

## Supplemental Exercises for Section 7.5

Use L'Hôpital's rule to show that each of the following limits is 0.

1.  $\lim_{x \rightarrow \infty} \frac{\ln^2 x}{\sqrt{x}}$

2.  $\lim_{x \rightarrow \infty} \frac{\ln^5 x}{\sqrt{x}}$

3.  $\lim_{x \rightarrow \infty} \frac{\ln^2 x}{\sqrt[3]{x}}$

4.  $\lim_{x \rightarrow \infty} \frac{\ln^4 x}{\sqrt[5]{x}}$

5.  $\lim_{x \rightarrow \infty} \frac{\ln^7 x}{\sqrt[9]{x}}$

Formulate a general statement based on the above examples. What conclusion can be drawn about the relative rate of growth of  $\ln^p x$  versus  $x^q$  for  $p$  and  $q$  both positive exponents?