

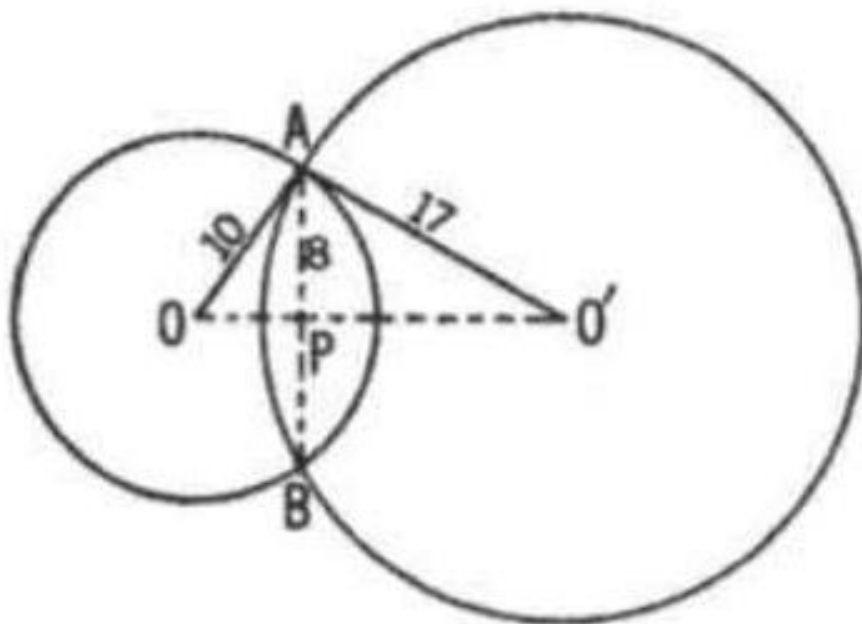
## Example 4

(1966 AMC) The length of the common chord of two intersecting circles is 16 feet. If the radii are 10 feet and 17 feet, a possible value for the distance between the centers of the circles, expressed in feet, is:

- (A) 27
- (B) 21
- (C)  $\sqrt{389}$
- (D) 15
- (E) undetermined

Solution: (B).

Denote the common chord by  $AB$ , its midpoint by  $P$ , and the centers of the smaller and larger circles by  $O$  and  $O'$ ;  $OO'$  is perpendicular to  $AB$  and passes through  $P$ .



The Pythagorean Theorem applied to right triangles  $OPA$  and  $O'PA$  yields

$$OP^2 = OA^2 - AP^2 = 10^2 - 8^2 = 36,$$

$$OP = 6,$$

And  $O'P^2 = O'A^2 - AP^2 = 17^2 - 8^2 = 225$ ,  $O'P = 15$ .  
The distance between the centers of the circles is  $15 + 6 = 21$ .