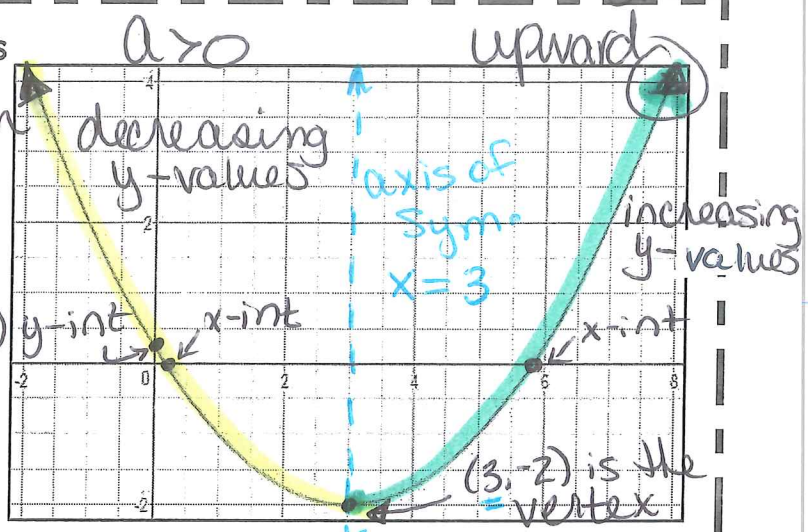
3rd

Quadratic Functions and Their Graphs Guided Notes



Quadratic Functions - Polynomial function with degree of 2.

- Standard Form: $f(x) = ax^2 + bx + c$
- Factored Form: $f(x) = (x \pm \quad)(x \pm \quad)$

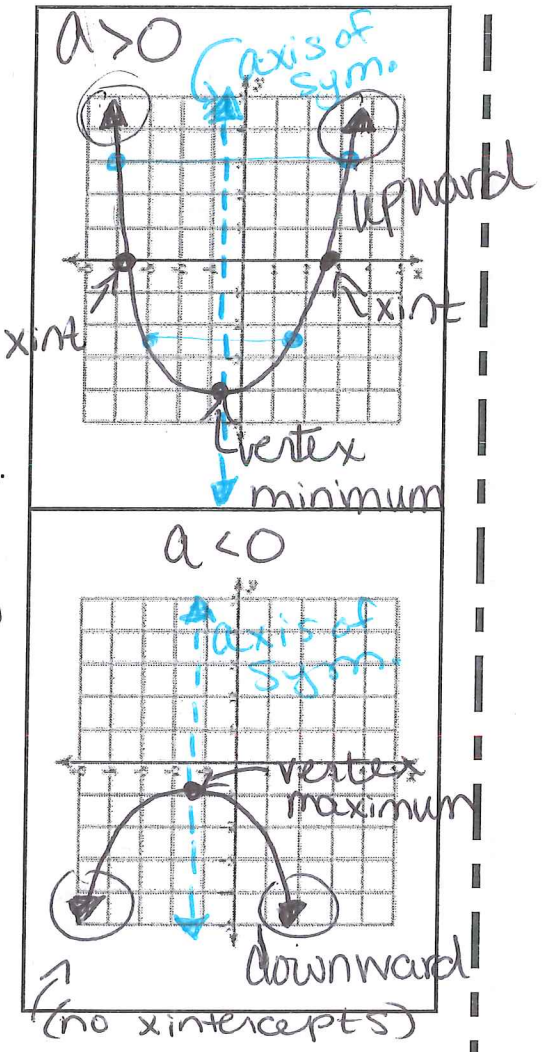
Basic Vocabulary To Know...

Graph:

- The graph is called a parabola and all quadratics have a basic U-shape.

Vertex:

- Either the highest (maximum) or the lowest (minimum) point on the parabola.



Axis of Symmetry:

- All parabolas are symmetric with respect to a line called the axis of symmetry.
  1. The axis of symmetry will be an $x =$ equation.
  2. The equation for the axis will always be the x-value of the vertex.

End Behavior:

- Any quadratic function will either open up when $a > 0$ (pos) or open down when $a < 0$ (neg.). This is also known as the facing of the graph.
  * If $a > 0$, then the function has a minimum at the vertex.
  * If $a < 0$, then the function has a maximum at the vertex.

How to Graph a Function

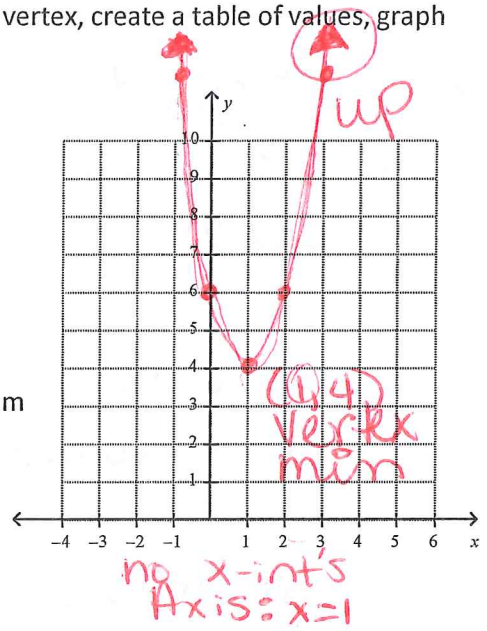
- **To enter an equation on the calculator:**
  1. Turn on the calculator
  2. Press HOME button
  3. 1: New Document
  4. Click NO
  5. 2: Add Graphs
  6. MENU
  7. 3: Graph Entry/Edit
  8. 1: Function

- **To change the window on the calculator:**
  1. After entering a function, press MENU
  2. 4: Window/Zoom
  3. 1: Window Settings – this will change the x and y min/max values based on what you choose

     - Or -

  3. A: Zoom – Fit - this will zoom to make the graph fit the window automatically.

- **Example:** Using the function $f(x) = 2x^2 - 4x + 6$, find the vertex, create a table of values, graph the function, and identify the axis of symmetry.



1. Plug function into the calculator
2. Change the window to match the graph provided
3. Find the vertex
   a. Press MENU
   b. 6: Analyze Graph
   c. Either 2 or 3 depending if you have a minimum or a maximum
   d. Set the bounds to find the vertex.
      a. This is going to be the middle value in your table!
4. Creating a Table of Values:
   a. Press MENU
   b. 7: Table
   c. 1: Split-Screen Table
   d. Find your vertex by scrolling up or down. This is the middle value in the table. You are now going to use the two x-values above your vertex and two x-values below with their respective y-values to fill in the rest of the table.

x	y
-1	12
0	6
1	4
2	6
3	12

5. Plot the points on the graph provided and connect with a smooth curve.