

問 1. 次の関数の導関数を書け。(1点 × 21)

(1) $f = 10$ $f' =$

(2) $f = x^5$ $f' =$

(3) $f = \sqrt[3]{x}$ $f' =$

(4) $f = \frac{1}{x^3}$ $f' =$

(5) $f = x^\pi$ $f' =$

(6) $f = \log x$ $f' =$

(7) $f = \log_2 x$ $f' =$

(8) $f = e^x$ $f' =$

(9) $f = 2^x$ $f' =$

(10) $f = \sin x$ $f' =$

(11) $f = \cos x$ $f' =$

(12) $f = \tan x$ $f' =$

(13) $f = \text{Sin}^{-1}x$ $f' =$

(14) $f = \text{Cos}^{-1}x$ $f' =$

(15) $f = \text{Tan}^{-1}x$ $f' =$

(16) $f = \sinh x$ $f' =$

(17) $f = \cosh x$ $f' =$

(18) $f = \tanh x$ $f' =$

(19) $f = \sinh^{-1} x$ $f' =$

(20) $f = \text{Cosh}^{-1}x$ $f' =$

(21) $f = \tanh^{-1} x$ $f' =$

問 2. 次の不定積分を書け。(1点 × 19)

$$(1) \int dx =$$

$$(2) \int x^8 dx =$$

$$(3) \int \sqrt{x} dx =$$

$$(4) \int \frac{dx}{x} =$$

$$(5) \int \frac{dx}{x^3} =$$

$$(6) \int \frac{dx}{x^\pi} =$$

$$(7) \int e^x dx =$$

$$(8) \int 2^x dx =$$

$$(9) \int \sin x dx =$$

$$(10) \int \cos x dx =$$

$$(11) \int \frac{dx}{\cos^2 x} =$$

$$(12) \int \frac{dx}{\sqrt{1-x^2}} =$$

$$(13) \int \frac{dx}{1+x^2} =$$

$$(14) \int \sinh x dx =$$

$$(15) \int \cosh x dx =$$

$$(16) \int \frac{dx}{\cosh^2 x} =$$

$$(17) \int \frac{dx}{\sqrt{x^2+1}} =$$

$$(18) \int \frac{dx}{\sqrt{x^2-1}} =$$

$$(19) \int \frac{dx}{1-x^2} =$$

問 3. 次の関数のマクローリン級数を書け.
このとき級数が収束する x の範囲も書くこと. (5点 × 4)

(1) e^x (2) $\cos x$ (3) $\log(1+x)$ (4) $\frac{1}{1-x}$

問 4. 次の積分を求めよ.

(1) $\int \frac{x+2}{\sqrt{1-2x^2}} dx$ (10点)

(2) $\int_{-\infty}^{\infty} \frac{dx}{1+x^2}$ (10点)

(3) $\int_1^{\sqrt{2}} \frac{dx}{x^3(x^2+1)}$ (20点)