

$$\begin{aligned}
& 8x^3 + y^3 + 6y^2 + 12y + 8 = \\
& = 2^3 \cdot x^3 + y^3 + 6y^2 + 12y + 8 = \\
& = (2x)^3 + y^3 + 6y^2 + 12y + 8 = \\
& = (2x+y) \left( (2x)^2 - 2xy + y^2 \right) + 6y^2 + 12y + \\
& 8 = (2x+y) (4x^2 - 2xy + y^2) + 2(3y^2 + 6y + 4) =
\end{aligned}$$

$$\begin{aligned}
& 8x^3 + y^3 + 6y^2 + 12y + 8 = \\
& (2x)^3 + y^3 + 6y^2 + 12y + 8 = \\
& (2x)^3 + y^3 + 3(2x)^2y + 3(2x)y^2 + 6y^2 + \\
& 12y + 8 - 3(2x)^2y - 3(2x)y^2 = \\
& = (2x+y)^3 + 6y^2 + 12y + 8 - 3(2x)^2y - \\
& 3(2x)y^2
\end{aligned}$$

$$\begin{aligned}
& 8x^3 + y^3 + 6y^2 + 12y + 8 = \\
& 8x^3 + y^3 + 3 \cdot 2 \cdot y^2 + 3 \cdot 2^2 \cdot y + 2^3 = \\
& 8x^3 + y^3 + 3 \cdot y^2 \cdot 2 + 3 \cdot y \cdot 2^2 + 2^3 = \\
& 8x^3 + (y+2)^3 = (2x)^3 + (y+2)^3 = \\
& (2x+y+2) \left( (2x)^2 - 2x(y+2) + (y+2)^2 \right) = \\
& (2x+y+2) (4x^2 - 2x \cdot y - 2x \cdot 2 + y^2 + 2y \cdot 2 + 2^2) = \\
& (2x+y+2) (4x^2 - 2xy - 4x + y^2 + 4y + 4)
\end{aligned}$$

$$\begin{aligned}
& x^3 + y^3 = (x+y) (x^2 - xy + y^2) \\
& x^3 - y^3 = (x-y) (x^2 + xy + y^2) \\
& (x+y)^3 = x^3 + 3x^2y + 3xy^2 + y^3 \\
& (x-y)^3 = x^3 - 3x^2y + 3xy^2 - y^3 \\
& (x+y)^2 = x^2 + 2xy + y^2
\end{aligned}$$