

MATH 5B INTEGRATION WORKSHEET ANSWERS

$$1) \int \sec^4 x dx = \frac{\tan^3 x}{3} + \tan x + C$$

$$2) \int \frac{dx}{x^2 + 4x - 5} = -\frac{1}{6} \ln|x+5| + \frac{1}{6} \ln|x-1| + C \quad \text{or} \quad \frac{1}{3} \ln \left| \frac{x-1}{\sqrt{x^2+4x-5}} \right| + C$$

$$3) \int \frac{dx}{2+\sqrt{x}} = 2(2+\sqrt{x}) - 4 \ln(2+\sqrt{x}) + C \quad \text{or} \quad 2\sqrt{x} - 4 \ln(2+\sqrt{x}) + C$$

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

$$\hookrightarrow \int \left(\frac{1}{x-1} + \frac{-1}{(x-1)^2} + \frac{-x+1}{x^2+1} \right) dx$$

$$5) \int_1^e x \ln x dx = \left[\frac{1}{2} x^2 \ln x - \frac{1}{4} x^2 \right]_1^e = \frac{1}{4}(e^2 + 1)$$

$$6) \int \sin^3 x \cos^{4/3} x dx = \frac{3}{13} \cos^{13/3} x - \frac{3}{7} \cos^{7/3} x + C$$

$$7) \int x \sec x \tan x dx = x \sec x - \ln|\sec x + \tan x| + C$$

$$8) \int_{\sqrt{2}}^2 \frac{1}{x^2 \sqrt{x^2-1}} dx = \left[\frac{\sqrt{x^2-1}}{x} \right]_{\sqrt{2}}^2 = \frac{\sqrt{3}-\sqrt{2}}{2}$$

$$9) \int \frac{1+e^x}{1-e^x} dx = x - 2 \ln|e^x - 1| + C$$

$$10) \int \left(\sin^2 4x + \frac{1}{3x-2} - \frac{1}{(2x+3)^2} \right) dx = \frac{1}{2} x - \frac{1}{16} \sin 8x + \frac{1}{3} \ln|3x-2| + \frac{1}{2(2x+3)} + C$$