

$$\begin{aligned}
 5) i) & 4x^2 + 9y^2 + 16z^2 + 12xy - 24yz - 16xz \\
 &= (2x)^2 + (3y)^2 + (-4z)^2 + 2 \times 2x \times 3y + 2 \times 3y \times (-4z) + 2 \times (-4z) \times 2x \\
 &= (2x + 3y - 4z)^2 \\
 &= (2x + 3y - 4z)(2x + 3y - 4z)
 \end{aligned}$$

$$\begin{aligned}
 5) ii) & 2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy + 4\sqrt{2}yz - 8xz \\
 &= (-\sqrt{2}x)^2 + y^2 + (2\sqrt{2}z)^2 + 2 \times (-\sqrt{2}x) \times y + 2 \times y \times 2\sqrt{2}z + 2 \times 2\sqrt{2}z \times (-\sqrt{2}x) \\
 &= (-\sqrt{2}x + y + 2\sqrt{2}z)^2 \\
 &= (-\sqrt{2}x + y + 2\sqrt{2}z)(-\sqrt{2}x + y + 2\sqrt{2}z)
 \end{aligned}$$

$$\begin{aligned}
 6) i) & (2x+1)^3 \\
 &= (2x)^3 + 1^3 + 3 \times 2x \times 1(2x+1) \\
 &= 8x^3 + 1 + 12x^2 + 6x
 \end{aligned}$$

$$\begin{aligned}
 6) ii) & (2a-3b)^3 \\
 &= (2a)^3 - (3b)^3 - 3 \times 2a \times 3b(2a-3b) \\
 &= 8a^3 - 27b^3 - 36a^2b + 54ab^2
 \end{aligned}$$

$$\begin{aligned}
 6) iii) & \left(\frac{3}{2}x+1\right)^3 \\
 &= \left(\frac{3}{2}x\right)^3 + 1^3 + 3 \times \frac{3}{2}x \times 1 \left(\frac{3}{2}x+1\right) \\
 &= \frac{27}{8}x^3 + 1 + \frac{27}{4}x^2 + \frac{9}{2}x
 \end{aligned}$$

$$\begin{aligned}
 6) iv) & \left(x - \frac{2}{3}y\right)^3 \\
 &= x^3 - \left(\frac{2}{3}y\right)^3 - 3 \times x \times \frac{2}{3}y \left(x - \frac{2}{3}y\right) \\
 &= x^3 - \frac{8}{27}y^3 - 2x^2y + \frac{4}{3}xy^2
 \end{aligned}$$