

## Answer on Question #64365 – Math – Abstract Algebra

### Question

Show that  $x^2 + x + 4$  is irreducible over  $\mathbb{Z}_{11}$ .

### Solution

Since the polynomial has degree 2, it is irreducible over a field if and only if it has no roots in the field. Let's check that:

	0	1	2	3	4	5	6	7	8	9	10
$x^2 + x + 4$	4	6	10	16	24	34	46	60	76	94	114
$x^2 + x + 4(\text{mod}11)$	4	6	10	5	2	1	2	5	10	6	4

We used Reducibility Test for Degrees 2 and 3 to prove that the given polynomial is irreducible over the given field.