

Sec 5.5 day 2 page 381 (8, 11-21 odd, 42, 43, 45)

$$\textcircled{8} \int x^2 (x^3+5)^9 dx \quad u = x^3+5$$
$$du = 3x^2 dx$$
$$\frac{1}{3} du = x^2 dx$$

$$\frac{1}{3} \int u^9 du = \frac{1}{3} \frac{u^{10}}{10} + C = \boxed{\frac{(x^3+5)^{10}}{30} + C}$$

$$\textcircled{11} \int \sin \pi t dt \quad u = \pi t$$
$$du = \pi dt$$
$$\frac{1}{\pi} du = dt$$

$$\frac{1}{\pi} \int \sin u dt = \frac{-\cos u}{\pi} + C = \boxed{\frac{-\cos \pi t + C}{\pi}}$$

$$\textcircled{13} \int \frac{(\ln x)^2}{x} dx \quad u = \ln x$$
$$du = \frac{1}{x} dx$$

$$\int u^2 du = \frac{u^3}{3} + C = \boxed{\frac{(\ln x)^3}{3} + C}$$

$$\textcircled{15} \int \frac{dx}{5-3x} \quad u = 5-3x$$
$$du = -3 dx$$
$$-\frac{1}{3} du = dx$$

$$-\frac{1}{3} \int u^{-1} du = -\frac{1}{3} \ln u + C = \boxed{\frac{-\ln(5-3x) + C}{3}}$$

$$\textcircled{17} \int \frac{a+bx^2}{\sqrt{3ax+bx^3}} dx \quad u = (3ax+bx^3)$$

$$du = (3a+3bx^2) dx$$

$$\frac{1}{3} du = (a+bx^2) dx$$

$$\frac{1}{3} \int u^{-1/2} du = \frac{1}{3} 2u^{1/2} + C = \frac{2\sqrt{3ax+bx^3} + C}{3}$$

$$\textcircled{19} \int e^x \sqrt{1+e^x} dx \quad u = 1+e^x$$

$$du = e^x dx$$

$$\int u^{1/2} du = \frac{2u^{3/2}}{3} + C = \frac{2(1+e^x)^{3/2} + C}{3}$$

$$\textcircled{21} \int \frac{\cos x}{\sin^2 x} dx \quad u = \sin x$$

$$du = \cos x dx$$

$$\int u^{-2} du = -u^{-1} + C = \frac{-1}{\sin x} + C$$

$$\text{or } -\csc x + C$$

$$\textcircled{42} \int_0^1 (3t-1)^{50} dt \quad u = 3t-1 \quad a = -1$$

$$du = 3 dt \quad b = 2$$

$$\frac{1}{3} du = dt$$

$$\frac{1}{3} \int_{-1}^2 u^{50} du = \frac{1}{3} \left[\frac{u^{51}}{51} \right]_{-1}^2 = \frac{1}{153} (2^{51} - (-1)^{51})$$

$$= \frac{2^{51} + 1}{153}$$

$$\textcircled{43} \int_0^1 \sqrt[3]{1+7x} dx \quad u=1+7x \quad a=1$$

$$du=7 dx \quad b=8$$

$$\frac{1}{7} du = dx$$

$$\frac{1}{7} \int_1^8 u^{1/3} du = \frac{1}{7} \left[\frac{3}{4} u^{4/3} \right]_1^8 = \frac{3}{28} (8^{4/3} - 1^{4/3})$$

$$= \frac{3}{28} (15) = \frac{45}{28}$$

$$\textcircled{45} \int_0^1 x^2 (1+2x^3)^5 dx \quad u=1+2x^3 \quad a=1$$

$$du=6x^2 dx \quad b=3$$

$$\frac{1}{6} du = x^2 dx$$

$$\frac{1}{6} \int_1^3 u^5 du = \frac{1}{6} \left[\frac{u^6}{6} \right]_1^3 = \frac{1}{36} (3^6 - 1^6)$$

$$= \frac{1}{36} (729 - 1) = \frac{728}{36} = \frac{182}{9}$$