11. The prices of two precious metals are being monitored.

The price per gram of metal A, £V_A, is modelled by the equation

$$V_A = 100 + 20e^{0.04t}$$

where t is the number of months after monitoring began.

The price per gram of metal B, £V_B, is modelled by the equation

$$V_B = pe^{-0.02t}$$

where p is a positive constant and t is the number of months after monitoring began.

Given that $V_B = 2V_A$ when $t = 0$

(a) find the value of p

(2)

When $t = T$, the rate of **increase** in the price per gram of metal A was equal to the rate of **decrease** in the price per gram of metal B

(b) Find the value of T, giving your answer to one decimal place.

(*Solutions based entirely on calculator technology are not acceptable.*)

(4)