

## Dividing Polynomials - NOTES

Divide.

1)  $(m^5 - 4m^4 - 17m^3 + 18m^2 + 26m + 20) \div (m + 3)$

$$\begin{array}{r}
 m^4 - 7m^3 + 4m^2 + 6m + 8 \\
 m+3 \overline{) m^5 - 4m^4 - 17m^3 + 18m^2 + 26m + 20} \\
 \underline{\ominus m^5 + 3m^4} \phantom{- 17m^3 + 18m^2 + 26m + 20} \\
 -7m^4 - 17m^3 \phantom{+ 18m^2 + 26m + 20} \\
 \underline{\ominus -7m^4 - 21m^3} \phantom{+ 18m^2 + 26m + 20} \\
 4m^3 + 18m^2 \phantom{+ 26m + 20} \\
 \underline{\ominus 4m^3 + 12m^2} \phantom{+ 26m + 20} \\
 6m^2 + 26m \phantom{+ 20} \\
 \underline{\ominus 6m^2 + 18m} \phantom{+ 20} \\
 8m + 20 \\
 \underline{\ominus 8m + 24} \\
 -4 \\
 \text{REMAINDER}
 \end{array}$$

$$m^4 - 7m^3 + 4m^2 + 6m + 8 + \frac{-4}{m+3}$$

2)  $(b^4 + 12b^3 + 36b^2 + 17b + 9) \div (b + 4)$

$$\begin{array}{r}
 b^3 + 8b^2 + 4b + 1 \\
 b+4 \overline{) b^4 + 12b^3 + 36b^2 + 17b + 9} \\
 \underline{\ominus b^4 + 4b^3} \phantom{+ 36b^2 + 17b + 9} \\
 -8b^3 + 36b^2 \phantom{+ 17b + 9} \\
 \underline{\ominus -8b^3 + 32b^2} \phantom{+ 17b + 9} \\
 4b^2 + 17b \phantom{+ 9} \\
 \underline{\ominus 4b^2 + 16b} \phantom{+ 9} \\
 1b + 9 \\
 \underline{\ominus 1b + 4} \\
 5 \\
 \text{REMAINDER}
 \end{array}$$

$$b^3 + 8b^2 + 4b + 1 + \frac{5}{b+4}$$

$$3) \frac{n^4 - 10n^3 + 6n^2 + 37n - 89}{n-9}$$

$$\begin{array}{r}
 n^3 - n^2 - 3n + 10 \\
 n-9 \overline{) n^4 - 10n^3 + 6n^2 + 37n - 89} \\
 \underline{\ominus n^4 - 9n^3} \phantom{+ 6n^2 + 37n - 89} \\
 \phantom{n-9 \overline{) }} -n^3 + 6n^2 \phantom{+ 37n - 89} \\
 \underline{\ominus -n^3 + 9n^2} \phantom{+ 37n - 89} \\
 \phantom{n-9 \overline{) }} \phantom{-} 3n^2 + 37n - 89 \\
 \underline{\ominus 3n^2 + 27n} \phantom{- 89} \\
 \phantom{n-9 \overline{) }} \phantom{3n^2 + } 10n - 89 \\
 \underline{\ominus 10n - 90} \\
 \phantom{n-9 \overline{) }} \phantom{3n^2 + } \phantom{10n - } 1 \\
 \text{REMAINDER}
 \end{array}$$

$$n^3 - n^2 - 3n + 10 + \frac{1}{n-9}$$

$$4) \frac{4k^4 + 50k^3 + 104k^2 + 50k + 102}{k+10}$$

$$\begin{array}{r}
 4k^3 + 10k^2 + 4k + 10 \\
 k+10 \overline{) 4k^4 + 50k^3 + 104k^2 + 50k + 102} \\
 \underline{\ominus 4k^4 + 40k^3} \phantom{+ 104k^2 + 50k + 102} \\
 \phantom{k+10 \overline{) }} 10k^3 + 104k^2 \phantom{+ 50k + 102} \\
 \underline{\ominus 10k^3 + 100k^2} \phantom{+ 50k + 102} \\
 \phantom{k+10 \overline{) }} \phantom{10k^3 + } 4k^2 + 50k \phantom{+ 102} \\
 \underline{\ominus 4k^2 + 40k} \phantom{+ 102} \\
 \phantom{k+10 \overline{) }} \phantom{10k^3 + } \phantom{4k^2 + } 10k + 102 \\
 \underline{\ominus 10k + 100} \\
 \phantom{k+10 \overline{) }} \phantom{10k^3 + } \phantom{4k^2 + } \phantom{10k + } 2 \\
 \text{REMAINDER}
 \end{array}$$

$$4k^3 + 10k^2 + 4k + 10 + \frac{2}{k+10}$$

$$5) (n^3 - 16n + 9) \div (n + 4)$$

$$n+4 \overline{) \begin{array}{r} n^3 - 16n + 9 \\ \ominus n^3 + 4n^2 \\ \hline \end{array}}$$

NOT LIKE-TERMS  
MUST RE-WRITE.

$$n+4 \overline{) \begin{array}{r} n^3 - 16n + 9 \\ \ominus n^3 + 4n^2 \\ \hline -4n^2 - 16n + 9 \\ \ominus -4n^2 + 16n \\ \hline 9 \end{array}}$$

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$$\boxed{n^2 - 4n + \frac{9}{n+4}}$$

$$6) (n^3 - 82n - 18) \div (n + 9)$$

$$n+9 \overline{) \begin{array}{r} n^3 - 82n - 18 \\ \ominus n^3 + 9n^2 \\ \hline \end{array}}$$

NOT LIKE-TERMS.

$$n+9 \overline{) \begin{array}{r} n^3 - 82n - 18 \\ \ominus n^3 + 9n^2 \\ \hline -9n^2 - 82n - 18 \\ \ominus -9n^2 - 81n \\ \hline -1n - 18 \\ \ominus -1n - 9 \\ \hline -9 \end{array}}$$

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$$\boxed{n^2 - 9n - 1 - \frac{9}{n+9}}$$