

BEE1020 – Basic Mathematical Economics	Juliette Stephenson Amr Algarhi
Class Exercises	Department of Economics
Week 6	University of Exeter

Exercise 1 Suppose £5000 is invested at an annual interest rate of 10%. Compute the balance after 10 years if interest is compounded (a) annually, (b) quarterly, (c) monthly, (d) continuously.

Exercise 2 How much should be invested today at 7% compounded quarterly so that it will be worth £5000 in five years?

Exercise 3 It is estimated that the population of a certain country grows exponentially ($P(t) = P_{1986}e^{r(t-1986)}$). If the population was 60 million in 1986 and 90 million in 1991, what will be the population in 2002?

Exercise 4 Differentiate the following functions twice:

$$\text{a) } y = e^{\frac{1}{x}} \quad \text{b) } y = x \ln x^2 \quad \text{c) } y = e^x \ln x$$

Exercise 5 Use logarithmic differentiation to find the derivatives of the following functions:

$$\begin{aligned} \text{a) } \quad y &= \frac{(x+2)^5}{\sqrt[6]{3x-5}} \\ \text{b) } \quad y &= (x+1)^3 (6-x)^2 \sqrt[3]{3x+1} \\ \text{c) } \quad y &= 2^{(x^2)} \\ \text{d) } \quad y &= (2^x)^2 \end{aligned}$$

Exercise 6 The demand function for good X is given by:

$$Q_x = 520 - 20P_x + 0.6Y + 2.9P_y$$

Find the price, income and cross-price elasticities of demand at $P_x = 10$, $Y=700$, $P_y = 21$

Which of the following terms can be used to describe the situation: complement/substitute; necessity/luxury; elastic/inelastic demand; inferior/normal?