

→ ONLY WHEN DIVISOR IS DEGREE 1 / LC = 1

SYNTHETIC DIVISION: This is an alternative shortcut to long division.

- Write the coefficients of the dividend so that the degrees of the terms are in descending order.
 - (Make sure to put in 0 for a missing term.)
- Write the constant 'r' of the divisor in the box for $x - r$.
- Bring down the first coefficient.
- Multiply the 1st coefficient by r and write the answer down under the 2nd coefficient.
- Add those 2 together.
- Repeat steps 4 and 5 until done.

EXAMPLES:

$(2x^3 - 13x^2 + 26x - 24) \div (x - 4)$

$x - 4 = 0$
 $x = 4$

$2x^2 - 5x + 6$

coefficients of dividend

$$\begin{array}{r|rrrr} 4 & 2 & -13 & 26 & -24 \\ & & +8 & -20 & +24 \\ \hline & 2 & -5 & 6 & 0 \end{array}$$

remainder

mult.

$(x^3 - 2x^2 - 25x + 6) \div (x - 6)$

$x - 6 = 0$
 $x = 6$

$x^2 + 4x - 1$

$$\begin{array}{r|rrrr} 6 & 1 & -2 & -25 & 6 \\ & & +6 & +24 & -6 \\ \hline & 1 & 4 & -1 & 0 \end{array}$$

remainder

$(x^4 - 10x^2 - 2x + 4) \div (x + 3)$

↑ missing x^3
 $x + 3 = 0$
 $x = -3$

$x^3 - 3x^2 - x + 1$
quotient degree 3

$$\begin{array}{r|rrrrr} -3 & 1 & 0 & -10 & -2 & 4 \\ & & -3 & +9 & +3 & -3 \\ \hline & 1 & -3 & -1 & 1 & 1 \end{array}$$

remainder

$(x^4 - 3x^3 + 5x - 6) \div (x + 2)$

↑ missing x^2

$x^3 - 5x^2 + 10x - 15 + \frac{24}{x+2}$

$$\begin{array}{r|rrrr} -2 & 1 & -3 & 0 & 5 & -6 \\ & & -2 & 10 & -20 & 30 \\ \hline & 1 & -5 & 10 & -15 & 24 \end{array}$$