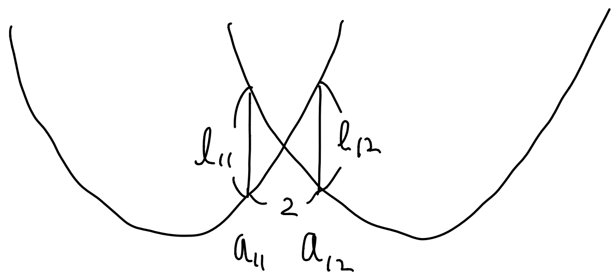
21.



$a_n = a + 2(n-1) \Rightarrow$ 조건(가)

조건(나),
조건(다)

$l_{11} = l_{12}$ $\quad$ $l_3 = l_{20}$

$l_3 = l_5 + 32$ $\quad$ $a_{11} = l_{11} = l_{12}$

$a_{11} = a + 20$

$\hookrightarrow$ $l_n\ (n \le 11)$ 공차 -16 등차수열

$l_{11} = a + 20$ $\quad$ $l_1 = a + 180$

$h(a) = a + 180$

$f(x) - g(x) = h(x) \quad (x \le a + 21)$

$h(x) = -8x + 9a + 180 = -8x + 72$

$\boxed{816}$

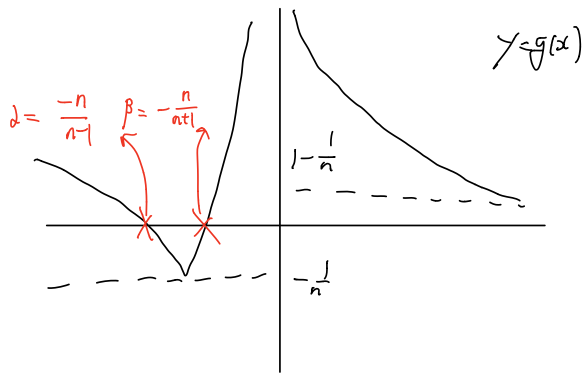
$a - 168 + 180 = 0$ $\quad$ $a = -12$

$$\sum_{x=1}^{20} |h(x)| = 2 \times \sum_{x=1}^{9} -8x + 72 + \sum_{x=18}^{20} 8x - 72 = 816$$

29.

$f(g(x))$ 불연속 의심 지점 : $x=0$, $g(x)=0$ 을 만족하는 x

$\Rightarrow \alpha, \beta$



$$f(g(0)) = f(0) = k$$
$$f(g(0+)) = f(\infty) = -n^2+1$$
$$f(g(0+)) = f(\infty) = -n^2+1$$

$$f(g(\alpha)) = f(0) = k \qquad f(g(\beta)) = f(0) = k$$
$$f(g(\alpha+)) = f(0-) = n^2+1 \qquad f(g(\beta+)) = f(0+) = -n^2+1$$
$$f(g(\alpha-)) = f(0+) = -n^2+1 \qquad f(g(\beta-)) = f(0-) = n^2+1$$

$n^2+1 \neq -n^2+1$ $\Rightarrow$ $f(g(x))$는 $x=0$ 에서 연속, $x=\alpha$와 $x=\beta$ 에서 불연속

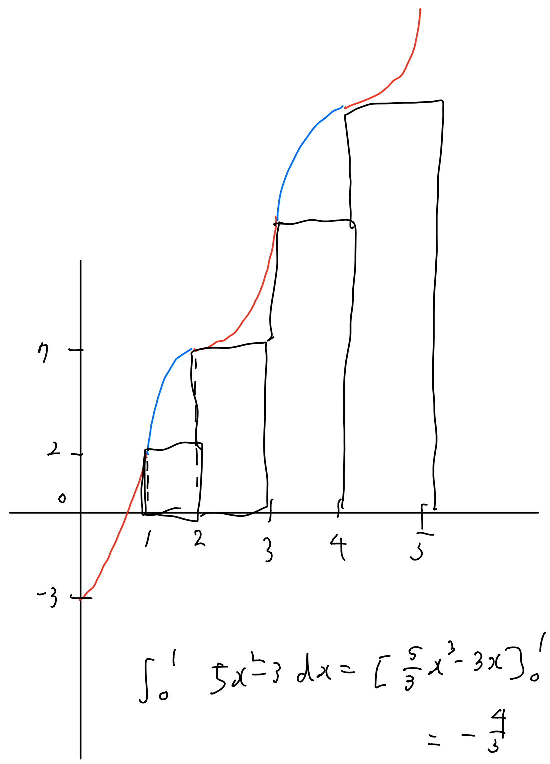
$k = a_n = -n^2+1$ $\qquad b_n = -\frac{2n^2}{n^2-1}$

$\rightarrow$ $f(g(x))$가 불연속이 되는 지점이 적으려면

$$\sum_{n=2}^{10} 2n^2 = 2 \times \frac{10 \cdot 11 \cdot 21}{6} - 2$$
$$= 770 - 2 = 768$$

$\boxed{768}$

30.



$$\int_0^1 5x^2-3\,dx = \left[\frac{5}{3}x^3-3x\right]_0^1$$
$$= -\frac{4}{3}$$

$f'(x)=10x \quad f(x) = -5x^2+3$

$a_1=0 \quad b_1=0 \qquad f(x) \qquad (0\le x\le 1)$

$f(1)=2 \quad , f'(1)=10$

$a_2=2 \quad b_2=4 \qquad -f(x-a_2)+b_2 \qquad (1\le x\le 2)$

$f(2)=7 \quad f'(2)=0$

$a_3=2 \quad b_3=10 \qquad f(x-a_3)+b_3 \qquad (2\le x\le 3)$

$f(3)=12 \quad f'(3)=10$

$a_4=4 \quad b_4=14 \qquad -f(x-a_4)+b_4 \qquad (3\le x\le 4)$

$f(4)=17 \quad f'(4)=0$

$a_5=4 \qquad f(x-a_5)+b_5 \qquad (4\le x\le 5)$

$18\times\left(34+14-\frac{4}{3}\right)=$

$864 \quad -24 = 840$

$\boxed{840}$