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18.727 Topics in Algebraic Geometry: Algebraic Surfaces  
Spring 2008

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## 18.727 Homework 2, Spring 2008

1. Show that every Enriques surface has an elliptic or quasielliptic fibration. (Hint: show that it has an indecomposable curve of canonical type.)
2. If  $X$  is a K3 surface with an elliptic fibration, show that the base must have genus 0. Show that there are surfaces of degree 4 in  $\mathbb{P}^3$  which do not have elliptic fibrations, but that every surface of degree 4 in  $\mathbb{P}^3$  which contains a line has an elliptic fibration.
3. Let  $A = E_1 \times E_2$  be a product of two elliptic curves, with  $j$ -invariants  $j_1$  and  $j_2$ . Can you write down a birational model of  $\text{Km}(A)$ ? What about if  $A = J(C)$ ,  $C$  a curve of genus two given by  $y^2 = f(x)$  for a polynomial  $f$  of degree six?