# Families of Quadratic Functions

A group of parabolas that share a common characteristic.

There are three types of quadratic families:

1.

2.

3.

## What's My Equation?

Determine the equation of the parabola with x-intercepts -4 and 3, that passes through (2,7).

## Welcome to North Bay!

The entranceway to the city of North Bay used to be an arch that can be modelled by the equation of a parabola.

If the edge of the arch is the origin, and the arch is 30 m wide, what is the equation of the parabola if the height of the arch 4 m from the edge of the base is 9 m?

## Modelling

The percent of 15- to 19-year old males who smoke has been tracked by Health Canada. The data from 1981 to 1996 are given in the table below.

| **Year** | 1981 | 1983 | 1985 | 1986 | 1989 | 1991 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|
| **Smokers (%)** | 43.4 | 39.6 | 26.7 | 25.2 | 22.6 | 22.6 | 27.3 | 28.5 | 29.1 |

a. Draw a scatter plot of the data and a curve of best fit.
b. Estimate the location of the vertex.
c. Determine a quadratic function that will model the data.
d. Based on the model, what percent of 15- to 19-year old males are expected to be smoking today?
e. Based on the model, when is it expected that the percent of 15- to 19-year old males smoking will reach 50%?