Task

Given that P(h,k) is a point equidistant from the points A(3,5) and B(7,-1), prove that 3k-2h+4=0

Solution

As it is given, PA = PB, so we can find squares of lengths and then equate them:

$AB^2 = (x_1 - x_2)^2 + (y_1 - y_2)^2$ - general formula of the square of the distance between points A $(x_1 ; y_1)$ and B$(x_2 ; y_2)$.

In this case:

$PA^2 = (h - 3)^2 + (k - 5)^2$

$PB^2 = (h - 7)^2 + (k + 1)^2$

Since $PA = PB$, so $PA^2 = PB^2$;

$(h - 7)^2 + (k + 1)^2 = (h - 3)^2 + (k - 5)^2$

$h^2 - 6h + 9 + k^2 - 10k + 25 = h^2 - 14h + 49 + k^2 + 2k + 1$

$12k - 8h + 16 = 0 \ /:4$

$3k - 2h + 4 = 0$

Answer

Proved: *3k - 2h + 4 = 0*