

1. 次の計算を行え.

$$a^3 \cdot a^4 = \boxed{}$$

$$(a^3)^4 = \boxed{}$$

$$5^{\log_5 32} = \boxed{}$$

$$e^{\log x} = \boxed{}$$

$$e^{-\log x} = \boxed{}$$

2. 次の不定積分を求めよ.

$$(1) \int x^a dx \ (a \neq -1) \quad (2) \int \frac{1}{x} dx \quad (3) \int \sin x dx \quad (4) \int \cos x dx$$

$$(5) \int \frac{dx}{\cos^2 x} \quad (6) \int e^x dx \quad (7) \int \frac{dx}{\sqrt{1-x^2}} \quad (8) \int \frac{dx}{x^2+1}$$

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

3. 次の不定積分を求めよ.

$$(1) \int \sin 2x dx \quad (2) \int \frac{(\sqrt{x}+1)^2}{x} dx \quad (3) \int \frac{x}{\sqrt{x+1}+1} dx$$

$$(4)^* \int x\sqrt{x^2+1} dx \quad (5) \int x \sin x dx \quad (6) \int xe^x dx$$

4. 次の広義定積分を求めよ.

$$(1) \int_0^1 \frac{dx}{(x-1)^2} \quad (2) \int_1^2 \frac{1}{\sqrt{x-1}} dx \quad (3) \int_5^\infty \frac{1}{x^2} dx$$

$$(4) \int_1^\infty \frac{1}{\sqrt{x}} dx$$

5. 次の微分方程式を求めよ.

$$(1) y' + 2xy = 0 \quad (2) y' + 2y = e^x \quad (3) xy' - 2y = x^5 \ (x > 0)$$

