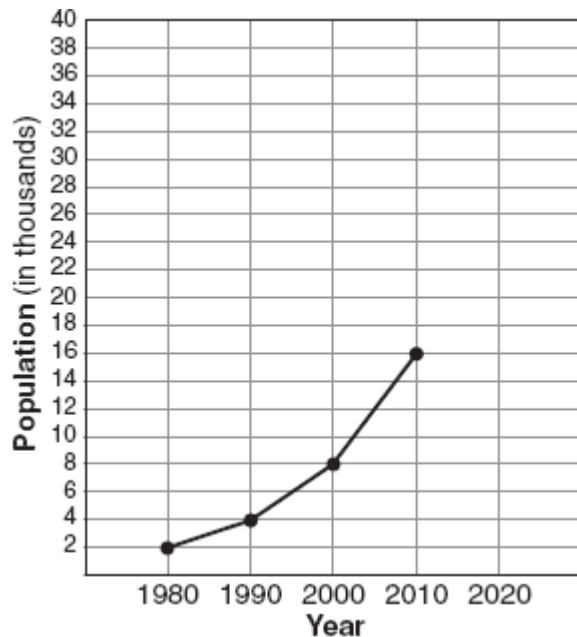


*A2.S.7: Determine the function for the regression model, using appropriate technology, and use the regression function to interpolate and extrapolate from the data*

1. 080705a, P.I. A2.S.7

The population growth of Boomtown is shown in the accompanying graph.



If the same pattern of population growth continues, what will the population of Boomtown be in the year 2020?

- [A] 40,000                      [B] 64,000  
[C] 32,000                      [D] 20,000

NAME: \_\_\_\_\_

2. 080429b, P.I. A2.S.7

A box containing 1,000 coins is shaken, and the coins are emptied onto a table. Only the coins that land heads up are returned to the box, and then the process is repeated. The accompanying table shows the number of trials and the number of coins returned to the box after each trial.

Trial	0	1	3	4	6
Coins Returned	1,000	610	220	132	45

Write an exponential regression equation, rounding the calculated values to the *nearest ten-thousandth*. Use the equation to predict how many coins would be returned to the box after the eighth trial.

NAME: \_\_\_\_\_

3. 080631b, P.I. A2.S.7

Jean invested \$380 in stocks. Over the next 5 years, the value of her investment grew, as shown in the accompanying table.

Years Since Investment ( $x$ )	Value of Stock, in Dollars ( $y$ )
0	380
1	395
2	411
3	427
4	445
5	462

Write the exponential regression equation for this set of data, rounding all values to *two decimal places*. Using this equation, find the value of her stock, to the *nearest dollar*, 10 years after her initial purchase.

4. 080827b, P.I. A2.S.7

The accompanying table shows the number of bacteria present in a certain culture over a 5-hour period, where  $x$  is the time, in hours, and  $y$  is the number of bacteria.

$x$	$y$
0	1,000
1	1,049
2	1,100
3	1,157
4	1,212
5	1,271

Write an exponential regression equation for this set of data, rounding all values to *four decimal places*. Using this equation, determine the number of whole bacteria present when  $x$  equals 6.5 hours.

NAME: \_\_\_\_\_

5. 060827b, P.I. A2.S.7

The accompanying table shows the amount of water vapor,  $y$ , that will saturate 1 cubic meter of air at different temperatures,  $x$ .

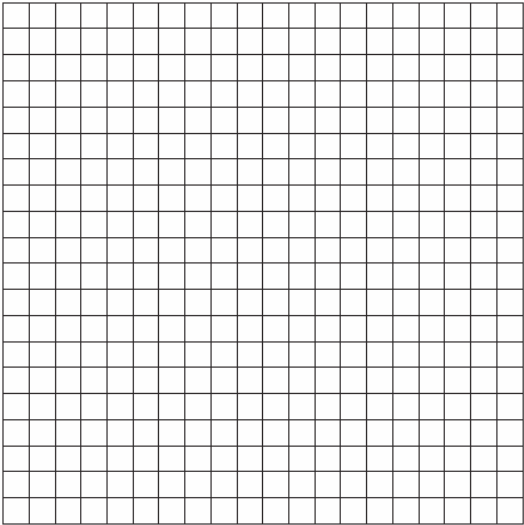
**Amount of Water Vapor That Will Saturate  
1 Cubic Meter of Air at Different Temperatures**

Air Temperature ( $x$ ) (°C)	Water Vapor ( $y$ ) (g)
-20	1
-10	2
0	5
10	9
20	17
30	29
40	50

Write an exponential regression equation for this set of data, rounding all values to the *nearest thousandth*. Using this equation, predict the amount of water vapor that will saturate 1 cubic meter of air at a temperature of 50°C, and round your answer to the *nearest tenth of a gram*.

(6.) *nearest thousandth*. Using this equation, determine the prediction that should have been made for the year 1998, to the *nearest cent*.

Year	Fare (\$)
55	0.10
60	0.15
65	0.20
70	0.30
75	0.40
80	0.60
85	0.80
90	1.15
95	1.50



6. 060234b, P.I. A2.S.7

The table below, created in 1996, shows a history of transit fares from 1955 to 1995. On the accompanying grid, construct a scatter plot where the independent variable is years. State the exponential regression equation with the coefficient and base rounded to the

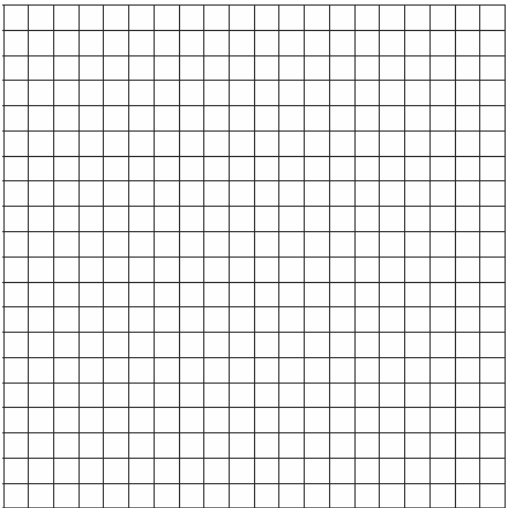
NAME: \_\_\_\_\_

7. 080232b, P.I. A2.S.7

The breaking strength,  $y$ , in tons, of steel cable with diameter  $d$ , in inches, is given in the table below.

$d$ (in)	$y$ (tons)
0.50	9.85
0.75	21.80
1.00	38.30
1.25	59.20
1.50	84.40
1.75	114.00

On the accompanying grid, make a scatter plot of these data. Write the exponential regression equation, expressing the regression coefficients to the *nearest tenth*.

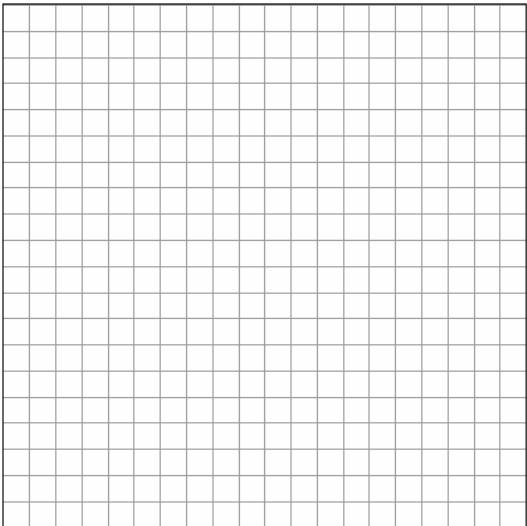


8. 010433b, P.I. A2.S.7

The accompanying table shows the average salary of baseball players since 1984. Using the data in the table, create a scatter plot on the grid and state the exponential regression equation with the coefficient and base rounded to the *nearest hundredth*. Using your written regression equation, estimate the salary of a baseball player in the year 2005, to the *nearest thousand dollars*.

Baseball Players' Salaries

Numbers of Years Since 1984	Average Salary (thousands of dollars)
0	290
1	320
2	400
3	495
4	600
5	700
6	820
7	1,000
8	1,250
9	1,580



*A2.S.7: Determine the function for the regression model, using appropriate technology, and use the regression function to interpolate and extrapolate from the data*

[1] C

[4]  $y = 1,018.2839(0.5969)^x$  and 16, and appropriate work is shown.

[3] Appropriate work is shown, but one computational or rounding error is made.

or [3]  $y = 1,018.2839(0.5969)^x$  and 16, but the substitution is not shown.

[2] Appropriate work is shown, but two or more computational or rounding errors are made.

or [2] Appropriate work is shown, but one conceptual error is made.

or [2] An appropriate regression equation is written, but the number of coins returned after the eighth trial is not found.

[1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.

or [1] An incorrect regression equation is written, but the number of coins returned after the eighth trial is found appropriately.

or [1]  $y = 1,018.2839(0.5969)^x$  and 16, but no work is shown.

[0]  $y = 1,018.2839(0.5969)^x$  or 16, but no work is shown.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an

[2] obviously incorrect procedure.

[4]  $y = 379.92(1.04)^x$  and 562, and appropriate work is shown.

[3] Appropriate work is shown, but one computational or rounding error is made.

or [3]  $y = 379.92(1.04)^x$  and 562, but the substitution is not shown to find the value of the stock.

or [3] The expression  $379.92(1.04)^x$  is written and 562, and appropriate work is shown, but the equation is not written.

[2] Appropriate work is shown, but two or more computational or rounding errors are made.

or [2] Appropriate work is shown, but one conceptual error is made.

or [2] The expression  $379.92(1.04)^x$  is written and 562, but no work is shown.

or [2] A correct regression equation is written, but no further correct work is shown.

or [2] An incorrect exponential regression equation of equal difficulty is written, but an appropriate substitution is made, and an appropriate value of the stock is found.

[1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.

or [1] An incorrect regression equation of a lesser degree of difficulty is written, but an appropriate substitution is made, and an appropriate value of the stock is found.

or [1] The expression  $379.92(1.04)^x$  is written, but no further correct work is shown.

or [1] 562, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[3] incorrect procedure.

- [4]  $y = 999.9725(1.0493)^x$  and 1,367, and appropriate work is shown.
- [3] Appropriate work is shown, but one computational or rounding error is made.  
or [3]  $y = 999.9725(1.0493)^x$  and 1,367, but no substitution is shown.  
or [3] The expression  $999.9725(1.0493)^x$  is written and 1,367, and an appropriate substitution is shown.
- [2] Appropriate work is shown, but two or more computational or rounding errors are made.  
or [2] Appropriate work is shown, but one conceptual error is made.  
or [2] An incorrect equation of equal difficulty is solved appropriately.  
or [2]  $y = 999.9725(1.0493)^x$ , but no further correct work is shown..
- [1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.  
or [1] The expression  $999.9725(1.0493)^x$  is written, but no further correct work is shown.  
or [1] An incorrect equation of a lesser degree of difficulty is solved appropriately.  
or [1] 1,367, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- 

- [4]  $y = 4.194(1.068)^x$  and 112.5, and appropriate work is shown.
- [3] Appropriate work is shown, but one computational or rounding error is made.  
or [3]  $y = 4.194(1.068)^x$  and 112.5, but no substitution is shown.  
or [3] The expression  $4.194(1.068)^x$  is written and 112.5, and appropriate substitution is shown.
- [2] Appropriate work is shown, but two or more computational or rounding errors are made.  
or [2] Appropriate work is shown, but one conceptual error is made.  
or [2]  $y = 4.194(1.068)^x$  but no further correct work is shown.  
or [2] An incorrect regression equation of equal difficulty is solved appropriately.
- [1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.  
or [1] An incorrect regression equation of a lesser degree of difficulty is solved appropriately.
- [0] The expression  $4.194(1.068)^x$  is written and 112.5, but no work is shown.  
or [1] 112.5, but no work is shown.  
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
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- [6] A correct scatter plot,  $y = (0.002)(1.070)^x$ , and \$1.52 or an equivalent answer, and appropriate work is shown.
- [5] Appropriate work is shown, but one computational or rounding error is made.
- [4] A correct scatter plot is shown, but an incorrect equation of equal difficulty is used, but an appropriate fare for 1998 is determined, based on the incorrect equation.
- or [4] A correct scatter plot with a function other than exponential is used, but an appropriate equation and fare derived from that equation are shown.
- [3] A correct scatter plot is shown, and an appropriate fare based on the scatter plot is found, but no equation or work is shown.
- [2] Only a correct scatter plot is shown.
- [1] \$1.52, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- 

- [4] The scatter plot is completed correctly, and the correct regression equation is given, such as  $y = (4.8)(6.8)^x$ .
- [3] Appropriate work is shown, but one graphing or rounding error is made.
- [2] The scatter plot is completed correctly, but the coefficients of the regression equation are transposed.
- or [2] The scatter plot is inaccurate, but the correct regression equation is given.
- [1] No scatter plot is drawn, but the correct regression equation is given.
- or [1] The scatter plot is completed correctly, but no regression equation is given.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- 

- [6] An appropriate scatter plot is drawn, and either  $y = 276.67(1.21)^x$  and \$15,151,000 or  $y = 276673.91(1.21)^x$  and \$15,152,000.
- [5] Appropriate work is shown, but one computational error is made.
- or [5] Appropriate work is shown, but one error is made in rounding the coefficients or by substituting an incorrect value of  $x$  for the year 2005.
- or [5] Appropriate work is shown, but an incorrect nonlinear function for the regression equation is written, but an appropriate salary is found.
- or [5] No scatter plot or an incorrect scatter plot is drawn, but the correct regression equation is written, and the correct salary is found.
- [4] Appropriate work is shown, but two or more computational errors are made.
- or [4] No scatter plot or an incorrect scatter plot is drawn, and one rounding error is made, but the correct regression equation is written, and an appropriate salary is found.
- [3] Appropriate work is shown, but a linear function for the regression equation is written, but an appropriate salary is found.
- or [3] An appropriate scatter plot is drawn, and the correct regression equation is written, but no further correct work is shown.
- [2] An appropriate scatter plot is drawn, and the correct salary is found, but no work or regression equation is shown.
- or [2] An appropriate scatter plot is drawn, but an incorrect regression equation is written, but an appropriate salary is found.
- [1] No scatter plot or an incorrect scatter plot is drawn, and an incorrect regression equation is written, but an appropriate salary is found.
- [1] An appropriate scatter plot is drawn, but no further correct work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
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[8] incorrect procedure.

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