

Name _____



Investigating $y = ax^2 + bx + c$



Part A - Varying c

1. Graph the following functions using your calculator and then complete the table.

| Function | Vertex | y-intercept | x-intercepts |
|---|--------|-------------|--------------|
| $y = x^2 + 4x + 9$ | | | |
| $y = x^2 + 4x + 6$ | | | |
| $y = x^2 + 4x + 3$ | | | |
| $y = x^2 + 4x + 0$ | | | |
| $y = x^2 + 4x - 3$ | | | |
| $y = x^2 + 4x - 6$ | | | |
| $y = x^2 + 4x - 9$ | | | |
| Predict the vertex, y-intercept and x-intercepts for the following functions. | | | |
| $y = x^2 + 4x - 15$ | | | |
| $y = x^2 + 4x + 10$ | | | |

Summarize: In general, what information does the value of c tell you about the parabola?

Part B - Varying a

| Function | Vertex | y-intercept | x-intercepts |
|---|--------|-------------|--------------|
| $y = 10x^2 + 4x + 9$ | | | |
| $y = 3x^2 + 4x + 9$ | | | |
| $y = 2x^2 + 4x + 9$ | | | |
| $y = x^2 + 4x + 9$ | | | |
| $y = \frac{1}{2}x^2 + 4x + 9$ | | | |
| $y = \frac{1}{3}x^2 + 4x + 9$ | | | |
| $y = \frac{1}{10}x^2 + 4x + 9$ | | | |
| Predict the vertex, y-intercept and x-intercepts for the following functions. | | | |
| $y = 5x^2 + 4x + 9$ | | | |
| $y = 0.75x^2 + 4x + 9$ | | | |

Summarize: In general, what information does the value of a tell you about the parabola?

Part C: Varying b

| Function | Vertex | y-intercept | x-intercepts |
|---|--------|-------------|--------------|
| $y = x^2 + 3x$ | | | |
| $y = x^2 + 2x$ | | | |
| $y = x^2 + x$ | | | |
| $y = x^2 + 0$ | | | |
| $y = x^2 - x$ | | | |
| $y = x^2 - 2x$ | | | |
| $y = x^2 - 3x$ | | | |
| Predict the vertex, y-intercept and x-intercepts for the following functions. | | | |
| $y = x^2 - 5x$ | | | |
| $y = x^2 + 5x + 1$ | | | |

Summarize: In general, what information does the value of b tell you about the parabola?

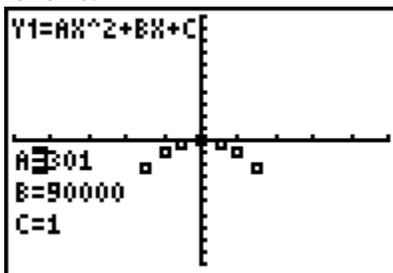
A closer look at varying b

Fill in the chart with the x and y-values of the vertices from the graphs you plotted above.

| | | | | | | | |
|---|--|--|--|--|--|--|--|
| x | | | | | | | |
| y | | | | | | | |

Calculator Instructions

1. Enter the x-values into L₁ and the y-values into L₂.
2. Clear the graphs you entered if you haven't already. Plot the points using STATPLOT.
3. Press Y= and enter the following equation in Y₁: $y = Ax^2 + Bx + C$.
(To enter the letters on your calculator, press ALPHA.)
4. Press the APPS key and select the Transfrm application. Press any key.
5. Press GRAPH. You should see a screen similar to the one below. Your values for A, B and C may be different.



6. Try to find the equation of the parabola that passes through the points plotted. Note: You can either enter the values for A, B or C or you can use the \uparrow or \downarrow key to change their values.

What equation best models the points plotted? _____

Practice with the Transfrm Application

Plot the data given using your calculator.

| | | | | | | |
|---|---|---|----|----|----|-----|
| x | 0 | 2 | 4 | 6 | 8 | 10 |
| y | 2 | 0 | 14 | 44 | 90 | 152 |

Fit a parabola to the points by changing the values of A, B and C.

What equation best models the points plotted? _____