

$$a^3 + a^2 - b^3 - b^2$$

$$\begin{aligned} a^3 + a^2 - b^3 - b^2 &= a^3 - b^3 + a^2 - b^2 = (a-b)(a^2 + ab + b^2) + (a-b)(a+b) = \\ &= (a-b)((a^2 + ab + b^2) + (a+b)) = (a-b)(a^2 + ab + b^2 + a + b) \end{aligned}$$