Folding Parabolas

FoldingParabolas.tns

Name _____

Class _____

In this activity, you will graph a quadratic function and investigate its symmetry by choosing pairs of points with the same *y*-value.

Consider the equation $y = x^2 + x - 15$. Graph this equation in **f1** on page 1.3. In order to make sure that the vertex is in view, you may need to adjust the window.

- Approximately where is the vertex of the parabola?

- What do you notice about the shape of the parabola?

The symmetry of a parabola means that for every *y*-value of the parabola, except the *y*-value of the vertex, there are two values of *x* that are paired with it.

We can use this fact to learn more about the characteristics of the parabola.

On page 1.9, you will see a graph of the parabola $y = x^2 + x - 15$. There are two points on it. Drag the points so that they have the same *y*-value. Then press ctrl + . to mark the points. Mark at least 5 pairs of points.

The coordinates of the points you marked are recorded on page 1.11. In the formula bar of Column D, enter a formula that will calculate the average of the *x1* value and *x2* value that correspond to the same *y*-value.

- Use either factoring or the quadratic formula to find two *x*-values that have zero as the *y*-value.

- What do you notice about the two averages so far? What significance might this number have?

Think about what it means to average two numbers on a number line. The average is the point halfway in between the numbers. If you fold the parabola and match up the symmetrical parts, what would be the point on the fold, or halfway in between?

To see the significance of the value $x = -0.5$, examine the graph. Go to **MENU > Trace > Graph Trace**. Then type **–0.5** to go to the point with the *x*-value –0.5.

- What is this point?