Answer on Question #72204, Math / Calculus

Let O be the origin of coordinate plane, A, B lie on the upper half plane satisfying $OA = OB$. If line OA has slope 1, line OB has slope -7, what is the slope of line AB?

Solution

Let $A(x_A, y_A), B(x_B, y_B)$

We have that

$y_A > 0, y_B > 0; OA = OB;\ y_A = x_A, y_B = -7x_B$

Hence

$x_A^2 + y_A^2 = x_B^2 + y_B^2$

$x_A^2 + x_A^2 = x_B^2 + (-7x_B)^2$

$x_A^2 = 25x_B^2$

If $y_A > 0, y_B > 0$, then $x_A > 0, x_B < 0$

$x_A = -5x_B, y_A = x_A = -5x_B\ , y_B = -7x_B$

$$slope_{AB} = \frac{y_B - y_A}{x_B - x_A} = \frac{-7x_B - (-5x_B)}{x_B - (-5x_B)} = \frac{-2}{6} = -\frac{1}{3}$$