

Question 1. If one of the roots of $x^2 + mx + n = 0$ is 3 times the other then the condition is?

Solution. Let x_1 and x_2 be the roots of the equation. By Vieta's formulas $x_1 + x_2 = -m$ and $x_1 x_2 = n$. We are given that $x_2 = 3x_1$, so

$$4x_1 = -m, \quad 3x_1^2 = n.$$

It follows from the first equation that $x_1 = -\frac{m}{4}$. Substituting this value to the second equation we get $n = \frac{3m^2}{16}$.

Answer: $n = \frac{3m^2}{16}$.

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