

[Chapter 02] 연습문제 정답

2.1

$$[\text{풀이}] \quad y = \frac{1}{3}x^3 + c$$

2.2

$$[\text{풀이}] \quad y = -x \cos x + \sin x + c$$

2.3

$$[\text{풀이}] \quad y = \frac{1}{2} \sin 2x + C$$

2.4

$$[\text{풀이}] \quad y = -\frac{1}{3}e^{-3x} + 1$$

2.5

$$[\text{풀이}] \quad y(x) = (2x+1)\sin x + (2-x)\cos x$$

2.6

$$[\text{풀이}] \quad y = \frac{1}{2}e^{2x} - 2\cos x + \frac{3}{2}x^2 + \frac{3}{2}$$

2.7

$$[\text{풀이}] \quad y = ce^{ax}$$

2.8

$$[\text{풀이}] \quad \frac{x^2}{5} + \frac{y^2}{4} = c$$

2.9

[풀이] $y(x) = \frac{1}{\ln \left| \frac{1}{cx} \right|}$

2.10

[풀이] $4y^2 + 9x^2 = 1$

2.11

[풀이] $y(x) = \sqrt{2x - \sin 2x + 4}$

2.12

[풀이] $i(t) = Ce^{-\frac{R}{L}t}$

2.13

[풀이] 처음보다 바이러스 개체수는 8배 증가한다.

2.14

[풀이] 약 69.6%

2.15

[풀이] $y = x(\ln |x| + c)$

2.16

[풀이] $y = -\frac{x}{x+c}$

2.17

[풀이] $y^4 = x^4(e^x + c)$

2.18

[풀이] $x^2 + 2xy - y^2 = c$

2.19

[풀이] $\therefore e^x \sin y = c$

2.20

[풀이] $\frac{2}{3}x^3y^2 = c$

2.21

[풀이] $y = cx$

2.22

[풀이] $3y\{y(6\ln x + 1) + 16\} + 2(x + 1) = 16$

2.23

[풀이] $2e^x - e^y = 2 - e$

2.24

[풀이] $x^4 \sin y^2 = 16$

2.25

[풀이] $y(x) = x + \frac{c}{x}$

2.26

$$[\text{풀이}] \quad y(x) = -\frac{6}{5}e^{3x} + ce^{8x}$$

2.27

$$[\text{풀이}] \quad y = \frac{1}{3}e^{2x}(\sin 3x + \cos 3x) + ce^{-4x}$$

2.28

$$[\text{풀이}] \quad \therefore y = -2\cos x(\cos x - 2)$$

2.29

$$[\text{풀이}] \quad y(x) = -e^{-2x} + \frac{1}{5}(2\cos x + \sin x)$$

2.30

$$[\text{풀이}] \quad y(x) = 5xe^x$$

2.31

$$[\text{풀이}] \quad y^3 = 2 + ce^{-\frac{3}{2}x^2}$$

2.32

$$[\text{풀이}] \quad y = \frac{1}{cxe^{-3x} - x/3}$$

2.33

$$[\text{풀이}] \quad y = (ce^x - 2x - 1)^{-\frac{1}{3}} \quad \text{또는} \quad y^3 = \frac{1}{ce^x - 2x - 1}$$

2.34

$$[\text{풀이}] \quad y^4 = \frac{1}{ce^x - 3x - 5}$$

2.35

[풀이]

$$(a) \quad \therefore Q(t) = Q_0 e^{\frac{1}{R} \left(\frac{1}{R} - \frac{1}{C} \right) t}$$

$$(b) \quad \therefore t = \frac{4.6 R^2 C}{R - C}$$

2.36

$$[\text{풀이}] \quad (a) \quad I(t) = \frac{E_0}{R} - \frac{E_0}{R} e^{-\frac{R}{L}t} = \frac{E_0}{R} \left(1 - e^{-\frac{R}{L}t} \right)$$

$$Q(t) = \frac{E_0}{R} t + \frac{E_0 L}{R^2} e^{-\frac{R}{L}t}$$

$$(b) \quad I(t) = \frac{E_0}{R^2 + \omega^2 L^2} (R \sin \omega t - \omega L \cos \omega t) + c e^{-\frac{R}{L}t}$$

$$Q(t) = \int I(t) dt = -\frac{E_0}{R^2 + \omega^2 L^2} \left(\frac{R}{\omega} \cos \omega t + L \sin \omega t \right) + \frac{cL}{R} \left(1 - e^{-\frac{R}{L}t} \right)$$

2.37

$$[\text{풀이}] \quad (a) \quad \therefore I(t) = c e^{-\frac{t}{RC}}$$

$$(b) \quad \therefore I(t) = c e^{-\frac{1}{RC}t} - \frac{\omega E_0 C}{1 + (\omega RC)^2} (\sin \omega t - \omega RC \cos \omega t)$$