

6)

$$\begin{aligned}(1 + y^2)^4 &= 1 + \binom{4}{1}(y^2) + \binom{4}{2}(y^2)^2 + \binom{4}{1}(y^2)^3 + (y^2)^4 \\ &= 1 + 4y^2 + 6y^4 + 4y^6 + y^8\end{aligned}$$

7)

$$\begin{aligned}\left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^6 &= (\sqrt{x})^6 - \binom{6}{1}(\sqrt{x})^5 \frac{1}{\sqrt{x}} + \binom{6}{2}(\sqrt{x})^4 \frac{1}{(\sqrt{x})^2} \\ &\quad - \binom{6}{3}(\sqrt{x})^3 \frac{1}{(\sqrt{x})^3} + \binom{6}{2}(\sqrt{x})^2 \frac{1}{(\sqrt{x})^4} \\ &\quad - \binom{6}{1}(\sqrt{x}) \frac{1}{(\sqrt{x})^5} + \frac{1}{(\sqrt{x})^6} \\ &= x^3 - 6x^2 + 15x - 20 + \frac{15}{x} - \frac{6}{x^2} + \frac{1}{x^3}\end{aligned}$$