Extra Project 7.4b: Power Functions

Objective

To compare the behavior of various exponential functions.

Narrative

If you have not already done so, read Section 7.4 in the text.

In this project you will be asked to use the `plot` command in Maple to plot several functions on one set of coordinate axes. These functions are important since they arise in applications that involve exponential growth (applications such as population growth) and decay (applications such as radioactive decay and Newton's Law of Cooling).

Tasks

1. Use Maple to plot the graphs of $y = 2^x$, $y = 3^x$, $y = (1/2)^x$, and $y = (1/3)^x$ on one set of axes for $x \in [-3, 3]$.

2. Use Maple to plot the graphs of $y = x^2$, $y = 2^x$, and $y = x^x$ on one set of axes for $x \in [-3, 3]$.

   At this point, make a hard-copy of your typed input and Maple's responses (both text and graphics). Then, ...

3. Label by hand each of the graphs you created in Task 1. (For example, label the graph of $y = 2^x$ by "$y = 2^x$".)

4. a) Label by hand each of the graphs you created in Task 2. (For example, label the graph of $y = 2^x$ by "$y = 2^x$".)

   b) Which of x^2, 2^x, and x^x grows fastest? Which grows second fastest? Which grows slowest?