4.4. Additional Exponential Models

General Procedure for Sketching the Graph

Step 1. Find the domain of $f(x)$.
Step 2. Find and plot all intercepts.
Step 3. Determine all vertical and horizontal asymptotes and draw them.
Step 4. Find $f'(x)$ and determine the critical numbers and intervals of increase and decrease.
Step 5. Determine all relative extrema. Plot each relative extrema.
Step 6. Find $f''(x)$ and determine intervals of concavity and points of inflection. Plot inflection points.
Step 7. Complete the sketch by joining the plotted points.
Example
Sketch the graph of the function $f(x) = xe^{-x}$. 
Example
Sketch the graph of the function $f(x) = x - \ln x$ for $x > 0$. 