Nom, Prénom:

Interrogation n°10 - Solutions

Les primitives

Série A

Le 22 mai 2025 Classe: 6BCD

Calculer les primitives suivantes :

.../4 1. $\displaystyle\int \frac{x^2+1}{3x^3+9x+8}\,dx$

$$\int \frac{x^2+1}{3x^3+9x+8}\,dx = \frac{1}{9}\int \frac{9(x^2+1)}{3x^3+9x+8}\,dx = \frac{1}{9}\int \frac{g'}{g}\,dx = \frac{\ln(3x^3+9x+8)}{9}+C$$

.../8 2. $\displaystyle\int \arctan x\,dx$

$$f = \arctan x \quad f' = \frac{1}{1+x^2}$$
$$g' = 1 \quad g = x$$

$$\int \arctan x\,dx = x\arctan x - \int \frac{x}{1+x^2}\,dx = x\arctan x - \frac{1}{2}\int \frac{2x}{1+x^2}\,dx$$
$$= x\arctan x - \ln(1+x^2)+C$$

.../4 3. $\displaystyle\int x^2(1-2x)^3\,dx$

$$\int x^2(1-2x)^3\,dx = \int \left(-8x^5+12x^4-6x^3+x^2\right)\,dx = -\frac{8x^6}{6}+\frac{12x^5}{5}-\frac{6x^4}{4}+\frac{x^3}{3}+C$$
$$= -\frac{4x^6}{3}+\frac{12x^5}{5}-\frac{3x^4}{2}+\frac{x^3}{3}+C$$

.../4 4. $\displaystyle\int \frac{e^{\ln x}}{x}\,dx$

$$\int \frac{e^{\ln x}}{x}\,dx = \int e^{\ln x}\frac{1}{x}\,dx = \int e^g g'\,dx = e^{\ln x}+C$$

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Interrogation n°10 - Solutions

Les primitives

Série B

Le 22 mai 2025 Classe: 6BCD

Calculer les primitives suivantes :

.../4 1. $\int \frac{e^{\ln x}}{x}\,dx$

$$\int \frac{e^{\ln x}}{x}\,dx = \int e^{\ln x}\frac{1}{x}\,dx = \int e^{g} g'\,dx = e^{\ln x} + C$$

.../4 2. $\int x^2(1-2x)^3\,dx$

$$\int x^2(1-2x)^3\,dx = \int \left(-8x^5 + 12x^4 - 6x^3 + x^2\right)\,dx = -\frac{8x^6}{6} + \frac{12x^5}{5} - \frac{6x^4}{4} + \frac{x^3}{3} + C$$
$$= -\frac{4x^6}{3} + \frac{12x^5}{5} - \frac{3x^4}{2} + \frac{x^3}{3} + C$$

.../4 3. $\int \frac{x^2+2}{2x^3+12x+14}\,dx$

$$\int \frac{x^2+2}{2x^3+12x+14}\,dx = \frac{1}{6}\int \frac{6(x^2+2)}{2x^3+12x+14}\,dx = \frac{1}{6}\int \frac{g'}{g}\,dx = \frac{\ln(2x^3+12x+14)}{6} + C$$

.../8 4. $\int \arctan x\,dx$

$$f = \arctan x \quad f' = \frac{1}{1+x^2}$$
$$g' = 1 \quad g = x$$

$$\int \arctan x\,dx = x\arctan x - \int \frac{x}{1+x^2}\,dx = x\arctan x - \frac{1}{2}\int \frac{2x}{1+x^2}\,dx = x\arctan x - \ln(1+x^2) + C$$