

$$1. \int x^2 \sin(3x) dx = -\frac{x^2 \cos(3x)}{3} + \frac{2x \sin(3x)}{9} + \frac{2 \cos(3x)}{27} + C$$

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

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

$$4. \int \frac{2x^2 + 3x - 8}{(x-4)(x+2)^2} dx = \ln |x-4| + \ln |x+2| - \frac{1}{x+2} + C$$

$$5. \int \tan x dx = -\ln |\cos x| + C$$

$$6. \int \ln x dx = x \ln x - C$$

$$7. \int \frac{4x^2 + 5x}{(x-1)(x^2 + 2)} dx = 3 \ln |x-1| - \frac{1}{2} \ln |x^2 + 2| + 3\sqrt{2} \tan^{-1} \left(\frac{x}{\sqrt{2}} \right) + C$$