Q01 次の関数を微分せよ

[1] $y = x^4 - 3x^3 + x^2 + 2x - 3$

[2] $y = 3\sin x + 2\cos x$

[3] $y = e^x + \log x$

[4] $y = x\sin x$

[5] $y = 3e^{2x} + 2e^{-x}$

Sheet [1] $y' =$ :: 5 [2] $y' =$ :: 5 [3] $y' =$ :: 5 [4] $y' =$ :: 5 [5] $y' =$ :: 5

Ans

[1] $4x^3 - 9x^2 + 2x + 2$

[2] $3\cos x - 2\sin x$

[3] $e^x + \dfrac{1}{x}$

[4] $\sin x + x\cos x$

[5] $6e^{2x} - 2e^{-x}$

Q02 次の不定積分を求めよ．ただし $+C$ は省略してよい

[1] $\int (x^2 - 4x)dx$

[2] $\int (\sin x + \cos x)dx$

[3] $\int (e^x + 1)dx$

[4] $\int (\frac{1}{x} + x)dx$

[5] $\int \cos 2x dx$

Sheet [1] = ::5 [2] = ::5 [3] = ::5 [4] = ::5 [5] = ::5

Ans

[1] $\frac{1}{3}x^3 - 2x^2$

[2] $-\cos x + \sin x$

[3] $e^x + x$

[4] $\log x + \frac{1}{2}x^2$

[5] $\frac{1}{2}\sin 2x$

Q03 次の定積分の値を求めよ

[1] $\int_0^1 x^3 dx$

[2] $\int_0^2 (e^x + 1) dx$

[3] $\int_1^2 \frac{1}{x} dx$

[4] $\int_0^\pi (\cos x + x) dx //$

ヒント：$\sin 0 = 0, \cos 0 = 1, \sin \pi = 0, \cos \pi = -1$

Sheet [1] = ::5 [2] = ::5 [3] = ::5 [4] = ::5

Ans

[1] $\frac{1}{4}$

[2] $e^2 + 1$

[3] $\log 2$

[4] $\frac{\pi^2}{2}$

Q04 $y = x^3 - 3x^2$について，問いに答えよ
[1] y'を求めよ
[2] 増減表の 1 行目に入る a, b は何か
[3] 増減表の 2 行目に入る c, d, e は何か
Sheet [1] $=$ :: 5 [2] $a, b =$ :: 5 :: -1 [3] $c, d, e =$ :: 5 :: -1
Ans
[1] $y' = 3x^2 - 6x$
[2] $0, 2$
[3] $+, -, +$

Q05 2 曲線 $y = x^2, y = x^3 - 2x$ で囲まれる図形について
[1] 交点の x 座標を求めよ
[2] y 軸の右側にある部分の面積を求めよ
[3] y 軸の左側にある部分の面積を求めよ
Sheet [1] = :: 5 :: −1 [2] = :: 5 [3] = :: 5
Ans
[1] $-1.0, 2$
[2] $\frac{8}{3}$
[3] $\frac{5}{12}$