47 By the factor theorem, since -4 is a zero, $(x+4)$ is a factor. $-4x^3 - x^2 + 51x - 36$ divided by $x+4$ can be performed using synthetic division.

$$\begin{array}{r|rrrr} -4 & -4 & -1 & 51 & -36 \\ & & 16 & -60 & 36 \\ \hline & -4 & 15 & -9 & 0 \end{array}$$

The quotient is $-4x^2 + 15x - 9$ and the remainder is 0. Thus,

$$-4x^3 - x^2 + 51x - 36 = (x+4)(-4x^2 + 15x - 9) = (x+4)(-4x+3)(x-3).$$

The complete factored form of $f(x) = -4x^3 - x^2 + 51x - 36$ is $f(x) = -4(x+4)(x-\frac{3}{4})(x-3)$.