

$$1. \int 3 dx = 3x + C$$

$$2. \int 7x^2 - 5x + 1 dx = \frac{7}{3} x^3 - \frac{5}{2} x^2 + x + C$$

$$3. \int \left(x^{\frac{4}{3}} - 2x^{\frac{1}{3}} + 1 \right) dx = \frac{3}{7} x^{\frac{7}{3}} - \frac{3}{2} x^{\frac{4}{3}} + x + C$$

$$4. \int (3x^{-2} - 5 \sec^2 x - 1) dx = -\frac{3}{x} - 5 \tan x - x + C$$

$$5. \int (x+2)(x-3) dx = \int x^2 - x - 6 dx = \frac{x^3}{3} - \frac{x^2}{2} - 6x + C$$

$$6. \int \frac{dx}{x^4} = \int x^{-4} dx = \frac{x^{-3}}{-3} + C = -\frac{1}{3x^3} + C$$

$$7. \int \frac{3}{\sqrt{x}} dx = \int 3x^{-\frac{1}{2}} dx = 6\sqrt{x} + C$$

$$8. \int x^{\frac{1}{3}}(x+5) dx = \int x^{\frac{4}{3}} + 5x^{\frac{1}{3}} dx = \frac{3}{7} x^{\frac{7}{3}} + \frac{15}{4} x^{\frac{4}{3}} + C$$

$$9. \int (x^2 - 2x)^3 dx = \int x^6 - 6x^5 + 12x^4 - 8x^3 dx$$

$$= \frac{x^7}{7} - x^6 + \frac{12}{5} x^5 - 2x^4 + C$$

$$\begin{aligned}
 10. \int \frac{x^4 - 3x^3 + x - 1}{x^2} dx &= \int x^2 - 3x + x^{-1} - x^{-2} dx \\
 &= \frac{x^3}{3} - \frac{3}{2}x^2 + \ln|x| + x^{-1} + C
 \end{aligned}$$

$$11. \int \frac{x^3 - 5x + 1}{x^4} dx = \int x^{-1} - 5x^{-3} + x^{-4} dx = \ln|x| + \frac{5}{2x^2} - \frac{1}{3x^3} + C$$

$$12. \int (\sec^2(x) - x - 1) dx = \tan x - \frac{x^2}{2} - x + C$$

$$13. \int \frac{\cos^3(x) + 4}{\cos^2(x)} dx = \int \cos x + 4\sec^2 x dx = \sin x + 4\tan x + C$$

$$\begin{aligned}
 14. \int \sec x \left(\frac{1+\sin x}{\cos x} \right) dx &= \int \sec x (\sec x + \tan x) dx \\
 &= \int \sec^2 x + \sec x \tan x dx = \tan x + \sec x + C
 \end{aligned}$$

$$15. \int \frac{2 \sin 2x}{\cos x} dx = \int \frac{4 \sin x \cos x}{\cos x} dx = \int 4 \sin x dx = -4 \cos x + C$$

$$16. \int_0^3 (x^2 - 3) dx = \left[\frac{x^3}{3} - 3x \right]_0^3 = (9 - 9) - (0 - 0) = 0$$

$$17. \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} (\sin x + \cos x) dx = \left[-\cos x + \sin x \right]_{\frac{\pi}{4}}^{\frac{\pi}{2}}$$

$$= \left(-\cos \frac{\pi}{2} + \sin \frac{\pi}{2} \right) - \left(-\cos \frac{\pi}{4} + \sin \frac{\pi}{4} \right) = (0 + 1) - \left(-\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \right)$$

$$= \boxed{1}$$

$$18. \int_1^5 (\sin^2 x + \cos^2 x) dx = \int_1^5 1 dx = \left[x \right]_1^5 = 5 - 1 = \boxed{4}$$

$$\begin{aligned}
 19. \int_0^{\frac{\pi}{4}} (5 + 5 \tan^2 x) dx &= 5 \int_0^{\frac{\pi}{4}} 1 + \tan^2 x \, dx = 5 \int_0^{\frac{\pi}{4}} \sec^2 x \, dx \\
 &= \left[5 \tan x \right]_0^{\frac{\pi}{4}} = 5 - 0 = \boxed{5}
 \end{aligned}$$

$$\begin{aligned}
 20. \int_0^{\ln 2} (e^x + 1) dx &= \left[e^x + x \right]_0^{\ln 2} = (e^{\ln 2} + \ln 2) - (e^0 + 0) \\
 &= 2 + \ln 2 - 1 = \boxed{1 + \ln 2}
 \end{aligned}$$