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DEPT: COMPUTER ENGINEERING

The hypotenuse of a right angle is denoted as c and the other two sides are denoted as a & b. is I 1.5%, find the max possible error in calculating

a) The area of the triangle and,
b) The length of the hypotenus.

Solve

a) $A = \frac{1}{2} a \cdot b = \frac{a \cdot b}{2}$

$\frac{\partial A}{\partial a} = \frac{1}{2}$, $\frac{\partial A}{\partial b} = \frac{a}{2}$

$\delta a = \pm \frac{39}{200}$, $\delta a = \frac{\partial A}{\partial b} \cdot \partial b$

$= \frac{b}{2} (c \pm \frac{39}{200}) + \frac{a}{2} (\pm \frac{b}{200})$

$= \pm \frac{a \cdot b}{2} (\frac{3}{200} + \frac{3}{200}) = \pm A \cdot \frac{3}{100}$

$\therefore \partial A = 3$ percent of A

b) $c = \sqrt{a^2 + b^2} = (a^2 + b^2)^{\frac{1}{2}}$

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

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

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

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

$\partial a = \pm \frac{39}{200}$, $\partial b = \pm \frac{3b}{200}$

$\therefore \partial c = \frac{\partial c}{\partial a} \cdot \partial a \pm \frac{\partial c}{\partial b} \cdot \partial b$

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

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

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

$\delta c = 1.5$ percent of c.

denoted as
a & b - is
calculating

b

$\pm \frac{b}{200}$

$\frac{3}{100}$