**Spouting Water**

**Purpose**

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Perhaps you have seen decorative fountains with arcs of water that appear to be standing still. One such fountain found at the Detroit Airport was created by the company WET Design and is shown to the right. Each of these arcs is in the shape of a parabola. In this project, you will use what you have learned to find equations that match arcs of water, and you will design a decorative fountain of your own.

**Directions**

**1.** The Perlach Shopping Center in Munich, Germany, has a fountain that uses several different arcs of water. Two of the arcs that are used in this fountain have the following specifications:

Water arc A: parabola jet height 2.5 m, parabola horizontal jet spray distance 4.5 m

Water arc B: parabola jet height 0.5 m, parabola horizontal jet spray distance 1 m

Find equations that would match each of these parabolas.

**2.** Now, it is time for you to find an equation for a water arc that you create. Take a digital photograph of a water arc created by a drinking fountain, a hose, a kitchen sink faucet, or an actual fountain. Set up a coordinate grid on the photo and find the coordinates of several points on the arc. You can do this either by printing out the photo and manually setting up an appropriate coordinate system, or you can use a "paint" or "draw" program on your computer and use pixel coordinates. Finally, use the coordinates of your points to write an equation that matches the water arc. Use your formula to find the maximum height that the water reaches.

**3.** Now that you have had practice finding equations for water arcs, you are to design a decorative fountain that uses at least two different water patterns. You will need an illustration of your fountain and formulas that match each of the water arcs that will be used in the fountain.

**4.** Write a report (which is to be a typed paper, PowerPoint or Google Slides, or a poster board – you can also

present this report to the class, if you desire) of your study that includes all of the work for Parts 1-3 of this

project.