primitive. Thus, if $f(x)$ is primitive, then F^* can be completely generated by constructing powers of x modulo $f(x)$. This is useful because it allows products of elements in F^* to be formed by converting the elements into their representations as powers of x, multiplying the powers of x, and then converting the result back into an element in F^*. We illustrate this in the following example.

Example 1.10 Consider the field D/B in Example 1.9. We can use the identity $x^2 = 2x + 1$ to construct the elements in this field that correspond to powers of x. For example, we can construct the field element that corresponds to x^3 as follows.

$$x^3 = x^2x = (2x+1)x = 2x^2 + x = 2(2x+1) + x = 5x + 2 = 2x + 2$$

Thus, $x^3 = 2x + 2$ in D/B. Also, we can construct the field element that corresponds to x^4 as follows.

$$x^4 = x^3x = (2x+2)x = 2x^2 + 2x = 2(2x+1) + 2x = 6x + 2 = 2$$

Thus, $x^4 = 2$ in D/B. The field elements that correspond to subsequent powers of x can be constructed similarly. We list the field elements that correspond to the first 8 powers of x in the following table.

Power	Field Element
x^1	x
x^2	$2x+1$
x^3	$2x+2$
x^4	2
x^5	$2x$
x^6	$x+2$
x^7	$x+1$
x^8	1

Note that the only element in D/B not listed in this table is 0. Since all nonzero elements in D/B are generated by computing powers of x, then $f(x) = x^2 + x + 2$ is primitive in $\mathbb{Z}_3[x]$. This table is useful for computing products in D/B. For example, we can compute the product of $2x + 1$ and $2x + 2$ in D/B as follows.

$$(2x+1)(2x+2) = x^2x^3 = x^5 = 2x$$

Note that this result is identical to the product we obtained for the same elements by two other methods in Example 1.9. We can also compute the