

Graphing a parabola without a graphing calculator?

President Trump was asked to graph $y = x^2 - 2x - 8$



Below are some notes from his lesson to this class:

1st find the y-intercept: This is the point where the graph crosses the y-axis and x-value is zero; it can be found by substituting zero for x into the equation, $y = (0)^2 - 2(0) - 8 = -8$. So the y-intercept is $(0, -8)$.

2nd find the x-intercept(s): This will be where the graph crosses the x-axis and the y-value is zero, (a parabola can cross the x-axis either two times, one time or not at all). It can sometimes be easier to first write the equation in factored form, $y = (x - 4)(x + 2)$.

Now use the zero-product property, (if $ab = 0$, then either $a = 0$ and/or $b = 0$).

$$y = (x - 4)(x + 2)$$

Thus we would have $0 = (x - 4)(x + 2)$ so there are two x-intercepts here, and they are

$$\rightarrow x = 4 \rightarrow x = -2$$

$(4, 0)$ and $(-2, 0)$.

3rd find the line of symmetry (L.O.S.): To find this line you remember that it is in the middle of the x-intercepts. What is in the middle of 4 and -2? So the equation for this line is $x = 1$.

4th find the vertex (A.K.A. the maximum or minimum point): The L.O.S. runs through the vertex, and thus the x-coordinate must have the same value as the L.O.S. does, in this case that value is 1. Now you find the y-value for this point $(1, y - \text{value?})$. This can be found by substituting the x-value of the L.O.S. into the equation. Note that every point on the graph

$$y = (x - 4)(x + 2)$$

$$y = (1 - 4)(1 + 2)$$

is also a solution to the equation.

$$y = (-3)(3)$$

The vertex point is $(1, -9)$.

$$y = -9$$

5th find two points to shape out the parabola (one to the right of the vertex and one to the left of the vertex):

x	-3	3
y	7	-5

the right of the

6th plot the points and create the parabola on the coordinate plane: Now be proud of your work knowing that you did not give up when things got hard! Because at the end of the day, there is no excuse for not trying! Aristotle once said that excellence is not an act, but a habit.