p. 304, 7-29 odd, 43-49 odd

7. $u = 1+2x,\ \ du = 2dx,\ \ dx = \dfrac{du}{2}$

$$\int u^4\,(2)\frac{du}{2} = \int u^4 du = \frac{1}{5}u^5 + C = \frac{1}{5}(1+2x)^5 + C$$

9. $u = 9-x^2,\ \ du = -2xdx,\ \ dx = \dfrac{du}{-2x}$

$$\int \sqrt{u}\,(-2x)\frac{du}{-2x} = \int \sqrt{u}\,du = \frac{2}{3}u^{3/2} + C = \frac{2}{3}\left(9-x^2\right)^{3/2} + C$$

11. $u = x^4+3,\ \ du = 4x^3dx,\ \ dx = \dfrac{du}{4x^3}$

$$\int x^3u^2\,\frac{du}{4x^3} = \int \frac{1}{4}u^2 du = \frac{1}{4}\cdot\frac{1}{3}u^3 + C = \frac{1}{12}\left(x^4+3\right)^3 + C$$

13. $u = x^3-1,\ \ du = 3x^2dx,\ \ dx = \dfrac{du}{3x^2}$

$$\int x^2u^4\,\frac{du}{3x^2} = \int \frac{1}{3}u^4 du = \frac{1}{3}\cdot\frac{1}{5}u^5 + C = \frac{1}{15}\left(x^3-1\right)^5 + C$$

15. $u = t^2+2,\ \ du = 2tdt,\ \ dt = \dfrac{du}{2t}$

$$\int t\sqrt{u}\,\frac{dt}{2t} = \int \frac{1}{2}\sqrt{u}\,du = \frac{1}{2}\cdot\frac{2}{3}u^{3/2} + C = \frac{1}{3}\left(t^2+2\right)^{3/2} + C$$

17. $u = 1-x^2,\ \ du = -2xdx,\ \ dx = \dfrac{du}{-2x}$

$$\int 5x\sqrt[3]{u}\,\frac{du}{-2x} = \int \frac{-5}{2}\sqrt[3]{u}\,du = -\frac{5}{2}\cdot\frac{3}{4}u^{4/3} + C = -\frac{15}{8}\left(1-x^2\right)^{4/3} + C$$

19. $u = 1-x^2,\ \ du = -2xdx,\ \ dx = \dfrac{du}{-2x}$

$$\int \frac{x}{u^3}\,\frac{du}{-2x} = \int \frac{-1}{2}u^{-3}du = -\frac{1}{2}\cdot-\frac{1}{2}u^{-2} + C = \frac{1}{4}\left(1-x^2\right)^{-2} + C$$

21. $u = 1+x^3,\ \ du = 3x^2dx,\ \ dx = \dfrac{du}{3x^2}$

$$\int \frac{x^2}{u^2}\,\frac{du}{3x^2} = \int \frac{1}{3}u^{-2}du = \frac{1}{3}\cdot -u^{-1} + C = -\frac{1}{3}\left(1+x^3\right)^{-1} + C$$

23. $u = 1-x^2,\ \ du = -2xdx,\ \ dx = \dfrac{du}{-2x}$

$$\int \frac{x}{u^{1/2}}\,\frac{du}{-2x} = \int \frac{-1}{2}u^{-1/2}du = -\frac{1}{2}\cdot 2u^{1/2} + C = -\left(1-x^2\right)^{1/2} + C$$

25. $u = 1 + \frac{1}{t}, \quad du = -t^{-2}dt, \quad dt = -t^2 du$

$$\int u^3\left(\frac{1}{t^2}\right) - t^2 du = \int -u^3 du = -\frac{1}{4}u^4 + C = -\frac{1}{4}\left(1 + \frac{1}{t}\right)^4 + C$$

27. $u = 2x, \quad du = 2dx, \quad dx = \frac{du}{2}$

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

29. $\int \frac{x^2 + 3x + 7}{\sqrt{x}}dx = \int \left(x^{3/2} + 3x^{1/2} + 7x^{-1/2}\right)dx =$

$$\frac{2}{5}x^{5/2} + 2x^{3/2} + 14x^{1/2} + C$$

43. $u = \pi x, \quad du = \pi dx, \quad dx = \frac{du}{\pi}$

$$\int \pi \sin u \frac{du}{\pi} = \int \sin u du = -\cos u + C = -\cos(\pi x) + C$$

45. $u = 2x, \quad du = 2dx, \quad dx = \frac{du}{2}$

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

47. $u = \frac{1}{\theta}, \quad du = -\theta^2 d\theta, \quad d\theta = -\theta^2 du$

$$\int -\frac{1}{\theta^2}\cos u\left(\theta^2 du\right) = -\int \cos u du = -\sin u + C = -\sin\left(\frac{1}{\theta}\right) + C$$

49. $u = \sin(2x), \quad du = \cos(2x)\cdot 2dx, \quad dx = \frac{du}{2\cos(2x)}$

$$\int u\cos(2x)\frac{du}{2\cos(2x)} = \int \frac{u}{2}du = \frac{1}{4}u^2 + C = \frac{1}{4}(\sin(2x))^2 + C$$