Calculus 112 Practice Problems

Section 7.3 Problems #6, #7, #20, #29

6. $-\frac{1}{5}\cos^5 w + C$

(Let $x = \cos w$, as suggested in IV-23. Then $-\sin w\, dw = dx$, and $\int \sin w \cos^4 w\, dw = -\int x^4\, dx$.)

7. $-\frac{1}{4}\sin^3 x \cos x - \frac{3}{8}\sin x \cos x + \frac{3}{8}x + C.$

(Use IV-17.)

20. Use long division to reorganize the integral:

$$\int \frac{t^2+1}{t^2-1}\,dt = \int \left(1 + \frac{2}{t^2-1}\right) dt = \int dt + \int \frac{2}{(t-1)(t+1)}\,dt.$$

To get this second integral, let $a = 1, b = -1$ in V-26, so

$$\int \frac{t^2+1}{t^2-1}\,dt = t + \ln|t-1| - \ln|t+1| + C.$$

29.

$$\int \frac{1}{x^2+4x+3}\,dx = \int \frac{1}{(x+1)(x+3)}\,dx = \frac{1}{2}(\ln|x+1| - \ln|x+3|) + C.$$

(Let $a = -1$ and $b = -3$ in V-26).