{100}\right] + \frac{b}{\sqrt{a^2+b^2}}\left[\frac{\pm 1.5b}{100}\right]$

$$\delta C = \frac{\pm 1.5\,[a^2+b^2]}{(100)(\sqrt{a^2+b^2})} \quad \therefore \quad \delta C = \pm \frac{1.5}{100}(\sqrt{a^2+b^2})$$

$$\therefore \delta C = \pm \frac{1.5}{100}[C]$$

$$= 1.5\% \text{ of } C$$