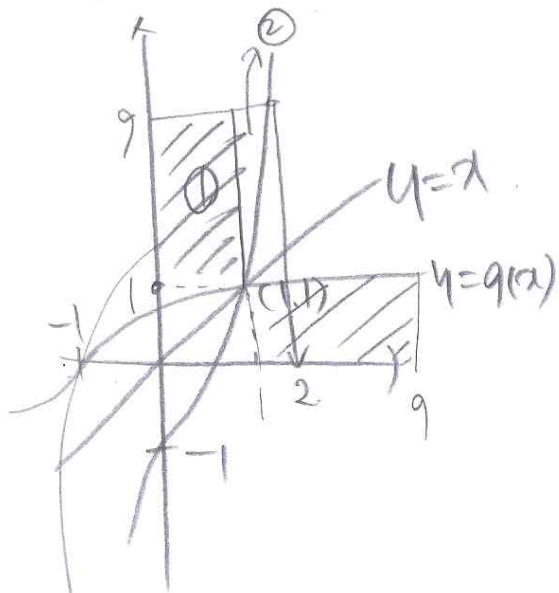


1.

$f(x) = x^2 + x - 1$ 의 영점 중 $q(x)$

$$\int_1^9 q(x) dx = ?$$



① $1 \times 8 = 8$. $x^2 + x - 1$ 영점이다.

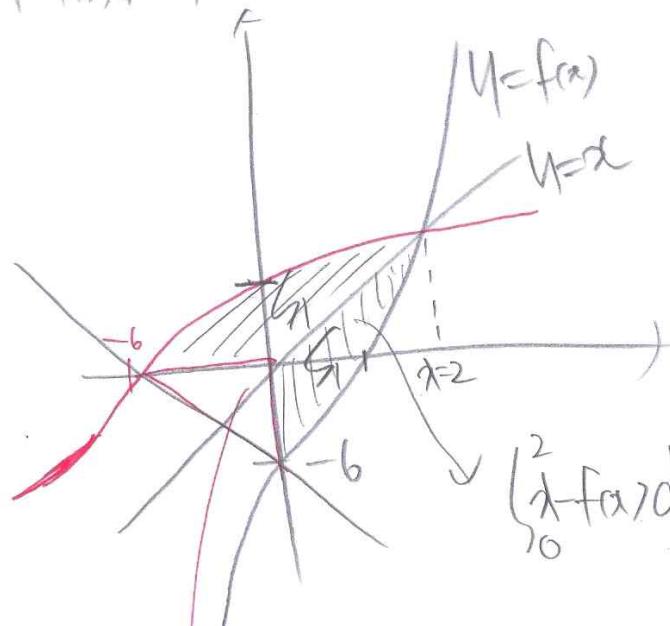
$$\begin{aligned} \text{② } \int_1^2 9 - f(x) dx &= 9 - \int_1^2 (x^2 + x - 1) dx \\ &= 9 - \frac{19}{4} = \frac{19}{4} \end{aligned}$$

$$\text{①} + \text{②} = \frac{51}{4} \quad \text{답 ㉗}$$

②

$y = x^3 - 6$ 의 역함수 $g(x)$

$y = f(x)$, $y = g(x)$ $y = -x - 6$ 으로 둘러싸인 넓이?



$$6 \times 6 \times \frac{1}{2} = 18$$

$$\int_0^2 (x - f(x)) dx = \int_0^2 (x - x^3 + 6) dx$$

$$= \left[\frac{1}{2}x^2 - \frac{1}{4}x^4 + 6x \right]_0^2$$

$$= \frac{4}{2} - \frac{16}{4} + 12 = 14 - 4 = 10$$

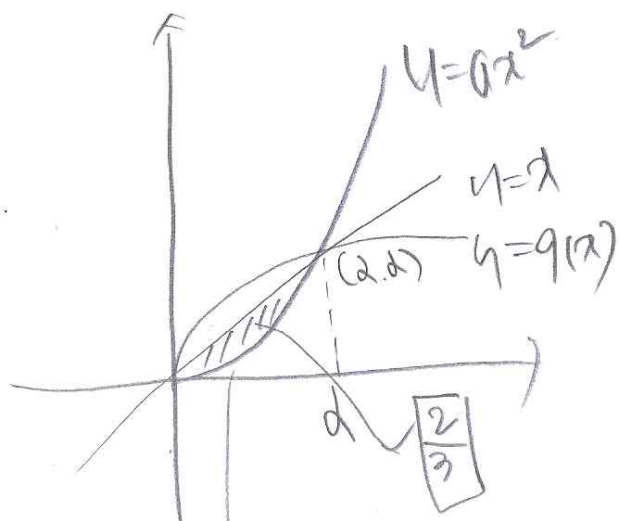
$$\therefore 25 + 18 = 20 + 18 = 38 \quad \text{답) } 38$$

7. $\{x|a \geq 0\}$

$f(x) = ax^2$ 의 역함은 $g(x)$

$y = f(x), y = g(x)$ 둘레/면적이 $\frac{4}{3}$ $\left[\frac{2}{3} \right]$ $d = ?$

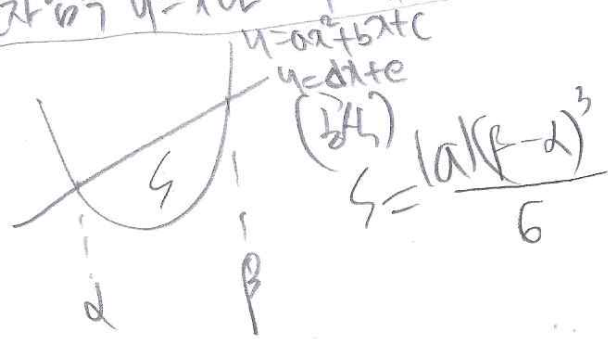
$\rightarrow f(x)$ 이나 $g(x)$



$$\frac{|a|(d-0)^3}{6} = \frac{2}{3}$$

$a d^3 = 4$

일반적으로 $y = ax^2$ 이 둘레/면적이 주어질 때



② $y = ax^2$ 이 (d, d) 를 지날 때.

$ad^2 = d$ $ad = 1$

① ② 연결 $d^2 = 4$ $d = 2$ (양수)

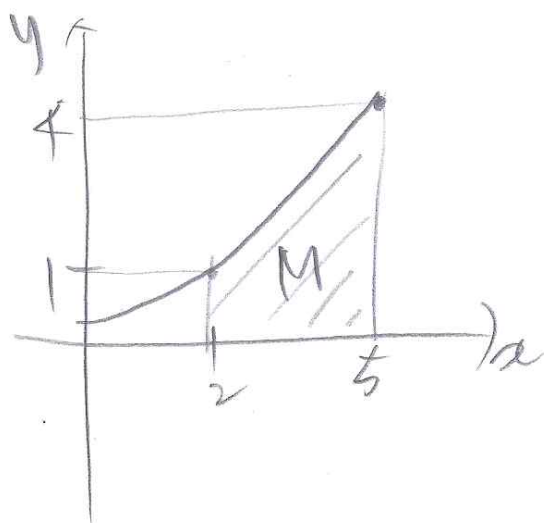
$a = \frac{1}{2}$

답 ③

④

㉠ $f(x)$ 의 넓이를 구하라

㉡ $f(2)=1$ $f(5)=4$



$$\int_2^5 f(x) dx = M$$

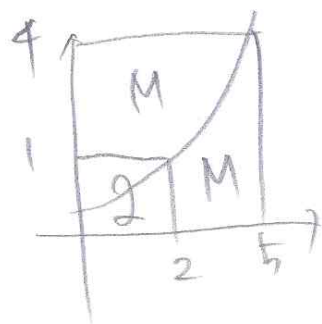
$$\lim_{n \rightarrow \infty} \sum_{k=1}^n g\left(1 + \frac{3k}{n}\right) \frac{2}{n} = a - \frac{2}{3}M \quad a = ?$$

↓
정규분포 근사

$$1 + \frac{3k}{n} \rightarrow x \quad \frac{3k}{n} \rightarrow dx$$

$$\int_1^4 g(x) \frac{2}{3} dx = a - \frac{2}{3}M$$

$$\frac{2}{3} \left(\int_1^4 g(x) dx \right) = a - \frac{2}{3}M$$



$y = f(x)$ or $y = \frac{2}{3}$ $y=1$, $y=4$ or $\frac{2}{3}$ or 4 in $\frac{2}{3}$ interval a .

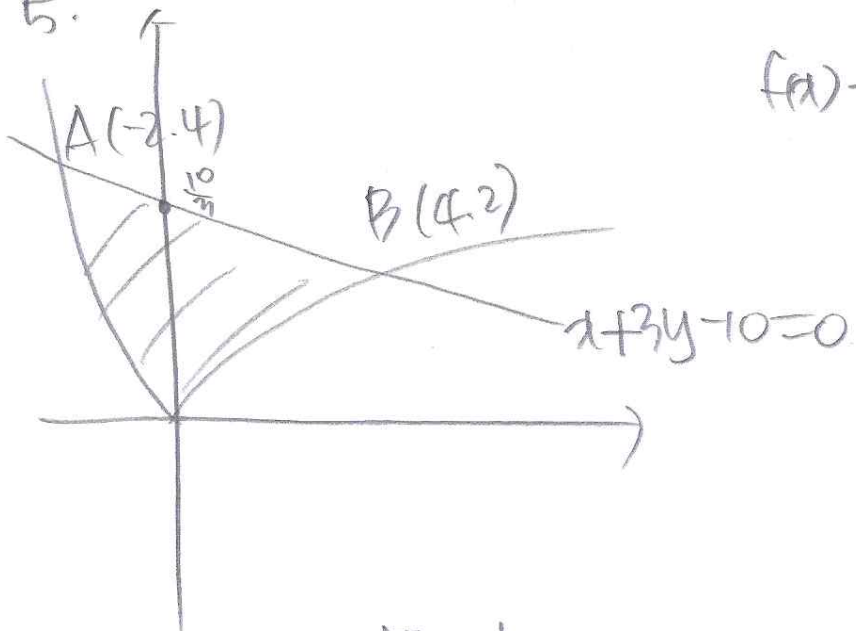
$$\therefore M = \frac{20}{3} \quad \frac{2}{3}M = a - \frac{2}{3}M$$

$$a = \frac{4}{3}M$$

$$\begin{aligned} 2 + 2M &= 20 \\ 2M &= 18 \\ M &= 9 \end{aligned}$$

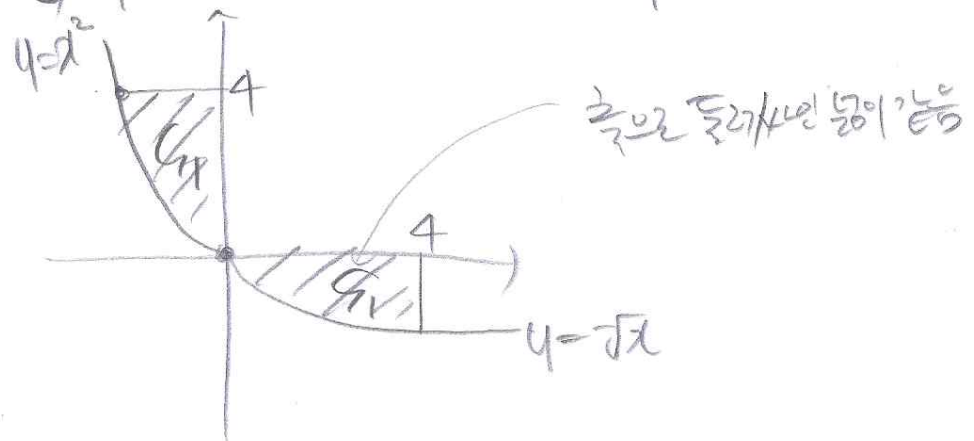
$$a = 12$$

5.

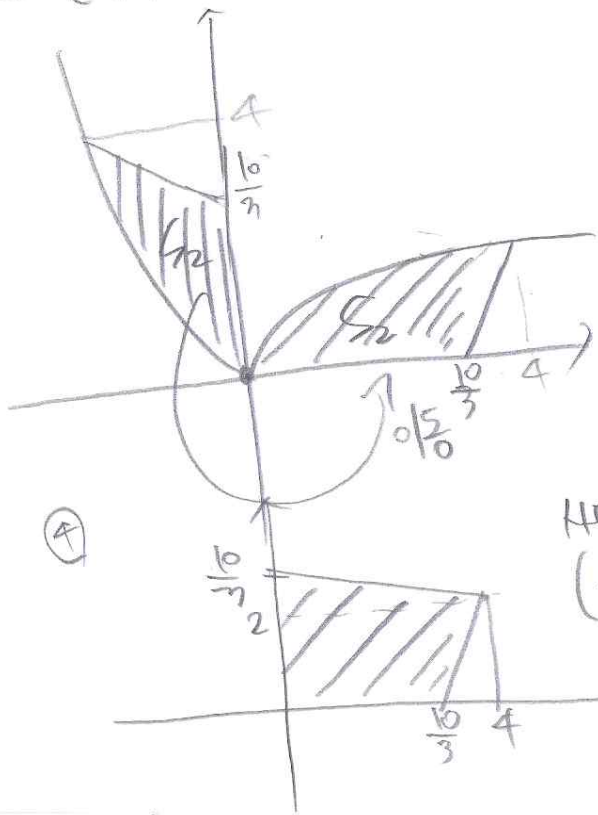


$$f(x) = \begin{cases} \sqrt{x} & (x \geq 0) \\ x^2 & (x < 0) \end{cases}$$

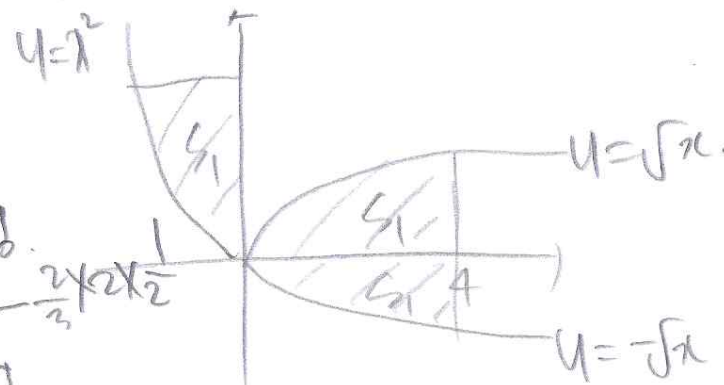
① $y = x^2 (x < 0)$ 의 옛날부터 $y = -\sqrt{x}$ 이다.



② 분할하여 각각의 넓이를 구하기



② $y = \sqrt{x}$ 는 $y = \sqrt{x}$ 을 x^2 과 비교하면 $x < 3$ 이다.



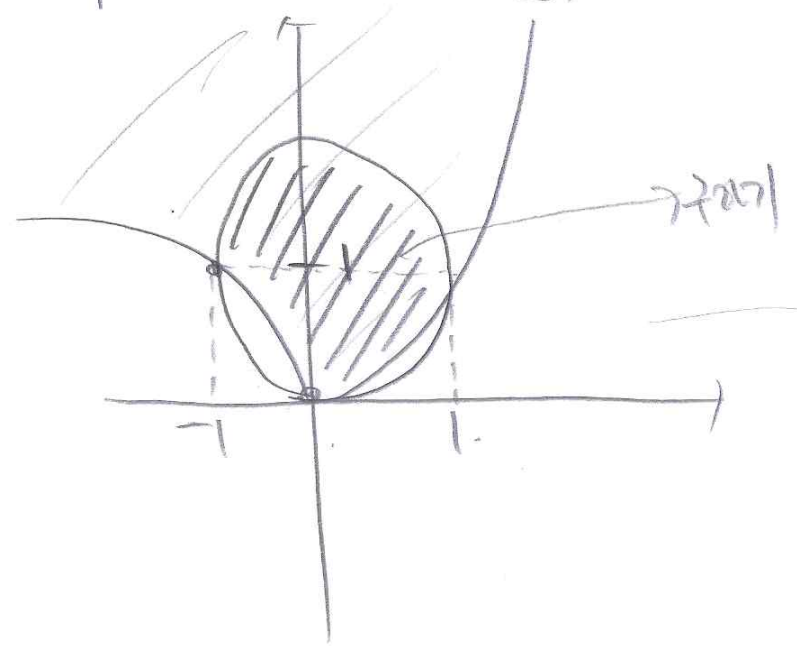
$$\frac{1}{2} \times \frac{10}{3} \times \frac{10}{3} - \frac{1}{2} \times \frac{10}{3} \times \frac{10}{3} - \frac{2}{3} \times 2 \times \frac{1}{2}$$

$$= \boxed{10}$$

$$\frac{1}{2} \times \frac{10}{3} \times \frac{10}{3} - \frac{2}{3} \times 2 \times \frac{1}{2} = \boxed{10}$$

$$6. f(x) = \begin{cases} x^2 & (x \geq 0) \\ \sqrt{-x} & (x < 0) \end{cases}$$

$$\begin{cases} y \geq f(x) \\ x^2 + (y-1)^2 \leq 1 \end{cases} \quad (x, y) \text{ 우상반평면}$$



① $y = x^2$ ($x \geq 0$) 의 영역은 $y = \sqrt{x}$ 이다.
 $y = \sqrt{-x^2}$ 을 $y^2 = -x$ 이라고 하면 $y = -\sqrt{x}$ 이다.

