This is the third set of exercises, based on the material in Chapter III, sections 1 and 2 in Silverman's book.

(1) Prove the *duplication formula*; If $P = (x, y)$ is a point on the elliptic curve E, prove that

$$x([2]P) = \frac{x^4 - b_4x^2 - 2b_6x - b_8}{4x^3 + b_2x^2 + 2b_4x + b_6}.$$

(This is also (d) on page 54 in Chapter III.)

(2) Exercise 3.1

(3) Exercise 3.8 (a)