



November 14

SWBAT:

Integrate using
all techniques



Basic

$$\int y^2 + e^y - \sin y \, dy$$

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

u-substitution

$$\int 4(8x^3 + 6x - 8)^3 (24x^2 + 6) \, dx$$

$$\int 5(9x^4 - 8x + 2)^4 (36x^3 - 8) \, dx$$

integration
by parts

$$\int n^2 e^{-n} \, dn$$

$$\int y^2 e^y \, dy$$

partial
fractions

$$\int \frac{1}{(m+2)(m+3)} \, dm$$

$$\int \frac{2}{(x+4)(x+2)} \, dx$$

$$\int \frac{9}{(2x+3)(x^2+3x+2)} dx$$

$$\int \frac{9}{(2x+3)(x+2)(x+1)} dx = \int \frac{A}{2x+3} + \frac{B}{x+2} + \frac{C}{x+1} dx$$

$$\blacksquare \quad 9 = A(x+2)(x+1) + B(2x+3)(x+1) + C(2x+3)(x+2)$$

$$x = -1$$

$$9 = A(1)(0) + B(1)(0) + C(1)(1)$$

$$C = 9$$

$$x = -2$$

$$9 = B$$

$$x = -1.5$$

$$36 = A$$

$$\int \frac{36}{2x+3} dx + \int \frac{9}{x+2} dx + \int \frac{9}{x+1} dx$$

$$36 \int \frac{1}{2x+3} dx + 9 \int \frac{1}{x+2} dx + 9 \int \frac{1}{x+1} dx$$

$$\begin{aligned} u &= 2x+3 \\ du &= 2 dx \\ \frac{1}{2} du &= dx \end{aligned}$$

$$36 \int \frac{1}{u} \cdot \frac{1}{2} du + 9 \int \frac{1}{x+2} dx + 9 \int \frac{1}{x+1} dx$$

$$18 \ln(2x+3) + 9 \ln(x+2) + 9 \ln(x+1) + C$$

$$\ln(2x+3)^{18} + \ln(x+2)^9 + \ln(x+1)^9 + C$$

$$\ln((2x+3)^{18}(x+2)^9(x+1)^9) + C$$

$$\ln x - \ln y = \ln\left(\frac{x}{y}\right)$$

$$\ln x - \ln y - \ln z = \ln\left(\frac{x}{yz}\right)$$

$$\ln x + \ln y = \ln(xy)$$

$$a \ln x = \ln x^a$$