#1. ④

$S_n = 2n^2 - n$.

$a_1 = S_1 = 1$, $d = 4$

$\to a_n = 4n - 3$

$\therefore a_{10} = 37$.

#2. ②

$(4, 2)$ 지남. 기울기 $= -2$.

$\to y = -2x + 10$.

#3. ③

$$P(A \cup B) = P(A) + P(B) - \underbrace{P(A \cap B)}_{= P(A)P(B)}$$

$$\frac{5}{8} = P(A) + \frac{1}{2} - \frac{1}{2}P(A)$$

$$\frac{1}{8} = \frac{1}{2}P(A) \qquad \therefore P(A) = \frac{1}{4}.$$

#4. (2)

$$\lim_{x\to 1-}(x^2+ax) = f(1) = \lim_{x\to 1+}(6x+b)$$

$$1+a=6+b \iff a-b=5$$

$$f'(x) = \begin{cases} 2x+a & (x<1) \\ 6 & (x\geq 1) \end{cases}$$

$$2+a=6. \iff a=4.$$
$$b=-1.$$

$$\therefore f(2) = 12+b$$
$$= 12+(-1)$$
$$= 11$$

#5 ③

$x=2+\sqrt{3}$
$y=2-\sqrt{3}$ ) $x+y=4$
$xy=4-3=1$

$$\frac{1}{x^3}+\frac{1}{y^3}$$

$$=\frac{x^3+y^3}{x^3y^3}$$

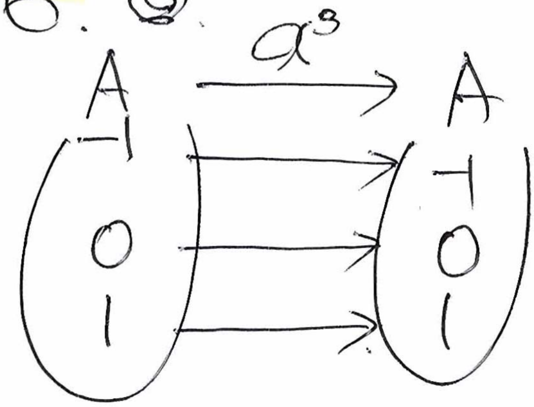
$$=\frac{(x+y)^3-3xy(x+y)}{(xy)^3}$$

$$=\frac{4^3-3\times1\times4}{1^3}$$

$$=64-12$$

$$=\boxed{52}$$

#6. ②.




#7. ②.

$$2^{\frac{1}{2}} \times 3^{-\frac{3}{2}} \times 2^{\frac{7}{2}} \times 3^{\frac{5}{2}}$$

$$= 2^{\frac{1}{2}+\frac{7}{2}} \times 3^{-\frac{3}{2}+\frac{5}{2}}$$

$$= 2^4 \times 3^1$$

$$= 48.$$

#1. ②

$$\lim_{x\to1}\frac{\sqrt{x^2+x+2}+ax}{x-1}=b$$

$$(\text{분자})=2+a=0.\iff a=-2$$

$$\lim_{x\to1}\frac{x^2+x+2-4x^2}{(x-1)(\sqrt{x^2+x+2}+2x)}$$

$$=\lim_{x\to1}\frac{\cancel{(x-1)}(-3x-2)}{\cancel{(x-1)}(\sqrt{x^2+x+2}+2x)}$$

$$=\frac{-5}{4}=b.$$

$$\therefore\ a+4b$$

$$=(-2)+4\times\left(-\frac{5}{4}\right)$$

$$=-2-5$$

$$=-7.$$

#9. ①

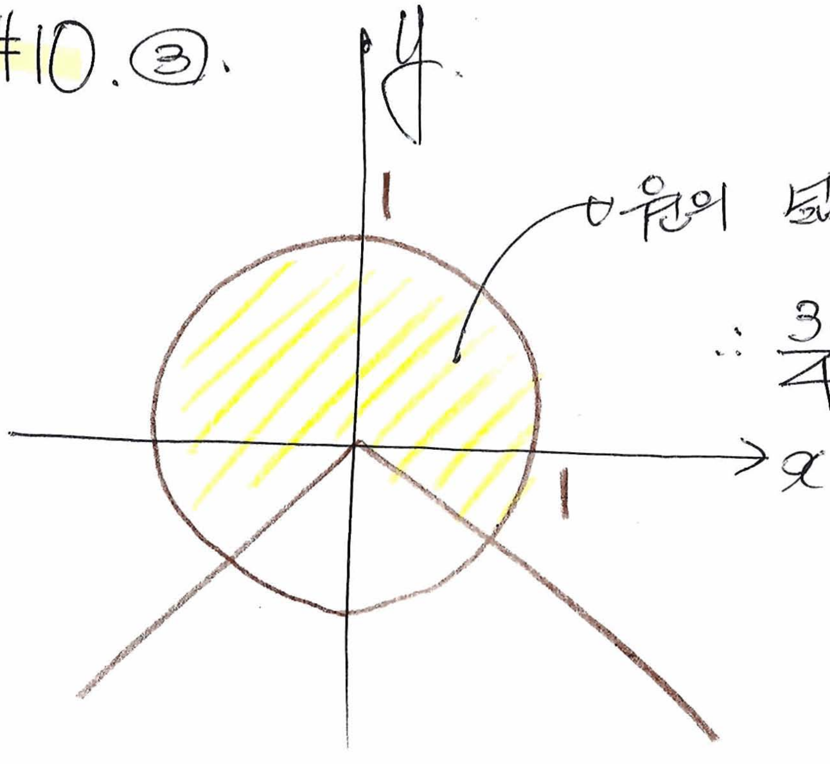
$$\int_3^9 f(x)\,dx$$

$$= \int_1^6 f(x)\,dx + \int_6^9 f(x)\,dx - \int_1^3 f(x)\,dx$$

$$= 9 + 7 - 4$$

$$= 12$$

#10. ③.




원의 넓이의 $\frac{3}{4}$이다.

$\therefore \frac{3}{4}\pi$.

#11. ④

$D/4 = 4 - a + 7 \geq 0 \iff 11 \geq a.$

$D/4 = 1 - 3a + 5 < 0 \iff 2 < a.$

$$\underline{\underline{2 < a \leq 11}}$$

정수 $a$는 $3, 4, \cdots, 11$

총 9개이다.

#12. ③

${}_7P_3 = 7 \cdot 6 \cdot 5 = 210.$

#13. ④

$y = \sqrt{k(x-4)} + 2$ 가 $(2, 4)$를

지나므로 $4 = \sqrt{-2k} + 2$

$\therefore k = -2$

A

#14. 4

$x, y > 0$.

$$x+y = 1\cdot(x+y)$$

$$= \left(\frac{2}{x}+\frac{3}{y}\right)(x+y)$$

$$= 2+\frac{2}{x}y+\frac{3}{y}x+3$$

$$\geq 5+2\sqrt{\frac{2y}{x}\times\frac{3x}{y}}$$

$$= 5+2\sqrt{6}.$$

#15. ①

$\sum_{n=1}^{\infty} \frac{a_n}{3^n} = 2$ 이므로 $\lim_{n\to\infty}\frac{a_n}{3^n}=0$.

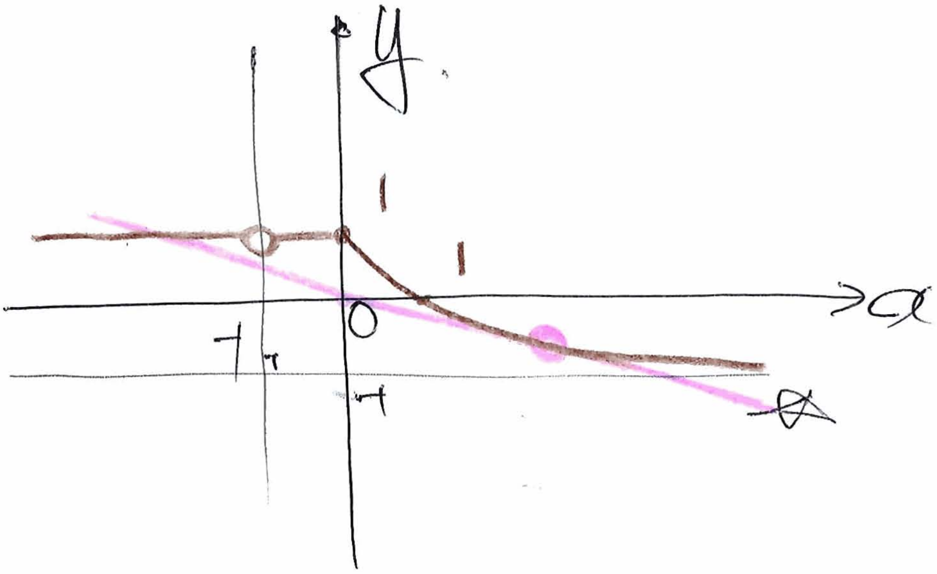
$$\lim_{n\to\infty} \frac{\underbrace{\frac{a_n}{3^n}}_{\to 0}+9-\underbrace{\left(\frac{2}{3}\right)^n}_{\to 0}}{3-\underbrace{\frac{2^{n+1}}{3^n}}_{\to 0}}$$

$= 3.$

#16. ①

$x \ge 0$ : $y=\frac{1-x}{1+x}$

$x<0$ : $y=\frac{1+x}{1+x}=1$ $(x\neq -1)$.



☆의 경우는 접하므로

$$\frac{1-x}{1+x} = mx.$$

$$1-x = mx^2 + mx$$

$$mx^2 + (m+1)x - 1 = 0.$$

$$D = (m+1)^2 + 4m = 0$$

$$m^2 + 6m + 1 = 0$$

$$m = -3 \pm \sqrt{9-1}$$

$$= -3 \pm 2\sqrt{2}.$$

$$m = -3 + 2\sqrt{2}$$

$$\underbrace{-3+2\sqrt{2}}_{a} < m < \underbrace{0}_{b}.$$

$$\therefore a+b = -3+2\sqrt{2}.$$

#17. ①

$x=0$ 대입.

$\therefore \ 1 = a+b+c+d$.

#18. ③

$10^a = 2^4 \iff 10 = 2^{\frac{4}{a}}$

$5^b = 2^8 \iff 5 = 2^{\frac{8}{b}}$

두 식을 나누면

$2 = 2^{\frac{4}{a}-\frac{8}{b}}$.

$\therefore \ \frac{4}{a} - \frac{8}{b} = 1$

#19 ③

$\frac{a}{b} = n$ (n은 정수).

$2019 \leq 10n+9 \leq 2219$

$201 \leq n \leq 221$.

n은 총 21개 → a값도 총21개.

#20. ④

$x^{10}-2x+4=(x-1)^2Q(x)+(ax+b)$.

양변에 x=1 대입: $3=a+b$.
양변을 x에 대하여 미분
: $10x^9-2=2(x-1)Q(x)+(x-1)^2Q'(x)+a$
이 식의 양변에 x=1 대입.

$a=8$ , $b=-5$

∴ 나머지는 $8x-5$.