This assignment is due Friday, April 13

1. Prove that, if a variety is covered by countably many constructible sets, a finite number of those sets will cover.

2. Prove Theorem 5.7.2 (iii).

I recommend this outline, but you may use any method you like.

(a) We may assume that \( Y \) and \( X \) are affine, \( Y = \text{Spec} \ B \) and \( X = \text{Spec} \ A \).

(b) The theorem is true when \( A \subset B \) and \( B \) is an integral extension of a polynomial subring \( A[y_1, \ldots, y_d] \).

(c) The fibre dimension is a constructible function. (Use Proposition 9.1.21.)

(d) The theorem is true when \( X \) is a smooth curve.

(e) The theorem is true for all \( X \).