

# Long Division of Polynomials WS#1

$$\begin{array}{r}
 3k^3 \quad +1 \\
 k-3 \overline{) 3k^4 - 9k^3 + 0k^2 + 1k - 11} \\
 \underline{-(3k^4 - 9k^3)} \\
 0 \quad 0 \quad 1k - 11 \\
 \underline{-(k-3)} \\
 -8
 \end{array}$$

$$\boxed{3k^3 + 1 - \frac{8}{k-3} \text{ ; no}}$$

$$\begin{array}{r}
 m^3 - 9m^2 - 7m - 1 \\
 m-8 \overline{) m^4 - 17m^3 + 65m^2 + 55m + 1} \\
 \underline{-(m^4 - 8m^3)} \\
 -9m^3 + 65m^2 \\
 \underline{-(-9m^3 + 72m^2)} \\
 -7m^2 + 55m \\
 \underline{-(-7m^2 + 56m)} \\
 -1m + 1 \\
 \underline{-(-1m + 8)} \\
 -7
 \end{array}$$

$$\boxed{m^3 - 9m^2 - 7m - 1 - \frac{7}{m-8} \text{ ; no}}$$

$$\begin{array}{r}
 p^3 + 2p^2 + 3p + 5 \\
 p-3 \overline{) p^4 - p^3 - 3p^2 - 4p - 11} \\
 \underline{-(p^4 - 3p^3)} \\
 2p^3 - 3p^2 \\
 \underline{-(2p^3 - 6p^2)} \\
 3p^2 - 4p \\
 \underline{-(3p^2 - 9p)} \\
 5p - 11 \\
 \underline{-(5p - 15)} \\
 4
 \end{array}$$

$$\boxed{p^3 + 2p^2 + 3p + 5 + \frac{4}{p-3} \text{ ; no}}$$

$$\begin{array}{r}
 k^3 + 3k^2 - 6k + 9 \\
 k-4 \overline{) k^4 - k^3 - 18k^2 + 33k - 34} \\
 \underline{-(k^4 - 4k^3)} \\
 3k^3 - 18k^2 \\
 \underline{-(3k^3 - 12k^2)} \\
 -6k^2 + 33k \\
 \underline{-(-6k^2 + 24k)} \\
 9k - 34 \\
 \underline{-(9k - 36)} \\
 2
 \end{array}$$

$$\boxed{k^3 + 3k^2 - 6k + 9 + \frac{2}{k-4} \text{ ; no}}$$

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$$\begin{array}{r}
 r^3 - 8r^2 - 1r - 10 \\
 5) \quad r-2 \overline{) r^4 - 10r^3 + 15r^2 - 8r + 23} \\
 \underline{-(r^4 - 2r^3)} \\
 -8r^3 + 15r^2 \\
 \underline{-(-8r^3 + 16r^2)} \\
 -1r^2 - 8r \\
 \underline{-(-1r^2 + 2r)} \\
 -10r + 23 \\
 \underline{-(-10r + 20)} \\
 3
 \end{array}$$

$$\boxed{r^3 - 8r^2 - r - 10 + \frac{3}{r-2}; \text{no}}$$

$$\begin{array}{r}
 n^3 \quad \quad \quad -1 \\
 6) \quad n+6 \overline{) n^4 + 6n^3 + 0n^2 - 1n - 12} \\
 \underline{-(n^4 + 6n^3)} \\
 0 \quad 0 \quad -1n - 12 \\
 \underline{-(-1n - 6)} \\
 -6
 \end{array}$$

$$\boxed{n^3 - 1 - \frac{6}{n+6}; \text{no}}$$

$$\begin{array}{r}
 x^3 - 9x^2 + 5x - 8 \\
 7) \quad x+3 \overline{) x^4 - 6x^3 - 22x^2 + 7x - 17} \\
 \underline{-(x^4 + 3x^3)} \\
 -9x^3 - 22x^2 \\
 \underline{-(-9x^3 - 27x^2)} \\
 5x^2 + 7x \\
 \underline{-(5x^2 + 15x)} \\
 -8x - 17 \\
 \underline{-(-8x - 24)} \\
 7
 \end{array}$$

$$\boxed{x^3 - 9x^2 + 5x - 8 + \frac{7}{x+3}; \text{no}}$$

$$\begin{array}{r}
 x^3 - 3x^2 \\
 8) \quad x-7 \overline{) x^4 - 10x^3 + 21x^2 + 0x - 1} \\
 \underline{-(x^4 - 7x^3)} \\
 -3x^3 + 21x^2 \\
 \underline{-(-3x^3 + 21x^2)} \\
 0 \quad 0 \quad -1
 \end{array}$$

$$\boxed{x^3 - 3x^2 - \frac{1}{x-7}; \text{no}}$$

# Long ÷, page 3

$$\begin{array}{r}
 3n^3 \quad -9 \\
 \hline
 9) \ 3n-10 \overline{) 9n^4 - 30n^3 + 0n^2 - 27n + 83} \\
 \underline{-(9n^4 - 30n^3)} \\
 0 \ 0 \ -27n + 83 \\
 \underline{-(-27n + 90)} \\
 -7
 \end{array}$$

$$\boxed{3n^4 - 9 - \frac{7}{3n-10} \quad \text{NO}}$$

$$\begin{array}{r}
 b^3 - 6b^2 \\
 \hline
 10) \ 9b+8 \overline{) 9b^4 - 46b^3 - 48b^2 + 0b - 5} \\
 \underline{-(9b^4 + 8b^3)} \\
 -54b^3 - 48b^2 \\
 \underline{-(-54b^3 - 48b^2)} \\
 0 \ 0 \ -5
 \end{array}$$

$$\boxed{b^3 - 6b^2 - \frac{5}{9b+8} \quad \text{no}}$$

$$\begin{array}{r}
 b^3 \quad -3 \\
 \hline
 11) \ 6b-8 \overline{) 6b^4 - 8b^3 - 18b + 27} \\
 \underline{-(6b^4 - 8b^3)} \\
 0 \ -18b + 27 \\
 \underline{-(-18b + 24)} \\
 3
 \end{array}$$

$$\boxed{b^3 - 3 + \frac{3}{6b-8} \quad \text{no}}$$

$$\begin{array}{r}
 9m^3 - 9m^2 - 1m - 5 \\
 \hline
 12) \ 6m-1 \overline{) 54m^4 - 63m^3 + 3m^2 - 29m + 7} \\
 \underline{-(54m^4 - 9m^3)} \\
 -54m^3 + 3m^2 \\
 \underline{-(-54m^3 + 9m^2)} \\
 -6m^2 - 29m \\
 \underline{-(-6m^2 + 1m)} \\
 -30m + 7 \\
 \underline{-(-30m + 5)} \\
 2
 \end{array}$$

$$\boxed{9m^3 - 9m^2 - m - 5 + \frac{2}{6m-1} \quad 2}$$

# Long ÷, page 4

$$\begin{array}{r}
 a^3 + 3a^2 - 3a - 4 \\
 13) \ 2a+3 \overline{) 2a^4 + 9a^3 + 3a^2 - 17a - 14} \quad (14) \ 9x-1 \overline{) 9x^4 - 1x^3 + 0x^2 - 63x + 0} \\
 \underline{-(2a^4 + 3a^3)} \\
 6a^3 + 3a^2 \\
 \underline{-(6a^3 + 9a^2)} \\
 -6a^2 - 17a \\
 \underline{-(-6a^2 - 9a)} \\
 -8a - 14 \\
 \underline{-(-8a - 12)} \\
 -2
 \end{array}$$

$$\boxed{a^3 + 3a^2 - 3a - 4 - \frac{2}{2a+3}; \text{no}}$$

$$\boxed{x^3 - 7 - \frac{7}{9x-1}; \text{no}}$$

$$\begin{array}{r}
 m^3 + 9m^2 + 2m - 9 \\
 15) \ 5m-9 \overline{) 5m^4 + 36m^3 - 71m^2 - 63m + 71} \quad (16) \ 3v-8 \overline{) v^3 - 4v^2 - 6v + 1} \\
 \underline{-(5m^4 - 9m^3)} \\
 45m^3 - 71m^2 \\
 \underline{-(45m^3 - 81m^2)} \\
 10m^2 - 63m \\
 \underline{-(10m^2 - 18m)} \\
 -45m + 71 \\
 \underline{-(-45m + 45)} \\
 -10
 \end{array}$$

$$\boxed{m^3 + 9m^2 + 2m - 9 - \frac{10}{5m-9}; \text{no}}$$

$$\boxed{v^3 - 4v^2 - 6v + 1 - \frac{1}{3v-8}; \text{no}}$$