Math 152 Quiz #7 Answers

1. $\displaystyle\int \frac{1}{1+\sqrt[3]{x}}\,dx \;=\; \frac{3}{2}x^{2/3} \;-\; 3\sqrt[3]{x} \;+\; \ln|1+\sqrt[3]{x}| \;+\; C$

   (Could use thes rationalizing substitution $u = \sqrt[3]{x} \quad\Rightarrow\quad 3u^2\,du = dx$, and then polynomial division to simplify the resulting rational function.)

2. $\displaystyle\int e^{2t}\cdot\sec^2(e^{2t})\,dt \;=\; \frac{1}{2}\tan(e^{2t}) \;+\; C$ (Using subst. $u = e^{2t}$)

3. Here are a couple of ways to evaluate the integral:

   - $\displaystyle\int \frac{\sqrt{2y^2-3}}{y^2}\,dy \;=\sqrt{2}(-\frac{\sqrt{2y^2-3}}{\sqrt{2}y} \;+\; \ln|\sqrt{2}y+\sqrt{2y^2-3}|)+C$

     (Subst. $u=\sqrt{2}y \quad\Rightarrow\quad \frac{1}{\sqrt{2}}\,du = dy, \qquad a=\sqrt{3}$)

   - $\displaystyle\int \frac{\sqrt{2y^2-3}}{y^2}\,dy \;=\sqrt{2}\int \frac{\sqrt{y^2-\frac{3}{2}}}{y^2}\,dy \;=\; \sqrt{2}(-\frac{\sqrt{y^2-\frac{3}{2}}}{y} \;+\; \ln|y+\sqrt{y^2-\frac{3}{2}}|) \;+\; C$

     (Rewriting the square root in the numerator and using the subst. $u=y \quad\Rightarrow\quad du=dy,\;\; a=\sqrt{\frac{3}{2}}$)