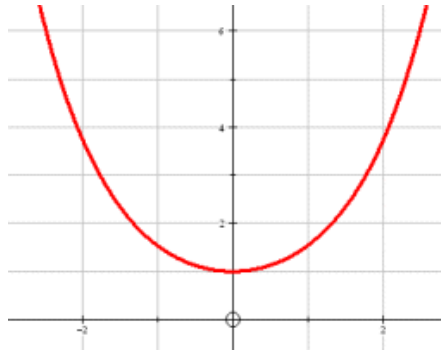


Risp 33: Almost Identical

How close is a parabola to being a catenary?

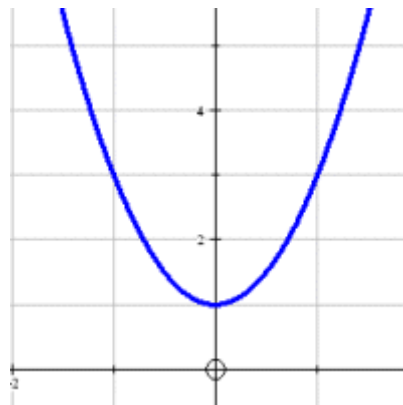
A chain suspended from two points will hang in a catenary.



The equation of this catenary is $y = \cosh(x) = \frac{e^x + e^{-x}}{2}$.

Imagine the ends of the chain being at $(\pm 1, \cosh(1))$.

Let's try to fit a parabola to this curve.



Say the parabola has a minimum at $(0, 1)$ too,
and it also goes through $(\pm 1, \cosh(1))$.

What is the largest difference that there can be
between the two curves?

What is the largest % error that there can be
between the two curves?

What if we ask the two curves to go through $(\pm a, \cosh(a))$?