

$$\begin{aligned} 1. (a+b)^2 &= a^2 + 2ab + b^2 \\ &= (a-b)^2 + 4ab \end{aligned}$$

$$\begin{aligned} 2. (a-b)^2 &= a^2 - 2ab + b^2 \\ &= (a+b)^2 - 4ab \end{aligned}$$

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

$$\begin{aligned} 4. (a-b)^3 &= a^3 - b^3 - 3ab(a-b) \\ &= a^3 - 3a^2b + 3ab^2 - b^3 \end{aligned}$$

$$5. (a+b+c)^2 = a^2 + b^2 + c^2 + 2(ab+bc+ca)$$

$$\begin{aligned} 6. a^2 + b^2 &= (a+b)^2 - 2ab \\ &= (a-b)^2 + 2ab \end{aligned}$$

$$7. a^2 - b^2 = (a+b)(a-b)$$

$$\begin{aligned} 8. a^3 + b^3 &= (a+b)^3 - 3ab(a+b) \\ &= (a+b)(a^2 - ab + b^2) \end{aligned}$$

$$\begin{aligned} 9. a^3 - b^3 &= (a-b)^3 + 3ab(a-b) \\ &= (a-b)(a^2 + ab + b^2) \end{aligned}$$

$$\begin{aligned} 10. a^3 + b^3 + c^3 - 3abc &= (a+b+c)(a^2 + b^2 + c^2 - \\ &\quad ab - bc - ca) \end{aligned}$$