

NB: You are to work individually on assignments. You may do all your other work together. If we believe you have **worked together**, let alone COPIED someone else's script or let someone else COPY YOUR SCRIPT, then you will get NO MARKS.

1. (10 marks) Let $f : \mathbb{R} \rightarrow \mathbb{R}$ and $g : \mathbb{R} \rightarrow \mathbb{R}$ satisfy $\lim_{x \rightarrow \infty} g(x) = \infty$, and $\lim_{x \rightarrow \infty} f(x) = \infty$.
- (a) Prove $\lim_{x \rightarrow \infty} f(g(x)) = \infty$.
 - (b) Prove $\lim_{x \rightarrow \infty} (f + g)(x) = \infty$.
 - (c) Prove that for all $k \in (0, \infty)$, $\lim_{x \rightarrow \infty} kf(x) = \infty$.
 - (d) Prove $\lim_{x \rightarrow \infty} -f(x) = -\infty$.
 - (e) Prove $\lim_{x \rightarrow -\infty} f(-x) = \infty$