

AI1110 Assignment I (ICSE Class 10 2017)

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Question 1a: If b is the mean proportion between a and c , show that:

$$\frac{a^4 + a^2 + b^2 + b^4}{b^4 + b^2c^2 + c^2} = \frac{a^2}{c^2}$$

Solution: Given that b is the mean proportion of a and c . Hence

$$a : b : c$$

i.e.

$$\frac{a}{b} = \frac{b}{c}$$

$$\therefore b^2 = ac$$

So we can replace b^2 with ac in the LHS
Doing that we get,

$$LHS = \frac{a^4 + a^2 + b^2 + b^4}{b^4 + b^2c^2 + c^2} \quad (1)$$

$$= \frac{a^4 + a^2ac + a^2c^2}{a^2c^2 + ac^3 + c^4} \quad (2)$$

$$= \frac{a^2(a^2 + ac + c^2)}{c^2(a^2 + ac + c^2)} \quad (3)$$

$$= \frac{a^2}{c^2} \quad (4)$$

$$= RHS \quad (5)$$

$$\boxed{\therefore LHS = RHS}$$

Hence proved that,

$$\frac{a^4 + a^2b^2 + b^4}{b^4 + b^2c^2 + c^4} = \frac{a^2}{c^2} \quad (6)$$