Parabolas

Drawing Mathematics with Desmos | Justin Skycak

Setup. Navigate to https://www.desmos.com/calculator. Be sure to sign in so that you can save your graph.

Demonstration - Parabola. Observe the graph as you type each of the following inputs. In general, an absolute value graph $y = mx^2$ makes a "U" shape, with the magnitude of m controlling the slope of the U, and the sign of m controlling whether the U opens upward or downward.

$$y = 5x^2$$

$$y = 1x^2$$

$$y = 0.1x^2$$

$$y = -0.1x^2$$

$$y = -1x^2$$

$$y = -5x^2$$

Demonstration - Shifts. Observe the graph as you type each of the following inputs. In general, the graph of $y = m(x - a)^2 + b$ shifts the absolute value graph $y = mx^2$ so that the hump of the "U" occurs at the point (a, b).
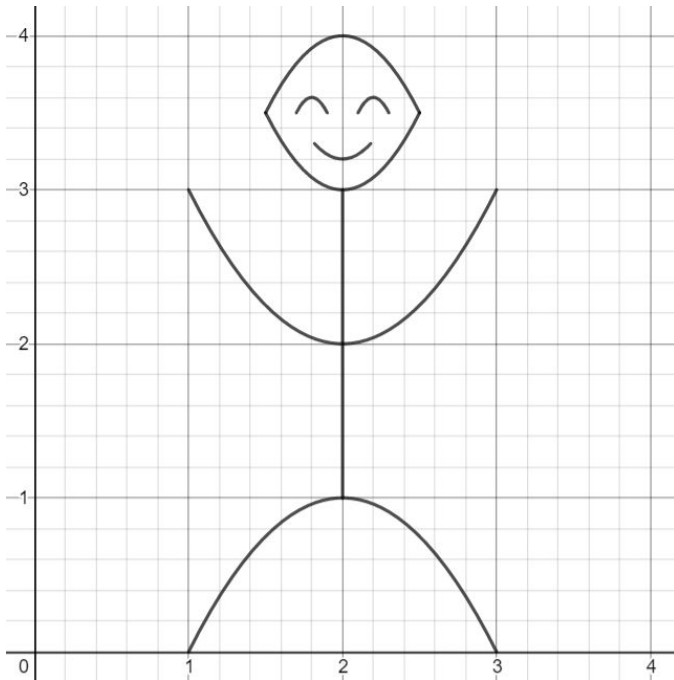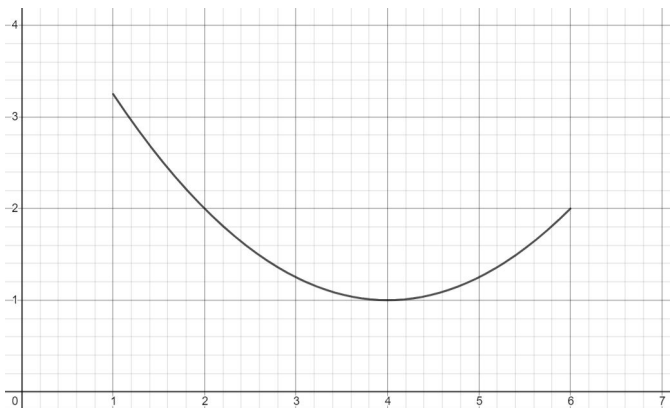
$$y = (x - 1)^2 + 2$$

$$y = -2(x - 1)^2 - 3$$

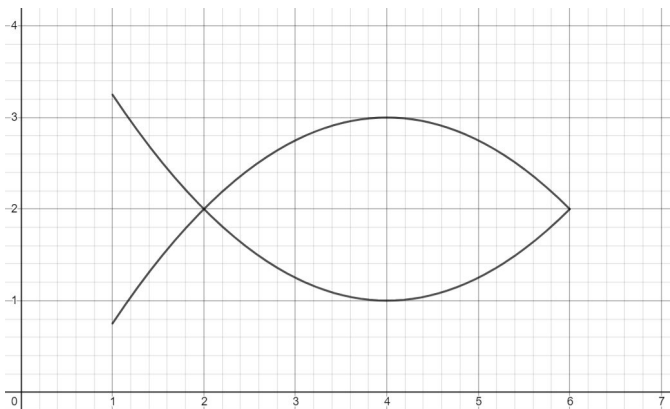$$y = -0.5(x + 3)^2 - 1$$

$$y = 10(x + 2)^2 + 1$$

Exercise. Previously, you used absolute value functions to create a person. This time, draw the person using parabolas!
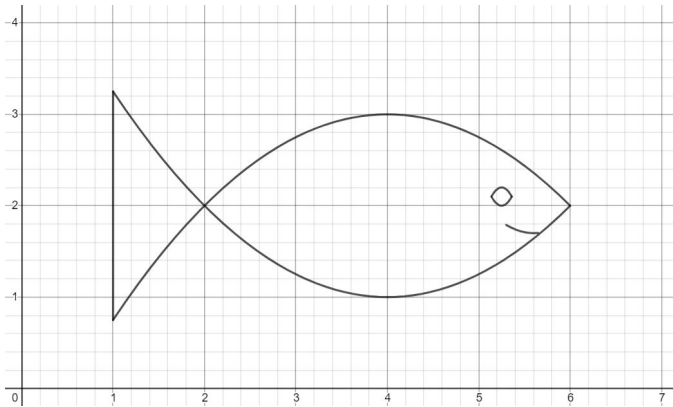
Exercise. Draw the portion of the parabola shown below.

Exercise. Reflect and shift a copy of the parabola portion drawn previously to form an outline of a fish.

Exercise. Complete the final details of the fish.

Challenge. Draw a school of fish! You can try to include other sea creatures, as well.