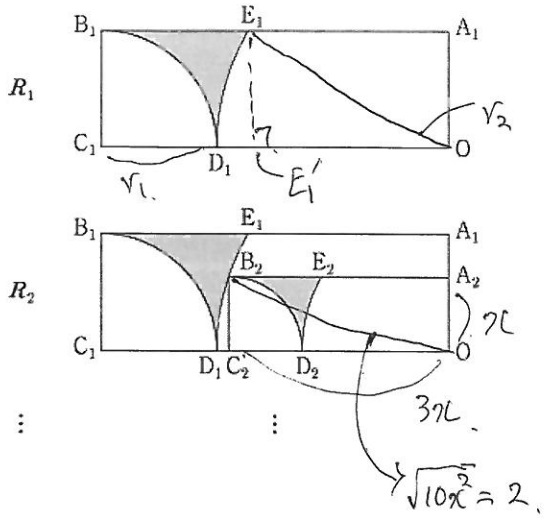
* 2019학년도 평가원 9월 수학 나형 19번.




$\overline{B_1A_1}=3$, $\overline{B_1C_1}=1=\overline{C_1D_1}=r_1$.

$\overline{D_1O}=\overline{E_1O}=r_2=2$.

점 $E_1$에서 선분 $C_1O$에 내린 수선의 발을 $E_1'$이라 하면

$\overline{OE_1}=\overline{E_1O}=2$, $\overline{E_1E_1'}=1$. $\therefore \angle E_1OE_1'=\frac{\pi}{6}=30^\circ$.

$\therefore \overline{E_1A_1}=\sqrt{3}$.

1) $n: 1\to 1$. $\therefore n=1$.

2) $l_r$: $\overline{A_2O}=x$라 하면 $l_r: 1\to x$.

$\overline{C_2O}=3x$, $\overline{B_2O}=\sqrt{10}\cdot x=2$. $\therefore x=\frac{\sqrt{2}}{\sqrt{5}}$.

$\therefore l_r=\frac{\sqrt{2}}{\sqrt{5}}$, $S_r=\frac{2}{5}$.

3) $a$: 직사각형 − 부채꼴 − 부채꼴 − 삼각형

직사각형 $3\times 1$

부채꼴 $\pi\cdot 1^2\cdot\frac{1}{4}$

부채꼴 $\pi\cdot 2^2\cdot\frac{1}{12}$

삼각형 $\frac{1}{2}\times\sqrt{3}\times 1$

$\therefore a=3-\frac{\pi}{4}-\frac{\pi}{3}-\frac{\sqrt{3}}{2}=3-\frac{\sqrt{3}}{2}-\frac{7\pi}{12}$.

$\therefore \lim_{n\to\infty} S_n=\frac{3-\frac{\sqrt{3}}{2}-\frac{7\pi}{12}}{1-\frac{2}{5}\times 1}=\frac{3-\frac{\sqrt{3}}{2}-\frac{7\pi}{12}}{\frac{3}{5}}=5-\frac{5\sqrt{3}}{6}-\frac{35}{36}\pi$ //