

2. Compute the following limits. Please indicate the steps of your derivation.
A hint to get started on the last one is to multiply and divide by $\sqrt{x^2 + x} + x$.

(a) $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x^2 - 4x + 3}$

(b) $\lim_{x \rightarrow 5^-} \frac{|2x - 10|}{x - 5}$

(c) $\lim_{x \rightarrow \infty} \frac{2x^2 + 3x + 4}{5x^2 + 6x + 7}$

(d) $\lim_{x \rightarrow \infty} \ln(3x) - \ln(x)$

(e) $\lim_{x \rightarrow \infty} \sqrt{x^2 + x} - x$

3. Use L'Hôpital's rule, perhaps more than once, to evaluate these limits.

(a) $\lim_{x \rightarrow 1^+} \frac{\ln x}{\sqrt{x} - 1}$

(b) $\lim_{x \rightarrow \infty} \frac{x^3}{e^x}$

4. Read the problem slowly and try to solve it. After 10 minutes, if you haven't solved it, go to the next page where the problem is broken down for you and solve it using the steps given. Understanding what constitutes a correct answer is really more of an issue of logic and notation than of computation.

Let $f(A)$ be the time it takes for a machine to harvest an area A in a field of soybeans. Let $g(A)$ be the time it takes a single worker to do this by hand. Do not assume f and g are linear, as there may be influences from learning, fatigue, and so forth. Do assume that workers and machines can join forces by working independently on different parts of the field. Write a formula for the amount of time it takes a machine plus five workers to harvest an area, A . The unspecified functions f and g will of course appear in the formula, as may one or more inverse functions.

