Evaluating a polynomial by synthetic division is the same as evaluating it using nested multiplication. For example, suppose

$$f(x) = 3x^3 + 2x^2 - 3x - 2 = x(3x^2 + 2x - 3) - 2 = x(x(3x + 2) - 3) - 2$$

So to evaluate $f(x)$ at $x = r$,

$$f(r) = r(r(3r + 2) - 3) - 2$$

Describing the expression for $f(r)$ in words, starting with the innermost nested term, multiply 3 by r and add 2. Then take that result and multiply it by r and then add -3. Then take that result and multiply it by r and then add -2.

One usually does the scratchwork as follows:

r	3	2	-3	-2
		3r	r(3r+2)	r(r(3r+2)-3)
	× r	× r	× r	
	3	3r+2	r(3r+2)-3	r(r(3r+2)-3)-2 = f(r)

For example, if $r = 2$,

2	3	2	-3	-2
		6	16	26
	3	8	13	24 = f(2)

If $r = 1$,

1	3	2	-3	-2
		3	5	2
	3	5	2	0 = f(1)

Notice also that the numbers in the bottom row to the left of the last entry give the coefficients of $q(x)$ when writing $f(x) = (x - r)q(x) + f(r)$. For example, when $r = 2$, $q(x) = 3x^2 + 8x + 13$ and $f(x) = (x - 2)(3x^2 + 8x + 13) + 24$. To see why the numbers in the bottom row give the coefficients of $q(x)$, divide $f(x) = 3x^3 + 2x^2 - 3x - 2$ by $x - 2$ using long division compare the computation to the computation doing synthetic division.