



Due Date: April 21, 2014 Monday

NAME:.....

Ali Sinan Sertöz

STUDENT NO:.....

**Math 431 Algebraic Geometry – Homework 2**

1	2	3	4	TOTAL
50	50	-	-	100

*Please do not write anything inside the above boxes!*

Check that there are **2** questions on your booklet. Write your name on top of every page. Show your work in reasonable detail. A correct answer without proper or too much reasoning may not get any credit.

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**Q-1)** Let  $G$  be an Arf semigroup and  $a < b < c$  be three consecutive elements in  $G$ , i.e. the only element of  $G$  in the open real interval  $(a, c)$  is  $b$ . Show that  $c - b < b - a$ , i.e. the elements of  $G$  get closer. Show that this is not necessarily the case for every semigroup.

**Answer:**

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**Q-2)** Let  $G = \{5m + 7n \mid m, n \in \mathbb{N}\}$ . Show that the complement of  $G$  in  $\mathbb{N}$  is finite. Find the Frobenius number of  $G$ , i.e. the largest integer not in  $G$ . Construct  ${}^*G$ , the Arf closure of  $G$ . Find the generators of  ${}^*G$ .

Find the multiplicity sequence of the plane cusp  $y^5 = x^7$ . How does this sequence relate to the elements of  ${}^*G$ ?

**Solution:**