**1**.The table shows some values of an exponential function, *f*, and a linear function, *g*. Find the equation for

*f*(*x*)

 and

*g*(*x*)

 and use the functions to complete the table.

|  |  |  |
| --- | --- | --- |
| *f*(*x*) | = |  |
| *g*(*x*) | = |  |

|  |  |  |
| --- | --- | --- |
| *x* | *f*(*x*) | *g*(*x*) |
| 0 |  | 7 |
| 1 | 0.81 |  |
| 2 | 0.729 | 9.8 |
| 3 |  |  |
| 4 | 0.59049 |  |
| 5 |  | 14 |

**2.** Managers of golf pro shops anticipate the total revenue for an upcoming year based on the predicted total number of rounds that will be played at their course. They do this by looking at the total number of rounds played in prior years. Assume there were32,039 rounds played 3 years ago and 37,411 rounds played this year.



Calculate the average rate of change and use it to predict the number of rounds to be played 2 years from now. (Round your answers to the nearest whole number.)

|  |  |
| --- | --- |
| avg. rate of change | rounds/yr |
| predicted number of rounds | rounds |

Calculate the annual percentage change and use it to predict the number of rounds to be played 2 years from now. (In the first answer blank, round your answer to one decimal place. In the second answer blank, round your answer to the nearest whole number.)

|  |  |
| --- | --- |
| annual percentage change | % |
| predicted number of rounds | rounds |

**3.** Most photocopy machines allow for enlarging or reducing the size of the original. Suppose you have a chart you wish to photocopy for a report. The chart has width 8 inches and height 7 inches. To reduce the size of the copy by 20%, you set the machine to reduce the chart to 80% of its original dimensions.



(a) What will be the dimensions of the photocopy?

|  |  |
| --- | --- |
| width | in |
| height | in |

(b) What is the percentage reduction in the *area* of the photocopy?  
 %  
  
(c) If the chart must fit into a space 3 inches high in your report, what is the minimum number of reductions you must make with the photocopier set at 80% to reduce the height of the image from the original 7 inches to 3 inches?  
 reductions  
  
(d) If you were to actually perform twelve 80% reductions (photocopies of photocopies), what will the dimensions of your chart be? (Round your answers to two decimal places.)

|  |  |
| --- | --- |
| width | in |
| height | in |

(e) Find formulas for the width, *w*, and height, *h*, of the chart in terms of the number of 80% reductions, *r*.

|  |  |  |
| --- | --- | --- |
| *w*(*r*) | = |  |
| *h*(*r*) | = |  |

**4**. Consider the following.

|  |  |
| --- | --- |
| **Years Since 1995 *t*** | **Average Brand-Name Drug Price (dollars) *d*** |
| 0 | 40.22 |
| 2 | 49.55 |
| 3 | 53.51 |
| 4 | 60.66 |
| 5 | 65.29 |
| 6 | 69.75 |
| 7 | 77.49 |
| 8 | 85.57 |
| 9 | 95.86 |

Use exponential regression to find a model for the data set. (As appropriate, align the data before finding the model equation. Round all numbers to three decimal places.)

*d*(*t*) =



What do the initial value and growth factor of the model represent in this real-world context?

The initial value tells us that the estimated average brand-name drug price in 1995 was $  . The growth factor tells us that each subsequent year, the estimated average brand-name drug price will be  times the estimated average price of the prior year.

**5**. Use the given information to answer the questions for the CD.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Institution** | **Maturity** | **Nominal** **Rate** | **Compounding** **Method** | **Minimum** **Investment** |
| Bank of Albuquerque | 3 years | 4.18% | quarterly | $1000 |

(a) Each time interest is compounded, what is the percentage gain in the CD's value?  
 %  
  
(b) What is the future value of the CD when it matures, assuming the minimum amount is invested? (Round your answer to two decimal places.)  
$    
  
(c) What is the average rate of change of the investment from the time when the CD is purchased until the time it matures? (Round your answer to two decimal places.)  
$  per year.  
  
(d) What is the APY for the CD? (Round your answer to two decimal places.)  
APY =  %  
  
(e) What initial investment would be required for the CD to be worth $5000 when it matures? (Round your answer to two decimal places.)  
$    
  
(f) How much more money would the CD be worth if the interest in part (b) was compounded continuously instead of periodically? (Assume the miminum amount is invested. Round your answer to two decimal places.)  
$ 

**6**. Use the table below and do the following.

|  |  |
| --- | --- |
| **Years** **Since** **2000** ***t*** | **Accidents** **Resulting in** **Injuries** **(percent)** ***p*** |
| 0 | 50.0 |
| 1 | 48.0 |
| 2 | 46.3 |
| 3 | 45.7 |
| 4 | 45.0 |

(a) Linearize the data. (Round your answers to four decimal places.)

|  |  |  |
| --- | --- | --- |
| **Years** **Since** **2000** ***t*** | **Accidents** **Resulting in** **Injuries** **(percent)** ***p*** | **log *p*** |
| 0 | 50.0 |  |
| 1 | 48.0 |  |
| 2 | 46.3 |  |
| 3 | 45.7 |  |
| 4 | 45.0 |  |

(b) Use linear regression to find a model of the form

log(*p*) = *mt* + *b*.

 (Round all numbers to four decimal places.)

log(*p*) =



(c) Solve the equation in (b) for *p* and rewrite the result in the standard form of an exponential function. (Round all numbers to four decimal places.)

*p* =



**7.** Consider the following.

|  |  |
| --- | --- |
| **Altitude (meters) *a*** | **Atmospheric Pressure (psi) *P*** |
| 0 | 14.696 |
| 1000 | 13.035 |
| 2000 | 11.530 |
| 3000 | 10.168 |
| 4000 | 8.940 |
| 5000 | 7.835 |
| 6000 | 6.843 |
| 7000 | 5.955 |
| 8000 | 5.163 |



(a) Linearize the data. (Round your answers to five decimal places.)

|  |  |  |
| --- | --- | --- |
| **Altitude (meters) *a*** | **Atmospheric Pressure (psi) *P*** | **log(*P*)** |
| 0 | 14.696 |  |
| 1000 | 13.035 |  |
| 2000 | 11.530 |  |
| 3000 | 10.168 |  |
| 4000 | 8.940 |  |
| 5000 | 7.835 |  |
| 6000 | 6.843 |  |
| 7000 | 5.955 |  |
| 8000 | 5.163 |  |

(b) Use linear regression to find a model of the form

log(*P*) = *ma* + *b*.

 (Round all numbers to five decimal places.)

log(*P*) =



(c) Solve the equation in part (b) for *P* and rewrite the result in the standard form of an exponential function. (Round all numbers to five decimal places.)

*P* =

