

1) - LEBOANDE RUKATATI KUTATI

BIOMEDICAL ENGINEERING.

17/ENG08/004

ENG 281 - ENGINEERING MATHEMATICS.

21/10/2018.

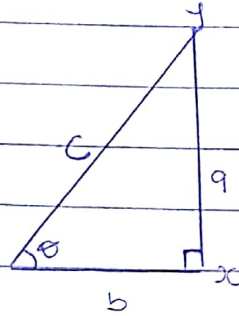
ASSIGNMENT 2.

Solution

$$A = \frac{1}{2}ab \quad b = \text{from } \frac{9}{2} \text{ \& } \frac{b}{2}$$

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

$$d_a = \frac{3a}{200}, \quad d_b = \pm \frac{3b}{200}$$



$$dA = \frac{\partial A}{\partial a} \cdot d_a + \frac{\partial A}{\partial b} \cdot d_b$$

$$\frac{b}{2} (\pm \frac{3a}{200}) + \frac{9}{2} (\pm \frac{b}{200})$$

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

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

$$\therefore dA = 3\% \text{ of } A$$

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

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

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

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

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

$$\Delta a = \pm \frac{3a}{200}, \quad \Delta b = \pm \frac{3b}{200}$$

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

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

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

$$= \pm \frac{3}{200} \cdot c$$

$$\therefore \Delta c = 1.5\% \text{ of } c$$