Math 1311

**Homework 7 (Section 4.1 - Section 4.2)**

Record your answers to all the problems in the EMCF titled **“ Homework 7”** .

1. Suppose that *f* is an exponential function with decay factor 0.099 and that . Find a formula for .

a) 

b) 

c) 

d) 

2. A certain phenomenon has initial value  and decays by  each year. Give an exponential function that describes this phenomenon using variable *t* for time in years.

a) 

b) 

c) 

d) 

3. The exponential function  where  is measured in decades, gives the number of individuals in a certain population. Find the yearly growth factor (round to the nearest thousandth).

a) 

b) 

c) 

d) 

4. The exponential function  where  is measured in decades, gives the number of individuals in a certain population. Find the percentage growth rate (rounded to two decimal places) per century.

a) 

b) 

c) 

d) 

5. You initially invest  in a savings account that pays a yearly interest rate of , compounded annually. Determine how long it will take for the account to reach (take ln or solve.)

a)  years

b)  years

c)  years

d)  years

6. Suppose a certain radioactive substance has a half-life of 2 years. Find how long it will take for  grams of the substance to decay to  grams.

a) 6 years

b) 8 years

c) 10 years

d) 12 years

7. The yearly *inflation rate* tells the percentage by which prices increase. In 1990 an individual retired on a fixed income of  per year. Assuming that the inflation rate remains constant at  determine how long it will take in years (rounded to the nearest hundredth) for the retirement income to deflate to half its 1990 value. (*Note:* To say that retirement income has deflated to half its 1990 value means that prices have doubled.)

a) 28.79 years

b) 7.35 years

c) 22.22 years

d) 8.04 years

8. Suppose a country had a population of 91.68 million in 1975 For the years 1975 to 1985 the population grew at a rate of 4.9% per year. Express in functional notation the population of this country in 1982 and calculate that value (rounded to the nearest hundredth). Assume the formula gives the population  in millions of this country with respect to time  in years from 1975

a) 

b) 

c) 

d) 

9. The exponential function where  is measured in decades, gives the number of individuals in a certain population. Find the yearly growth factor (round to the nearest thousandth).

a)

b)

c)

d) 1.5

10. Find a formula for the exponential function  using the information  and .

a) 

b) 

c) 

d) 

11. Determine whether the following table shows exponential data or linear data.



a) The data are linear.

b) The data are exponential.

12. For the exponential function  increasing *t* by 1 unit multiplies *N* by , where . How does an increase by 7 units affect *N* ?

a) 

b) 

c) 

d) 

13. In order to determine its rate of decay, 1 gram of an unknown radioactive isotope was placed in a container. The amount remaining was measured at 1-minute intervals and recorded in the table below.



Find an exponential model for the data with variable  corresponding to remaining mass (in grams) and  corresponding to time (in minutes).

a) 

b) 

c) 

d) 

14. You have invested money in a savings account that pays a fixed monthly interest on the account balance. The following table shows the account balance over the first 5 months.



Find how long it takes for your money to double in value.

a) 53.66 years

b) 4.47 years

c) 52.97 years

d) 23.67 years

15. The following table shows the income, measured in thousands of dollars, from sales of a certain magazine at the start of the given year. Find an exponential model for the income where  is the income, measured in thousands of dollars, and  is the number of years since  Round the parameters to the nearest hundredth.



a) 

b) 

c) 

d) 

16. Section 4.1 Skill Building Exercise S-4

a)

b)

c)

d)

17. Section 4.1 Skill Building Exercise S-6

a)

b)

c)

d)

18. Exercise 4.1 Skill Building Exercise S-8

a)

b)

c)

d)

19. Section 4.2 Skill Building Exercise S-6

a)

b)

c)

d)

20. Section 4.2 Skill Building Exercise S-8

a)

b)

c)

d)