Dividing Polynomials Using Synthetic Division

① $2x^3 + 13x^2 - 64$ is divided by $x+3$
Find the quotient

$2x^3 + 13x^2 - 64$ divided by $x+3$

$$\begin{array}{r} 2x^2 + 7x - 31 \\ x+3 \overline{\smash{\big)}\ 2x^3 + 13x^2 - 64} \\ -(2x^3 + 6x^2) \\ \hline 0 + 7x^2 - 64 \\ -(7x^2 + 21x) \\ \hline 0 - 21x - 64 \\ -21x - 63 \\ \hline 0 - 1 \end{array}$$

note
$x + 3 = 0$
$x = -3$
$x - (-3) = x+3$

$$2x^3 + 7x - 31 \quad \dfrac{-1}{x+3}$$

$$\begin{array}{r|rrrr} -3 & 2 & 13 & 0 & -64 \\ & & -6 & -21 & 63 \\ \hline & 2 & 7 & -21 & -1 \end{array}$$

$2x^2 + 7x - 21 \quad R-1$

$2x^2 + 7x - 21 \quad \dfrac{-1}{x+3}$