Factors and Remainders

If $(x+3)$ is a factor then $f(-3)=0$

If $f(-3)=5$ the remainder when you divide by $(x+3)$ is 5.

Divide $x^3+4x^2+9x+18$ by $x+3$

$$
\begin{array}{r}
x^2+x+6 \\
x+3 \overline{\smash{\big)}\ x^3+4x^2+9x+18} \\
\underline{x^3+3x^2} \\
x^2+9x \\
\underline{x^2+3x} \\
6x+18 \\
\underline{6x+18} \\
0
\end{array}
$$