

3) If $a, b, c \in \mathbb{R}^+$, and $2b = a + c$, then check the nature of roots of equation $ax^2 + bx + c = 0$.

Solution: Given equation is $ax^2 + 2bx + c = 0$. Hence,

$$D = 4b^2 - 4ac$$

$$= (a+c)^2 - 4ac$$

$$= (a-c)^2 > 0.$$

Thus, the roots are real and distinct.