

\* 2016 학년도 EBS 수능완성 B형 적분법 36번.

1. 좌표로 접근.

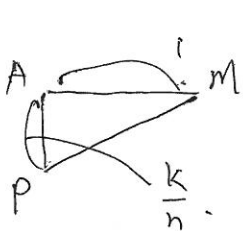
점 B를 원점으로 설정하면,  $B(0,0)$ ,  $M(1,1)$ ,  $P_k(0, 1-\frac{k}{n})$ ,  $Q_k(\frac{2k}{n}, 0)$

$$\therefore \overline{MP_k}^2 = 1 + \frac{k^2}{n^2}, \quad \overline{MQ_k}^2 = 1 + (1 - \frac{2k}{n})^2 = \frac{4k^2}{n^2} - \frac{4k}{n} + 2.$$

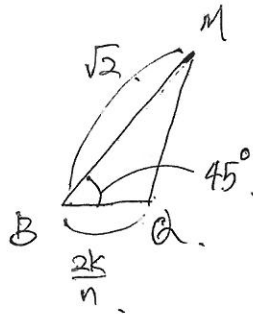
$$\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{k=1}^n (\overline{MP_k}^2 + \overline{MQ_k}^2) = \lim_{n \rightarrow \infty} \frac{1}{n} \sum_{k=1}^n (\frac{5k^2}{n^2} - \frac{4k}{n} + 3)$$

$$\rightarrow \frac{k}{n} = x_k, \quad \frac{1}{n} = dx, \quad \lim_{n \rightarrow \infty} x_1 = 0, \quad \lim_{n \rightarrow \infty} x_n = 1. \quad \therefore \int_0^1 \{5x^2 - 4x + 3\} dx = \frac{8}{3}$$

2. 길이로 접근.



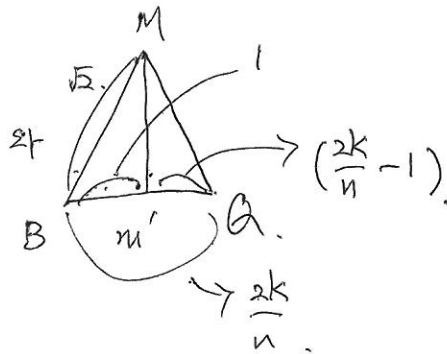
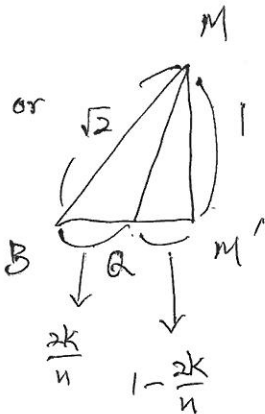
$$\therefore \overline{PM}^2 = 1 + \frac{k^2}{n^2}$$



$$\overline{MQ}^2 = (\sqrt{2})^2 + (\frac{2k}{n})^2$$

$$- 2 \cdot \sqrt{2} \cdot \frac{2k}{n} \cdot \cos 45^\circ$$

$$= \frac{4k^2}{n^2} - \frac{4k}{n} + 2.$$



$\Rightarrow$  이와 같이 구해도 제곱 형태는 동일한 식으로 귀결됨.

$\rightarrow$  무한급수를 정적분으로 바꿀 때는 (1)  $x_k$  설정, (2)  $dx$  확인, (3)  $\lim x_1$ ,  $\lim x_n$  확인.

$\rightarrow$  도가  $\sum_{k=1}^{2n}$  으로 나타났다면?