



1. (10 points) Find each of the following limits, with justification (show steps). If there is an infinite limit, then explain whether it is  $\infty$  or  $-\infty$ .

(a) (5 points)  $\lim_{x \rightarrow 1} \left( \frac{x^2 - 3x + 2}{3x^2 - 21x + 18} - 5 \right)$

(b) (5 points)  $\lim_{x \rightarrow \infty} (\sqrt{4x^2 - x} - 2x)$

2. (10 points) (a) (3 points) What are the critical numbers of a function  $f(x)$ ?

(b) (8 points) Find the global maximum and the global minimum of the function  $f(x) = (x - 2)e^{-x}$  on the domain  $[0, 10]$ .