M 383: Assignment 8

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Exercises 4.2.4 — Problem 1

Problem. If f is monotone increasing on an interval and ahs a jump discontinuit at x_0 in the interior of the domain, show that the jump is bounded above by $f(x_2) - f(x_1)$ for any two points x_1, x_2 of the domain surrounding x_0, $x_1 < x_0 < x_2$.

Proof.

Exercises 4.2.4 — Problem 3

Problem. If the domain of a continuous function is an interval, show that the image is an interval. Give examples where the image is an open interval.

Proof.

Exercises 4.2.4 — Problem 9

Problem. If f and g are uniformly continuous, show that $f + g$ is uniformly continuous.

Proof.

Exercises 4.2.4 — Problem 11

Problem. If f is a continuous function on a compact set, show that either f has a zero or f is bounded away from zero ($|f(x)| > 1/n$ for all x in the domain, for some $1/n$).

Proof.