Predictive Business Analytics Using Excel: Exercise 2

The demand for electricity over the period 2008 to 2014 is stored in **eletricitydemand.txt** file located at the Business Analytics website: www.small-big-data.com.

Calculate a regression line for the data.

1. Determine the equation of the estimated regression line. Based on the data, what is the intercept of this line?
A) -105.357
B) 105.357
C) -210,885
D) 210,885
E) None of the above

2. Determine the equation of the estimated regression line. Based on the data, what is the slope of this line?
A) -105.357
B) 105.357
C) -210,885
D) 210,885
E) None of the above

3. What is your forecast for 2015?
A) 1,210
B) 1,310
C) 1,410
D) 1,515
E) None of the above

4. What is your forecast for 2016?
A) 1,210
B) 1,310
C) 1,410
D) 1,515
E) None of the above

Solution

The objective of this exercise is to practice how to conduct a basic forecasting using an application software such as MS Excel.

MS Excel formulas to be used include:
=INTERCEPT()
=SLOPE()
=FORECAST()

First, you need to import the **eletricitydemand.txt** file located at the Business Analytics website: www.small-big-data.com (depicted in Figure 1) into Excel. The file is comma delimited. The procedure of importing text files into Excel is described at:
http://www.small-big-data.com/baexcelworkshop.htm

	A	B	C	D	E	F
1	Year	Electricity Demand				
2	2008	740				
3	2009	790				
4	2010	800				
5	2011	900				
6	2012	1050				
7	2013	1420				
8	2014	1220				
9						
10						
11						

Figure 1.

1. After importing the data set **eletricitydemand.txt**, to determine the intercept of the regression line, the INTERCEPT function needs to be used. The Year column is selected as X variable and in the same formula, the Electricity Demand column (as Y variable) is selected. We separate them with a comma.

   Formula: **=INTERCEPT(B:B,A:A)**

   Result: **-210884.6429**

The answer is C, which is -210,885 as shown in Figure 2 and Figure 3.

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INTERCEPT ✕ ✓ *fx* =INTERCEPT(B:B,A:A)

	A	B	C	D	E
1	Year	Electricity Demand	Interecept	=INTERCEPT(B:B,A:A)	
2	2008	740			
3	2009	790			
4	2010	800			
5	2011	900			
6	2012	1050			
7	2013	1420			
8	2014	1220			
9					

Figure 2

	A	B	C	D
			fx	=INTERCEPT(B:B,A:A)
1	Year	Electricity Demand	Interecept	-210884.64
2	2008	740		
3	2009	790		
4	2010	800		
5	2011	900		
6	2012	1050		
7	2013	1420		
8	2014	1220		

D1

Figure 3

2. To determine the slope of the regression line, we use the SLOPE function. The Year column is selected as X variable and in the same formula, the Electricity Demand column (as Y variable) is selected.

Formula: **=SLOPE(B:B,A:A)**

Result: **105.3571429**

The answer is B, which is 105.357 as depicted in Figure 4.

	A	B	C	D
				=SLOPE(B:B,A:A)
1	Year	Electricity Demand	Interecept	-210884.64
2	2008	740	Slope	105.35714
3	2009	790		
4	2010	800		
5	2011	900		
6	2012	1050		
7	2013	1420		
8	2014	1220		

Figure 4

3. Expected electricity demand for 2015 can be determined by utilizing the knowledge from the two previous questions. The regression line has the following equation: Y=a+bx, where a is INTERCEPT and b is SLOPE. In this case, when replacing the variables, it would be

Y= -210,885 + 105.357*2015 which is 1409.355

The answer is C, which is 1410.

Another way to solve this problem efficiently is by utilizing the FORECAST function for linear regression. It requires the following information, =FORECAST(X, Known Ys, Known Xs) as depicted in Figure 5.

	D4		f_x =FORECAST(C4,B:B,A:A)	

	A	B	C	D	
1	Year	Electricity Demand	Interecept	-210884.64	
2	2008	740	Slope	105.35714	
3	2009	790	Forecast		
4	2010	800	2015	1410	
5	2011	900			
6	2012	1050			
7	2013	1420			
8	2014	1220			
9					

Figure 5.

4. Expected electricity demand for 2016 can be determined by utilizing the knowledge from the two previous questions. The regression line has the following equation: Y=a+bx, where a is INTERCEPT and b is SLOPE. In this case, when replacing the variables, it would be

Y= -210,885 + 105.357*2016 which is 1514.99424

The answer is D, which is 1515.

Another way to solve this problem efficiently is by utilizing the FORECAST function for linear regression. It requires the following information, =FORECAST(X, Known Ys, Known Xs) as depicted in Figure 6.

	A	B	C	D
		fx	=FORECAST(C5,B:B,A:A)	
	A	**B**	**C**	**D**
1	Year	Electricity Demand	Interecept	-210884.64
2	2008	740	Slope	105.35714
3	2009	790	Forecast	
4	2010	800	2015	1410
5	2011	900	2016	1515.3571
6	2012	1050		
7	2013	1420		
8	2014	1220		
9				

Figure 6.

Answers

Exercise
1. C
2. B
3. C
4. D