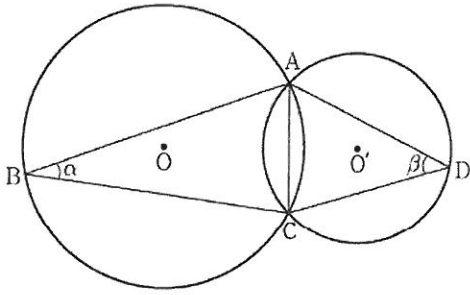


* 2022 학년도 대수능 예시문항 21번.

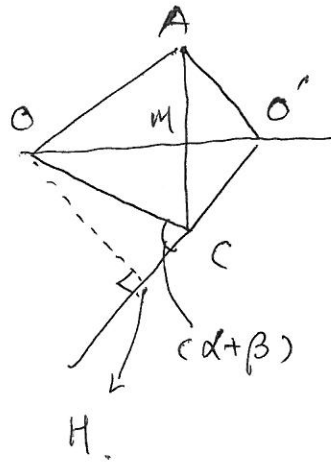
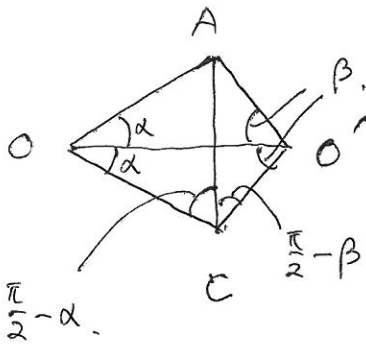


$\overline{OA} = R_1, \overline{O'A} = R_2$ 라 하면

$\overline{OO'} = 1, \cos(\alpha + \beta) = \frac{1}{3}, \frac{\sin \beta}{\sin \alpha} = \frac{3}{2}$ 에서

$\frac{\overline{AC}}{\sin \alpha} = 2R_1, \frac{\overline{AC}}{\sin \beta} = 2R_2. \therefore R_1 = \frac{3}{2} R_2.$

$\angle AOC = 2\alpha, \angle A'O'C = 2\beta, \overline{AC}$ 의 중점을 M이라 하면



중점의 직선 $O'C$ 키르니

정사영을 H라 하면

$\overline{OC} = R_1, \overline{CH} = \frac{1}{3} R_1, \overline{OH} = \frac{\sqrt{8}}{3} R_1, \overline{O'C} = R_2 = \frac{2}{3} R_1, \triangle OHO'$ 은 직각삼각형.

$\therefore \left(\frac{\sqrt{8}}{3} R_1\right)^2 + \left(\frac{1}{3} R_1 + \frac{2}{3} R_1\right)^2 = 1^2$ (\because 피타고라스 정리).

$\therefore \frac{17}{9} R_1^2 = 1, \triangle ABC$ 의 외접원의 넓이는 $R_1^2 \pi = \frac{9}{17} \pi = \frac{9}{p} \pi.$

$\therefore p + q = 26.$

(9와 17은 서로 소).