

Synthetic Division of Polynomials WS#1

1) $k-3=0$ $3k^4-9k^3$ $+k-11$

$$\begin{array}{r|rrrrrr} 3 & 3 & -9 & 0 & 1 & -11 \\ & & 9 & 0 & 0 & 3 \\ \hline & 3 & 0 & 0 & 1 & -8 \end{array}$$

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

2) $m-8=0$ $m^4-17m^3+65m^2+55m+11$

$$\begin{array}{r|rrrrrr} 8 & 1 & -17 & 65 & 55 & 11 \\ & & 8 & -72 & -56 & -8 \\ \hline & 1 & -9 & -7 & -1 & -7 \end{array}$$

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

3) $p-3$ $p^4 - p^3 - 3p^2 - 4p - 11$

$$\begin{array}{r|rrrrrr} 3 & 1 & -1 & -3 & -4 & -11 \\ & & 3 & 6 & 9 & 15 \\ \hline & 1 & 2 & 3 & 5 & 4 \end{array}$$

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

4) $k-4$ $k^4 - k^3 - 18k^2 + 33k - 34$

$$\begin{array}{r|rrrrrr} 4 & 1 & -1 & -18 & 33 & -34 \\ & & 4 & 12 & -24 & 36 \\ \hline & 1 & 3 & -6 & 9 & 2 \end{array}$$

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

5) $r-2$ $r^4 - 10r^3 + 15r^2 - 8r + 23$

$$\begin{array}{r|rrrrrr} 2 & 1 & -10 & 15 & -8 & 23 \\ & & 2 & -6 & -2 & -20 \\ \hline & 1 & -8 & -1 & -10 & 3 \end{array}$$

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

6) $n+6$ $n^4 + 6n^3 - n - 12$

$$\begin{array}{r|rrrrrr} -6 & 1 & 6 & 0 & -1 & -12 \\ & & -6 & 0 & 0 & 6 \\ \hline & 1 & 0 & 0 & -1 & -6 \end{array}$$

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

7) $x+3$ $x^4 - 6x^3 - 22x^2 + 7x - 17$

$$\begin{array}{r|rrrrrr} -3 & 1 & -6 & -22 & 7 & -17 \\ & & -3 & 27 & -15 & 24 \\ \hline & 1 & -9 & 5 & -8 & 7 \end{array}$$

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

8) $x-7$ $x^4 - 10x^3 + 21x^2 - 1$

$$\begin{array}{r|rrrrrr} 7 & 1 & -10 & 21 & 0 & -1 \\ & & 7 & -21 & 0 & 0 \\ \hline & 1 & -3 & 0 & 0 & -1 \end{array}$$

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

9) $3n-10=0$ $3n^4-9$ $3n=10$ $n=\frac{10}{3}$

$$\begin{array}{r|rrrrrr} \frac{10}{3} & 9 & -30 & 0 & -27 & 9 \\ & & 30 & 0 & 0 & -90 \\ \hline & 9 & 0 & 0 & -27 & -7 \\ \hline & 3 & 0 & 0 & -9 & -7 \end{array}$$

$$3n^4 - 9 - \frac{7}{3n-10} ; \text{no}$$

10) $9b+8$ $9b^4 - 46b^3 - 48b^2 - 5$

$$\begin{array}{r|rrrrrr} -\frac{8}{9} & 9 & -46 & -48 & 0 & -5 \\ & & -8 & 48 & 0 & 0 \\ \hline & 9 & -54 & 0 & 0 & -5 \\ \hline & 1 & -6 & 0 & 0 & -\frac{5}{9} \end{array}$$

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

