Worksheet: Convexity proofs

Over the course of the semester there will be proofs on various topics, but also many concrete calculations to do and programs to write. For now, a bit of practice with the logic of convexity, and more examples of how to write proofs, might make things easier. I won't expect any particular proof style when grading homework and exams, but it might give confidence to have a target style.

A.   (Same as Exercise 3.4 in Section 2.3.)   Prove that a function f is concave if and only if $-f$ is convex.

Statement.

Proof.

□

B.   (Compare Exercise 3.13 in Section 2.3.)   Prove that if g is concave then $S = \left\{ x \ : \ g(x) \geq 0 \right\}$ is convex.

Statement.

Proof.

$\square$