

SF2729 Groups and Rings

Problem set 9

due: Thursday February 12 in class.

Write clear, clean, brief, and complete solutions and use whole sentences. Solutions without proper reasoning score worse. You can submit hand-written or typed solutions and turn them in in class or send them by email to `wojtek@kth.se`. I will not accept late homework except under extraordinary circumstances that you need to discuss with me before the deadline.

Problem 1. Let K be a field. Show that every ideal in the polynomial ring $K[X]$ is generated by a single element.

Problem 2. Give an ideal in the polynomial ring $\mathbb{Z}[X]$ which is not generated by one element.

Problem 3. Find all integer solutions to the system of congruences (using the Chinese Remainder Theorem).

$$x \equiv 2 \pmod{3}$$

$$x \equiv 1 \pmod{4}$$

$$x \equiv 3 \pmod{5}$$