

1. (9 points) Find each of the following limits, with justification (show steps). If there is an infinite limit, then explain whether it is ∞ or $-\infty$.

(a) (5 points) $\lim_{x \rightarrow 3} \frac{(x-1)(x-2) - 2}{x^2 - 5x + 6}$

(b) (4 points) $\lim_{x \rightarrow \infty} \frac{x^4 + 2x^2 - 9}{e^{-x}}$

2. (10 points) Careful: These two questions are unrelated.

(a) (3 points) State the extreme value theorem.

(b) (7 points) Find the derivative of $f(x) = \sqrt{1 - 2x}$ using the definition. No marks will be awarded if you get the right answer using other methods.