

Best Fitting Line/Curve – the line that lies as close as possible to all the data points.

Regression Analysis – a method used to find the equation of the best fitting line or curve.

1. A cup of soup is left on a countertop to cool. The table below gives the temperatures, in degrees Fahrenheit, of the soup recorded over a 10-minute period.

Time in Minutes (x)	Temperature in °F (y)
0	180.2
2	165.8
4	146.3
6	135.4
8	127.7
10	110.5

Exponential Regression Equation:

$$y = 180.38(.95)^x$$

Correlation Coefficient (r^2):

$$-0.99$$

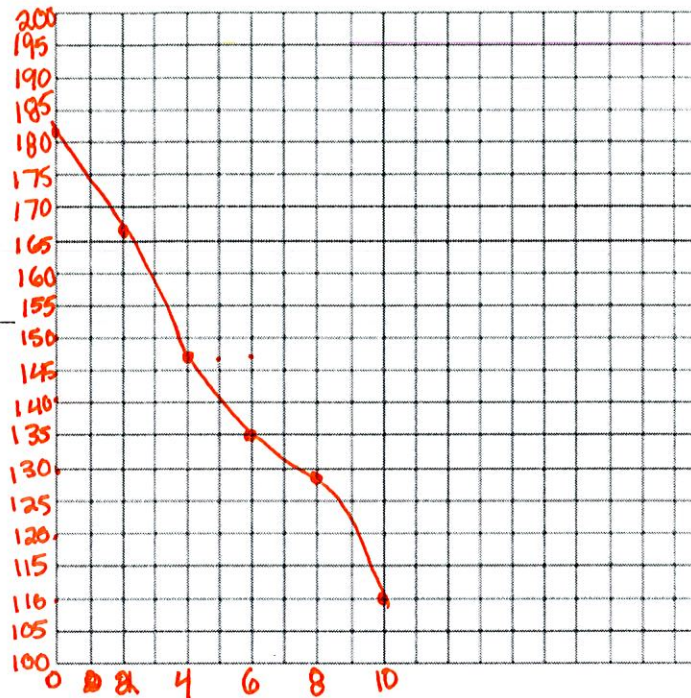
Type of Correlation:

Strong Negative

Is the correlation strong? Explain

Using the exponential regression equation predict temperature at 16 minutes.

$$79.39$$



2. The table below shows the number of new stores in a coffee shop chain that opened during the years 1986 - 1994. Using $x = 1$ to represent the year 1986 and y to represent the number of new stores, write the exponential regression equation for these data. Round all values to the nearest thousandth.

Year	Number of New Stores
1986	14
1987	27
1988	48
1989	80
1990	110
1991	153
1992	261
1993	403
1994	681

Exponential Regression Equation:

$$y = 10.6(1.59)^x$$

Correlation Coefficient (r^2):

$$0.996$$

Type of Correlation:

strong positive

Is the correlation strong? Explain

Using the exponential regression equation predict the number of new stores opened in 2000.

$$11,124 \text{ stores}$$

3. 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.

Exponential Regression Equation: $y = 1018.28(0.6)^x$

Correlation Coefficient (r^2): -0.99987

Type of Correlation: strong negative

Is the correlation strong? Explain

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

Using the exponential regression equation predict the number of coins returned on the 9th trial.

10.26

4. 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.

Exponential Regression Equation: $y = 999.97(1.05)^x$

Correlation Coefficient (r^2): 0.99995

Type of Correlation: _____

Is the correlation strong? Explain

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

Using the exponential regression equation predict the number of bacteria after 7 hours.

1407.06

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

Exponential Regression Equation: $y = 4.75(6.77)^x$

Correlation Coefficient (r^2): 0.98

Type of Correlation: _____

Is the correlation strong? Explain

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

Using the exponential regression equation predict the breaking strength of steel cable if it is 3 inches diameter.