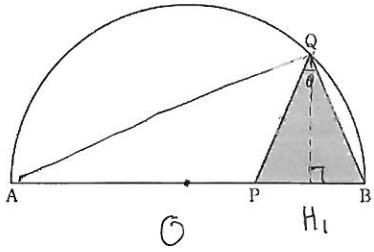


* 2019년 7월 시행 교육청 고3 수학 가형 17번.



$\overline{QB} = \overline{QP}$, $\angle BQP = \theta$ ($0 < \theta < \frac{\pi}{2}$) 이므로,

$$\angle QPB = \angle QBP = \frac{\pi - \theta}{2} = \frac{\pi}{2} - \frac{\theta}{2}. \quad \therefore \angle QAB = \frac{\theta}{2}.$$

$$\therefore \overline{QB} = 2 \sin \frac{\theta}{2}. \quad \text{따라서 } \frac{\overline{PB}}{2} = \overline{QP} \times \cos \left(\frac{\pi}{2} - \frac{\theta}{2} \right).$$

$$\therefore \overline{PB} = 2 \times 2 \sin \frac{\theta}{2} \times \sin \frac{\theta}{2},$$

또한 Q에서 직선 AB에 내린 수선의 발을 H1이라 하면, $\overline{QH1} = \overline{QP} \times \sin \left(\frac{\pi}{2} - \frac{\theta}{2} \right)$.

$$\therefore \overline{QH1} = 2 \sin \frac{\theta}{2} \times \cos \frac{\theta}{2}.$$

$$\text{따라서 } \Delta QPB = S(\theta) = \frac{1}{2} \times 2 \times 2 \sin \frac{\theta}{2} \times \sin \frac{\theta}{2} \times 2 \sin \frac{\theta}{2} \times \cos \frac{\theta}{2} = 4 \sin^3 \frac{\theta}{2} \times \cos \frac{\theta}{2}.$$

$$\therefore \lim_{\theta \rightarrow 0^+} \frac{S(\theta)}{\theta^3} = \lim_{\theta \rightarrow 0^+} \frac{4 \sin^3 \frac{\theta}{2} \times \cos \frac{\theta}{2}}{\theta^3} = \lim_{\theta \rightarrow 0} \frac{\sin^3 \frac{\theta}{2} \times 4 \cos \frac{\theta}{2}}{\frac{\theta^3}{8} \times 8} = \frac{4}{8} = \frac{1}{2} //$$

* 보조선을 그어서 추가정보, 주어있는 정보를 활용할 수 있어야 한다.

* 2019년 7월 시행 교육청 고3 수학 가형 15번

$$\tan \alpha = -\frac{5}{12} \quad \left(\frac{3}{2}\pi < \alpha < 2\pi \right), \quad \therefore 1 + \frac{25}{144} = \frac{169}{144} = \left(\frac{13}{12} \right)^2 = \sec^2 \alpha = \frac{1}{\cos^2 \alpha}$$

$$\therefore \cos \alpha = \frac{13}{12} \quad (\cos \alpha > 0). \quad 0 \leq x < \frac{\pi}{2} \rightarrow \cos x \neq 0 \quad \sin \alpha = -\frac{5}{13} //$$

$$\cos x \leq \sin(x + \alpha) \leq 2 \cos x$$

$$1 \leq \frac{\sin x \times \cos \alpha + \cos x \times \sin \alpha}{\cos x} \leq 2 \quad \Rightarrow \quad 1 \leq \frac{12}{13} \tan x - \frac{5}{13} \leq 2$$

$$\therefore \frac{18}{13} \times \frac{13}{12} \leq \tan x \leq \frac{31}{13} \times \frac{13}{12} \quad \Rightarrow \quad \frac{3}{2} = \frac{18}{12} \leq \tan x \leq \frac{31}{12}. \quad \therefore \frac{49}{12} //$$