Do **not** write solutions on this page.

9. [Maximum mark: 16]

An environmental group records the numbers of coyotes and foxes in a wildlife reserve after t years, starting on 1 January 1995.

Let c be the number of coyotes in the reserve after t years. The following table shows the number of coyotes after t years.

number of years (t)	0	2	10	15	19
number of coyotes (c)	115	197	265	320	406

The relationship between the variables can be modelled by the regression equation $c = at + b$.

(a) Find the value of a and of b. [3]

(b) Use the regression equation to estimate the number of coyotes in the reserve when $t = 7$. [3]

Let f be the number of foxes in the reserve after t years. The number of foxes can be modelled by the equation $f = \frac{2000}{1+99e^{-kt}}$, where k is a constant.

(c) Find the number of foxes in the reserve on 1 January 1995. [3]

(d) After five years, there were 64 foxes in the reserve. Find k. [3]

(e) During which year were the number of coyotes the same as the number of foxes? [4]