

Answer on Question #48368 – Math – Abstract Algebra:

Calculate $(2x + 3)(3x + 4)$ in $\mathbb{Z}_5[x]$.

Solution.

$$(2x + 3)(3x + 4) = 6x^2 + 8x + 9x + 12 = 6x^2 + 17x + 12;$$

$$6 \equiv 1(\text{mod } 5);$$

$$17 \equiv 2(\text{mod } 5);$$

$$12 \equiv 2(\text{mod } 5);$$

Hence:

$$6x^2 + 17x + 12 = x^2 + 2x + 2 \text{ in } \mathbb{Z}_5[x].$$