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ELECTRICAL ENGINEERING.

The hypotenuse of a right angle triangle is denoted as 'c' and the other two sides are denoted as 'a' and 'b'.
Q15) Find the max possible error in calculating the length of the hypotenuse.

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

$$\frac{dA}{da} = \frac{b}{2}, \quad \frac{dA}{db} = \frac{a}{2}$$

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

$$dA = \frac{dA}{da} \cdot da + \frac{dA}{db} \cdot db$$

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

$$= \pm \frac{a \cdot b}{2} \left[\frac{3}{200} + \frac{3}{200} \right]$$

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

$$dA = 3 \text{ percent of } A.$$

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

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

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

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

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

$$da = \frac{+3a}{200}, \quad db = \frac{+3b}{200}$$

$$dc = \frac{dc}{da} \cdot da + \frac{dc}{db} \cdot db$$

$$dc = \frac{a}{\sqrt{a^2 + b^2}} \left(\frac{+3a}{200} \right) + \frac{b}{\sqrt{a^2 + b^2}} \left(\frac{+3b}{200} \right)$$

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

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

$dc = 1.5$ percent of c .