

Section 28.1: cont'd

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$$\begin{aligned} \textcircled{4} \quad & \int e^{7x} (1+e^{7x})^5 dx \\ &= \int \frac{u^5 du}{7} \\ &= \frac{u^6}{42} + C \\ &= \frac{(1+e^{7x})^6}{42} + C \end{aligned}$$

$$\begin{aligned} \text{let } u &= 1+e^{7x} \\ du &= 7e^{7x} dx \\ \frac{du}{7} &= e^{7x} dx \end{aligned}$$

$$\begin{aligned} \textcircled{5} \quad & \int \frac{\tan^{-1} 2x}{1+4x^2} dx \\ &= \int \frac{u du}{2} \\ &= \frac{u^2}{4} + C \\ &= \frac{(\tan^{-1} 2x)^2}{4} + C \end{aligned}$$

$$\begin{aligned} \text{let } u &= \tan^{-1} 2x \\ du &= \frac{1}{1+4x^2} 2 dx \\ \frac{du}{2} &= \frac{1}{1+4x^2} dx \end{aligned}$$

note: not $\tan^{-2} 2x$

$$\textcircled{6} \quad \int \sqrt{3+\tan \theta} \sec^2 \theta d\theta$$

$$\begin{aligned} \text{let } u &= 3+\tan \theta \\ du &= \sec^2 \theta d\theta \end{aligned}$$

$$\textcircled{6} \int \sqrt{3 + \tan \theta} \sec^2 \theta \, d\theta$$

$$\left. \begin{array}{l} \text{let } u = 3 + \tan \theta \\ du = \sec^2 \theta \, d\theta \end{array} \right\}$$

$$= \int u^{1/2} \, du$$

$$= \frac{2}{3} u^{3/2} + C$$

$$= \frac{2}{3} (3 + \tan \theta)^{3/2} + C$$