

Parabola through three points

Find the equation of the parabola through (1,2),(-1,1) and (2,3)

Start with standard form:

$$y = Q x^2 + bx + C$$

plug in all three points to get three equations.
 $2 = Q \cdot 1^2 + b \cdot 1 + C$
 $1 = Q (-1)^2 + b (-1) + C$
 $3 = Q \cdot 3^2 + b \cdot 3 + C$
Solve a system

5900

▲□▶ ▲□▶ ▲ 国▶ ▲ 国▶ ― 国

$$\begin{array}{c}
2 = Q + b + C \\
1 = Q - b + C \\
3 = 4Q + 2b + C \\
2 = 2 - b - C \\
3 = 4(2 - b - C) + 2b + C \\
2 = 2 - b - C \\
3 = 8 - 2b - 3C \\
3 = 8 - 2b - 3C \\
2 = 8 - 2b - 3C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 2 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - 2 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - 2 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - 2 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - 2 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - 2 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - 2 - b - C \\
3 = 8 - 2\left(\frac{1}{2}\right) - 3C \\
2 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
3 = 4 - 2 - 1 - 4 - 4 - 1 \\
4 - 2 - 1 - 4 - 4 - 1 \\
4 - 2 - 1 - 4 - 4 - 1 \\
4 - 2 - 1 - 4 - 4 - 1 \\
4 - 2 - 1 - 4 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 4 - 1 \\
4 - 2 - 1 - 1 \\
4 - 2 - 1 - 1$$

Current Status Cases	Epidemiologic Curves Cumulative Counts Demographics Testing COVID-like Illness Hospitalizations Healthcare System Readiness Vaccination Hospitalizations Deaths R-effective Estimates Count © Rate Count © Count
This chart shows the referred to in the pherical statement of the second state	IN WASHINGTON STATE Cases and Deaths by Specimen Collection Date, and Hospitalizations by Admission Date DATA AS OF 10/12/2021 11:59PM PT e progression of the COVID-19 outbreak in Washington by cases, hospitalizations and deaths over time and is known as an epidemiologic curve. The epidemiologic curve is the cur rase, "flatten the curve." Learn More
Search Search Select all Adams County Benton County Chelan County Chelan County Clallam County Clallam County Clark County Cowlitz County Douglas County Franklin County Granst County Granst County Clark of the County Clark of	 Probable Cases © Confirmed Cases © Incomplete (Probable Cases) © Incomplete (Confirmed Cases) — Total Cases (7 day avg.) Incomplete (7 day avg.) Probable Cases © Confirmed Cases © Incomplete (Probable Cases) © Incomplete (Confirmed Cases) — Total Cases (7 day avg.) Incomplete (7 day avg.) Sound y Sound y Apr 2020 Jul 2020 Oct 2020 Jul 2021 Apr 2021 Jul 021 Oct 20 Jan 2021 Apr 2021 Jul 021 Oct 20 Specimen Collection Date
Microsoft Power Bl	County-level information can be found on Local Health Jurisdiction (<u>[HJ]) websites</u>
Sum Find e and	nary Data Tables quefion of perebole with Vertex at (5,400) through (5.25,1000)

A min/max problem is a modeling problem where you need to minimize/maximize a quantity q. In this class $q = q(x) = ax^2 + bx + c$ The min / max usually is at the vertex of the parabola

5900

< □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □

To solve a min/max problem

- Choose your variables and find a formula for q. q=q(x).
- In 120 q(x) should involve a quadratic function. Usually you find max/min by finding the vertex.
- Pay attention whether the problem is asking for an x value (h) or a q value (k) or both.

5900

Issues-tricks

- The quantity is a distance given by a formula : $q = \sqrt{\cdots x \cdots}$.
- \triangleright q depends on more than one variable. q=q(x,y).
- Min/max not at vertex.

< ロ > < 回 > < 三 > < 三 > < 三 > < 回 > < ○ < ○

Rosalie is organizing a circus performance to raise money for a charity. She is trying to decide how much to charge for tickets. From past experience she knows that the number of tickets sold is a linear function of the price. If she charges 5 dollars per ticket , she can sell 1000 tickets, if she charges 7 dollars she can only sell 900 tickets. How much should she charge per ticket to make the most money ?

SQ (V

=

<ロト < 団 > < 国 > < 国 > < 国 > <

You have 720 m of fencing with which to build 3 enclosures. Two are identical squares and one is a rectangle that is twice as long as it is wide. What should the dimensions of the squares be, in order to to minimize the combined area of all three enclosures ? What should the dimensions of the squares be, in order to maximize the combined area of all three enclosures ?

SQ (V

=

▲□▶ ▲圖▶ ▲厘▶ ▲厘▶ --

An American Airlines plane is flying North at a speed of 200 mph. At time t = 0 it is located 100 mi South of a control tower. A United Airlines plane is flying in a straight line towards the control tower with a speed of 1**3**0 mi/hour. At time t = 0 it is located 50 mi East and 100 mi South of the control tower. When are the planes closest ? How close do they get ?



$$Simplify$$

$$d(t) = \sqrt{8900t^2 - 1800t + 2900}$$