Factoring the sum or difference of cubes

If a polynomial is made up of the sum of difference of two perfect cubes, we have special rules to handle the factoring (these are not easy to memorize, I can never remember them without looking).

$$\mathbf{a^3 + b^3 = (a + b)(a^2 - ab + b^2)}$$
$$\mathbf{a^3 - b^3 = (a - b)(a^2 + ab + b^2)}$$

Example:

Factor $x^3 + 8$ note: $8 = 2^3$

Therefore, we get

$x^3 + 2^3$ a = x and b = 2

$(x + 2)(x^2 - 2x + 2^2)$

$(x + 2)(x^2 - 2x + 4)$

Example:

Factor $64u^3 - 27v^6$ note: $64u^3 = (4u)^3$ and $27v^6 = (3v^2)^3$

$(4u)^3 - (3v^2)^3$ a = 4u and b = $3v^2$

$(4u - 3v^2)((4u)^2 + (4u)(3v^2) + (3v^2)^2)$

$(4u - 3v^2)(16u^2 + 12uv^2 + 3v^4)$