# Key Concepts Review

In this chapter, you saw that calculus can help you sketch graphs of polynomial and rational functions. Remember that concepts you learned in earlier studies are useful, and that calculus techniques help with sketching. Basic shapes should always be kept in mind. Use these, together with the algorithm for curve sketching, and always use your accumulated knowledge.

Basic Shapes to Remember
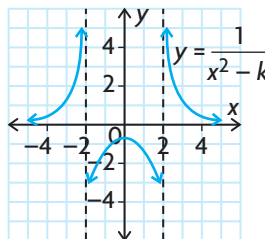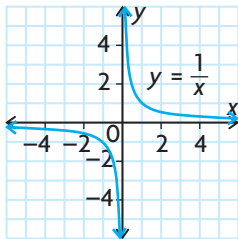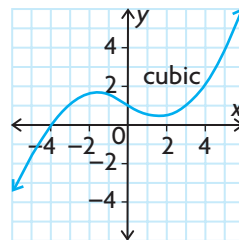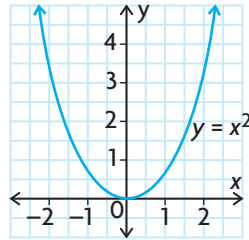
Sketching the Graph of a Polynomial or Rational Function

1. Use the function to
   - determine the domain and any discontinuities
   - determine the intercepts
   - find any asymptotes, and determine function behaviour relative to these asymptotes

2. Use the first derivative to
   - find the critical numbers
   - determine where the function is increasing and where it is decreasing
   - identify any local maxima or minima

3. Use the second derivative to
   - determine where the graph is concave up and where it is concave down
   - find any points of inflection

   The second derivative can also be used to identify local maxima and minima.

4. Calculate the values of y that correspond to critical points and points of inflection. Use the information above to sketch the graph.