

1. START INTEGRALS

You can use two basic rules related to integrals

$$\int kf(x)dx = k \int f(x)dx$$

$$\int (f(x) \pm g(x))dx = \int f(x)dx \pm \int g(x)dx$$

EXAMPLES:

$$\int 2x dx, \int x^2 dx, \int (-t^4) dt, \int \sqrt{x} dx, \int \sqrt[5]{x^3} dx, \int \frac{dx}{\sqrt[3]{x}}, \int \frac{x-3}{x^2} dx, \int \frac{10x^8+3}{x^4} dx, \int x^3 \sqrt{x} dx$$

$$\int (x^4 - \sqrt{x} + \frac{1}{x^2}) dx, \int (3 \sin x + 4 \cos x - \frac{1}{2}x - 5^x + \frac{2}{1+x^2} - \frac{4}{\sqrt{1-x^2}}) dx$$

$$\int \frac{\cos 2x}{\sin^2 x \cos^2 x} dx, \int \frac{dx}{\sin^2 x \cos^2 x}, \int tg^2 x dx, \int ctg^2 x dx, \int \sin^2 \frac{x}{2} dx, \int \frac{3-2ctg^2 x}{\cos^2 x} dx$$

2. METHOD where we use replacement

$$\int f(x)dx = \int f(g(t))g'(t)dt$$

x = g (t) is REPLACEMENT

EXAMPLES:

$$\int (5-2x)dx, \int (4x+3)^{\frac{1}{3}} dx, \int \sqrt{2x-1} dx, \int \frac{dy}{3y-4}, \int \frac{dx}{2x+6}, \int e^{\sin x} \cos x dx, \int e^{-x^2} x dx$$

$$\int e^{x^3} x^2 dx, \int 3^{5x^2} x dx, \int \frac{x^2}{x^3+1} dx, \int \frac{xdx}{x^2-7}, \int \frac{xdx}{\sqrt{1-x^2}}, \int \frac{\ln x}{x} dx, \int \frac{\ln^3 y}{y} dy, \int \frac{dx}{x \ln x \ln(\ln x)}, \int \sin(2x+3) dx,$$

$$\int x \cos(x^2+1) dx, \int tg x dx, \int \cos^2 x dx,$$

$$\int \sin^2 x \cos x dx, \int \frac{\cos x}{1+2 \sin x} dx, \int \cos^4 x dx, \int tg^4 x dx,$$

$$\int \frac{dx}{x^2+9}, \int \frac{dx}{x^2+\sqrt{5}}, \int \frac{dx}{25+4x^2}, \int \frac{\cos x dx}{4+\sin^2 x}, \int \frac{dx}{x(1+\ln^2 x)}, \int \frac{x^2}{4+x^6} dx$$

$$\int \frac{dx}{\sqrt{9-x}}, \int \frac{dz}{\sqrt{25-16z^2}}, \int \frac{\cos x dx}{\sqrt{a^2-\sin^2 x}}, \int \frac{3^x dx}{\sqrt{25-9^x}}, \int \frac{xdx}{\sqrt{3-x^4}}$$