3. (a part of Theorem 5.8.2) Let \( f : Y \to X \) be a morphism of varieties. Suppose we know that the fibre dimension is a constructible function. Use the curve criterion to show that fibre dimension is semicontinuous.

Case 1: \( X \) is a smooth curve. Use Krull’s Theorem.

Case 2: general case. The curve criterion asks about a test curve \( g : C \to Y \). Let \( \pi = fg \) be the composed map \( C \to X \). Form the fibred product \( Z = C \times_X Y \) (see notes), and use the map \( Z \to C \) to reduce to Case 1, even though \( Z \) may not be irreducible.