機械系数学　「微分積分の公式の復習」 (※空欄を埋めよ)　(担当: 谷戸)

1　基礎的な導関数の公式

$$(c)' = \qquad \text{(ただし, } c \text{ は定数)} \tag{1}$$

$$(x^n)' = \tag{2}$$

$$(\sin x)' = \tag{3}$$

$$(\cos x)' = \tag{4}$$

$$(\tan x)' = \tag{5}$$

$$(e^x)' = \tag{6}$$

$$(\log x)' = \tag{7}$$

$$(\arcsin x)' = \frac{1}{\sqrt{1-x^2}} \tag{8}$$

$$(\arctan x)' = \frac{1}{1+x^2} \tag{9}$$

定数倍の微分

$$\{cf(x)\}' = cf'(x) \tag{10}$$

和の微分

$$\{f(x)+g(x)\}' = f'(x)+g'(x) \tag{11}$$

積の微分

$$\{f(x)g(x)\}' = \tag{12}$$

商の微分

$$\left\{\frac{f(x)}{g(x)}\right\}' = \tag{13}$$

合成関数の微分 1

$y = f(g(x))$ を $y = f(t), t = g(x)$ と分解して

$$\frac{dy}{dx} = \frac{dy}{dt} \times \frac{dt}{dx} = \frac{d}{dt}f(t) \times \frac{d}{dx}g(x) \tag{14}$$

合成関数の微分 2

$$\{f(g(x))\}' = f'(g(x)) \times g'(x) \tag{15}$$

2　基礎的な不定積分の公式

$$\int k\,dx = \qquad \text{(ただし, } k \text{ は定数)} \tag{16}$$

$$\int x^n\,dx = \qquad \text{(ただし, } n \neq -1) \tag{17}$$

$$\int x^{-1}\,dx = \int \frac{1}{x}\,dx = \tag{18}$$

$$\int \sin x\,dx = \tag{19}$$

$$\int \cos x\,dx = \tag{20}$$

$$\int \frac{1}{\cos^2 x}\,dx = \tag{21}$$

$$\int e^x\,dx = \tag{22}$$

$$\int \frac{1}{\sqrt{1-x^2}}\,dx = \arcsin x + C \tag{23}$$

$$\int \frac{1}{1+x^2}\,dx = \arctan x + C \tag{24}$$

定数倍の積分

$$\int cf(x)\,dx = c\int f(x)\,dx \tag{25}$$

和の積分

$$\int \{f(x)+g(x)\}\,dx = \int f(x)\,dx + \int g(x)\,dx \tag{26}$$

置換積分 1

$$\int f(g(x)) \cdot g'(x)\,dx = \int f(t)\,dt \tag{27}$$

ただし, $t = g(x)$.

置換積分 2

$$\int f(x)\,dx = \int f(g(t)) \cdot g'(t)\,dt \tag{28}$$

ただし, $x = g(t)$.

部分積分

$$\int f'(x)g(x)\,dx = f(x)g(x) - \int f(x)g'(x)\,dx \tag{29}$$