5.4

6. $\int \sqrt[4]{x^5}\, dx \to x^{4/5} \qquad \frac{9}{5} x^{a/5} + C$

11. $\int \frac{1+\sqrt{x}+x}{x}\, dx \to \int \frac{1}{x} + \int \frac{x^{1/2}}{x} + \int \frac{x}{x}^{1}$

$\ln|x| + 2\sqrt{x} + C \qquad \int x^{-1/2} \to 2\frac{x^{1/2}}{\frac{1}{2}}$

16. $\int \sec t (\sec t + \tan t)\, dt$

$\int \frac{1}{\cos t}\left(\frac{1}{\cos t} + \frac{\sin t}{\cos t}\right) dt \to \int \frac{1}{\cos^2 t} + \frac{\sin t}{\cos^2 t}$

$\tan t + \sec t + C$

28. $\int_1^2 \left(\frac{1}{x^2} - \frac{4}{x^3}\right) dx \qquad \int \frac{1}{x^2} - 4\int \frac{x^1}{x^3}\, dx$

$\left[\ln x^2 - 4\ln x^3\right] + C$

$\left[\ln (2)^2 - 4\ln |(2)^3|\right] - \left[\ln (1)^2 - 4\ln |(1)^3|\right] =$

$\int x^{-2} - \int x^{-3} \qquad \frac{\left(-\frac{1}{x}\right) + \frac{2}{x^2}}{\frac{x}{x}} \qquad \frac{-x}{x^2} + \frac{2}{x^2} \to \frac{2-x}{x^2} + C$

$-1x^{-1} \qquad -2x^{-2}$

$-\frac{1}{x} \qquad -\frac{1}{2x^2}$

$\left[\frac{2-(2)}{(2)^2}\right] - \left[\frac{2-(1)}{(1)^2}\right]$

$0 \quad - \quad 1 \qquad = \quad -1$

5.5

8. $\int x^2 e^{x^3} dx$ $u = x^3$ $\frac{du}{dx} = 3x^2$

           $\frac{1}{3}\frac{du}{dx} = x^2$

$\int e^u \frac{1}{3} du$

            $dx = \frac{1}{3x^2} du$

$\frac{1}{3}\int e^u du$

     $\frac{e^u}{3} \rightarrow \frac{e^{x^3}}{3} + C$

18. $\int \frac{\sin\sqrt{x}}{\sqrt{x}} dx$ $u = \sqrt{x}, x^{\frac{1}{2}}$ $\frac{du}{dx} = \frac{1}{2} x^{-\frac{1}{2}}, \frac{1}{2\sqrt{x}}$

      $\frac{du}{dx} = \frac{1}{2\sqrt{x}} \rightarrow du = \frac{1}{2\sqrt{x}} dx \rightarrow dx = 2\sqrt{x}\, du$

$2 \int \sin(u) du \rightarrow -2\cos u \quad -2\cos(\sqrt{x}) + C$

30. $\int \frac{\sec^2 x}{\tan^2 x} dx \rightarrow \frac{1}{\cos^2 x \tan^2 x} \quad \frac{\cos^2 x}{\cos^2 x \sin^2 x}$

   $u = \tan x$ $\frac{du}{dx} \sec^2 x$ $dx = \frac{1}{\sec^2 x} du$

$\frac{\sec^2 x}{\tan^2 x} \cdot \frac{1}{\sec^2 x} \quad \frac{1}{\tan^2 x} \quad \frac{1}{\tan^2 x \rightarrow u^2} \quad u^{-2} \rightarrow -1u^{-1} \rightarrow \frac{-1}{u}$

   $-\frac{1}{\cot\tan x} \rightarrow -\cot x + C$

56. $\int_0^3 \frac{1}{5x+1} dx$ $u = 5x+1$ $\frac{du}{dx} = 5, \; du = 5dx$

             $dx = \frac{1}{5} du$

$\int \frac{1}{u} \frac{1}{5} du \rightarrow \frac{1}{5} \int \frac{1}{u} du \rightarrow \ln|u|$

      $\frac{1}{5}\ln|u| \rightarrow \frac{1}{5}\ln|5x+1| + C$

$\left[\frac{1}{5}\ln|5(3)+1|\right] - \left[\frac{1}{5}\ln|5(0)+1|\right] = \frac{1}{5} \cdot \ln 16$

60. $\int_0^1 xe^{-x^2} dx$ $u = -x^2$ $\frac{du}{dx} = -2x$, $du = -2x dx$

$dx = \frac{1}{-2x} du$

$\int xe^u \frac{1}{-2x} \rightarrow -\frac{1}{2} \int xe^u \frac{1}{x}$ $-\frac{1}{2} \int e^u \rightarrow -\frac{1}{2} e^u$ $\frac{1}{2} e^{-x^2} + C$

$\left[-\frac{1}{2} e^{-(1)^2} \right] - \left[-\frac{1}{2} e^{-(0)^2} \right]$ $-\frac{e}{e} \frac{1}{2} - \frac{1}{2e} \rightarrow \frac{e}{2e} - \frac{1}{2e} \rightarrow \frac{e-1}{2e}$

$\frac{-1}{2e}$ $\frac{-1}{2}$