

$$\begin{aligned} \text{b)} \quad & \int \left(\sqrt{4-x} + \frac{1}{\sqrt{4-x}} \right) dx \\ &= \int \left((4-x)^{\frac{1}{2}} + (4-x)^{-\frac{1}{2}} \right) dx \\ &= -\frac{2}{3}(4-x)^{\frac{3}{2}} - 2(4-x)^{\frac{1}{2}} + C \end{aligned}$$

$$7 \text{ ii) } \int_1^2 (2x + 7(3x-4)^6) dx$$

$$= \left[x^2 + \frac{1}{3}(3x-4)^7 \right]_1^2$$

$$= 2^2 + \frac{1}{3}(2)^7 - 1^2 + \frac{1}{3}$$

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$$\frac{d}{dx}(uv) = u \frac{dv}{dx} + v \frac{du}{dx}$$

$$\int \frac{d}{dx}(uv) dx = \int u \frac{dv}{dx} dx + \int v \frac{du}{dx} dx$$

$$uv = \int u dv + \int v du$$

$$\int u dv = uv - \int v du$$

$$b_1 \int x \sqrt{1+x} \, dx \quad u=x \quad v=\frac{2}{3}(1+x)^{\frac{3}{2}}$$

$$= \frac{2}{3}x(1+x)^{\frac{3}{2}} - \frac{2}{3} \int (1+x)^{\frac{3}{2}} \, dx \quad du=dx \quad dv=\sqrt{1+x} \, dx$$

$$= \frac{2}{3}x(1+x)^{\frac{3}{2}} - \frac{2}{3} \times \frac{2}{5} (1+x)^{\frac{5}{2}} + C$$

$$= \frac{2}{3}x(1+x)^{\frac{3}{2}} - \frac{4}{15}(1+x)^{\frac{5}{2}} + C$$

$$= \frac{2}{3}(1+x)^{\frac{3}{2}} \left(x - \frac{2}{5}(1+x) \right) + C$$

$$= \frac{2}{3}(1+x)^{\frac{3}{2}} \left(\frac{3}{5}x - \frac{2}{5} \right) + C$$

$$= \frac{2}{15}(1+x)\sqrt{1+x} (3x-2) + C$$
