Math 122 Project, Professor Blanco-Silva

Katelyn Gladstone: Half Life and Double Time

1. The quantity of Ozone, Q, is decaying exponentially at a continuous rate of 0.25% per year. What is the half-life of the Ozone?
2. The doubling time of a population is 7 years. When will it triple in size?

Cat Renzaglia: Average Rate of Change

1. Find the average rate of change of $f(x) = 10x^2$ between x=1 and x=3
2.

Year	1995	2000	2005
P (billions)	5.68	6.07	6.45
A (millions)	36.1	41.3	45.9
C (millions)	91	740	2168

Find the average rate of change, with units, for each of P, A, and C between 1995 and 2005.

Tori Robbins: Relative Change/Percent Change

1. Choose the relative change which is bigger in magnitude:
    a. An increase in class size from 6 to 12
    b. An increase in class size from 30 to 50

2. Find the relative change in the price of a $75.99 pair of jeans, if the sale price is $52.99 and explain the meaning of this percent in terms of the sale.

3. NYC has a population of 8,250,000 people. If the population increases by 1000 people, find the relative change in the population of NYC.

Robert (Robby) Kuenzli: The Natural Logarithm

$$9e^{4t} = 12e^{3t}$$

1. Solve for ***t*** using natural logarithms.

   Round your answer to three decimal places

   t =

$$P = P_0 e^{kt}$$

2. Put the following function in the form .

$$P = 19(1.4)^t$$

   Round your answer to four decimal places, if required.

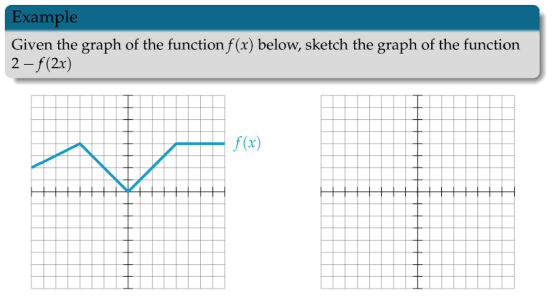
   P=

3. A quantity ***P*** is an exponential function of time ***t*** , such that ***P=50*** when ***t=3*** and ***P=80*** when ***t=2*** . Use the given information about the function $P = P_0 e^{kt}$ to:

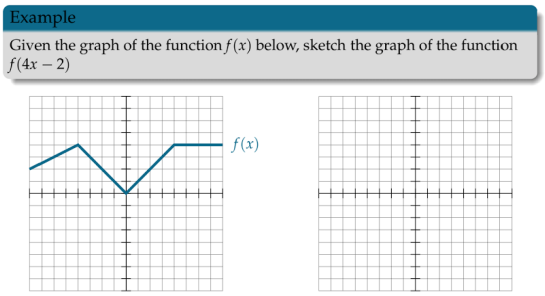
   a. **(a)** Find values for the parameters k and P_0 .
      Round your answers to three decimal places.

Jocelyn Nelson: Vertical and Horizontal Operations

1.



2.



Victoria Olmo: Exponential Growth/Decay

1. The EPA investigated a spill of radioactive iodine. The radiation level at site was 2.4 milirems/hour. The level of radiation decays at a continuous hourly rate of k= -0.04.
    a. What was the level of radiation 24 hours later?
    b. Find the number of hours until the level of radiation reached the maximum acceptable limit (0.6 milirems/hour).
2. If the world's population increased exponentially from 4.453 billion in 1980 to 5.937 billion in 1998 and continued to increase at the same percentage rate between 1998 and 2008, calculate what the world's population would have been in 2008.
3. A quantity P is an exponential function of time t, such that $P_0a^4= 9$ and $P_0a^3=10$. Use the given information about the function $P=P_0a^t$ to:
    a. Find values for the parameters a and P_0.
    b. State the initial quantity and the percent rate of growth or decay.

Daniel Meinster: Power Functions

1. The number of species of lizards on an island is proportional to the sixth root of the area of the island. What is the power function for this if N= number of lizards and A= the area of the island?
2. The surface area of a whale, W, is proportional to the ⅔ power of its body mass. Write an appropriate formula for this proportion.
3. Are the following expressions power functions?
   a. $\frac{3}{8x}$
   b. 4^x
   c. $-5\sqrt{x}$

Satyen Champaneri: Intro To Functions

1. The concentration of Carbon Dioxide, C= f(t), in the atmosphere, in parts per million, is a function of years, t, since 1960

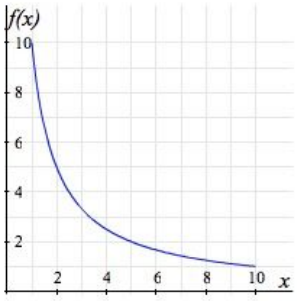
   A) Interpret f(40)=370 in terms of carbon dioxide.
   B) What does f(10) mean?

2. Determine the slope and the y-intercept of the following equation of a line

   $$30x=6y+4$$

   A) The line has a slope of?
   B) The line has as y-intercept of?

3. For the function in this problem what is the value of f(1)



Caroline Spence: Compounding Continuously

1.) If you deposit $10,000 in an account earning interest at an 4% annual rate compounded continuously, how much money is in the account after seven years?

Round your answer to two decimal places.
After seven years, the account will have _____?

2.) If you need $40,000 in your bank account in 8 years, how much must be deposited now? The interest rate is 12%, compounded continuously.

Round your answer to the nearest dollar.
The deposit required is _____?

3.) If $12,000 is deposited in an account paying 3% interest per year, compounded continuously, how long will it take for the balance to reach $20,000?

Round your answer to two decimal places.
After_____years there will be $20,000 in the account.

Will Kupec: Compounding Annually

1. Suppose $1000 is invested in an account paying interest at a rate of 4.0% per year. Round your answers to two decimal places.
    a. How much is in the account after 5 years if the interest is compounded annually?

2. Suppose $5000 is invested in an account paying interest at a rate of 8% per year. Round your answers to two decimal places.
    a. How much is in the account after 3 years if the interest is compounded annually?

3. You win the lottery and are offered the choice between $1 million in four yearly installments of $250,000 each, starting now, or a lump-sum payment of $920,000 now. Assuming a 6% interest rate per year, compounded annually, and ignoring taxes, which should you choose?

Evan Hoey: Cost, Revenue, Profit:

The factory and machinery needed to begin production are fixed costs, which are incurred even if no phones are made. The cost of labor and materials are variable costs, since these quantities depend on how many are made. The fixed costs for this company are $24,000 and the variable costs are $37 per phone.

1. What is the Total Cost function for this company?
2. If phones sell for $250 each, find the manufacturer's revenue function.
3. Find a formula for the profit function of the smartphone manufacturer. Find the breakeven point.

Payton Mahan: Linear Functions

1. The solid waste W generated each year in the cities of the US is increasing. The solid waste generated (in millions of tons) was 238.3 in 2000, and 251.3 in 2006. Find a formula using the equation of a line.
2. A city's population was 30,700 in the year 2000, and is growing by 850 people a year.
    a. Give a formula for the city's population, P, as a function of the number of years, t, since 2000.
    b. What is the population predicted to be in 2020?
    c. When is the population expected to reach 55,000?
3. Find the equation of the line that passes through the points (0, 2) and (4, 22). The answer should be in terms of x.