Problem of the Week
Problem D
The Area Within

Quadrilateral $ABCD$ is constructed as follows:

- vertex $A$ is located at the origin;
- vertex $C$ is at the intersection point of the lines $\ell_1 : 5x + 2y = 30$ and $\ell_2 : x + 2y = 22$;
- vertex $B$ is at the intersection point of the $y$-axis and $\ell_2$; and
- vertex $D$ is at the intersection point of the $x$-axis and $\ell_1$.

Determine the area of $ABCD$. 