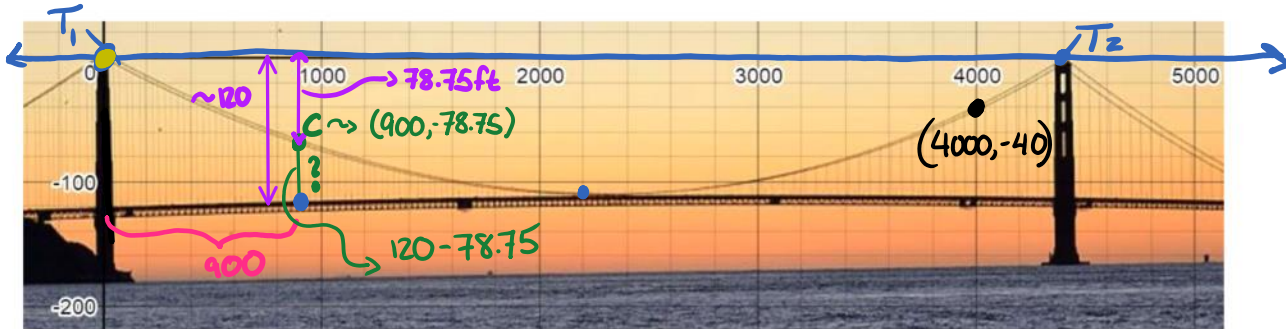


4.6 - Modelling Situations with Quadratics

November 20, 2019 3:29 PM

Because a number of objects in real life are shaped like parabolas, we can model them using different forms of quadratic functions.

Example: Modelling a bridge with a quadratic equation.



What are the coordinates of the top of each tower? The vertex?

$T_1: (0, 0)$
 $T_2: (4400, 0)$
 Vertex: $(2200, -110)$ (approx.)

Estimate the equation that the Golden Gate Bridge models. (In factored form).

$y = a(x - m)(x - n)$
 $y = a(x - 0)(x - 4400)$
 $y = ax(x - 4400)$

To find "a", determine a point on the graph and substitute: $(4000, -40)$

$y = ax(x - 4400)$
 $(-40) = a(4000)[(4000) - 4400]$

Determine the height of the parabolic cable above the road 900 ft. from the left tower (Assume the axes are in feet).

point C: $(900, y)$

full equation: $y = 0.000025x(x - 4400)$

$-40 = -1600000a$
 $-1600000 \quad -1600000$

$a = \frac{-40}{-1600000} = 0.000025$

$y = 0.000025(900)[(900) - 4400]$
 $y = 0.000025(900)(-3500)$
 $y = -78.75 \text{ ft.}$

Final distance above road: $120 \text{ ft.} - 78.75 \text{ ft.} = 41.25 \text{ ft.}$