Problem of the Week

Problem E

Sliding Parabola

Suppose the parabola with equation $y = 4 - x^2$ has vertex at $P$ and crosses the $x$-axis at points $A$ and $B$, with $B$ lying to the right of $A$ on the $x$-axis.

This parabola is translated so that its vertex moves along the line $y = x + 4$ to the point $Q$. The new parabola crosses the $x$-axis at points $B$ and $C$, with $C$ lying to the right of $B$ on the $x$-axis.

Determine the coordinates of $C$. 

![Diagram showing the parabola and its translation]