Math 124 - Section 012
Solution to section 3.8, #30

We know $x = 0$ and $y = 615$ at the top of the arch, so

$$615 = b - a\cosh(\frac{0}{a}) = b - a.$$

This implies that $b = a + 615$. We also know that $x = 215$ and $y = 0$ where the arch hits the ground, so

$$0 = b - a\cosh(\frac{265}{a}) = a + 615 - \cosh(\frac{265}{a}).$$

This equation cannot be solved algebraically, so you need to use your calculator. More specifically, graph the function $f(a) = a + 615 - \cosh(\frac{265}{a})$ and trace the graph to approximate the horizontal intercept (where the height of the function is 0). The result you should get is $a \approx 100$, which means that $b \approx 715$.