A S S I G N M E N T 01

Statistics for Business & Economics
Course Code: STA 217

Submitted To

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Item	2001		2005					
	Price	Quantity	Price	Quantity				
	p_0	q_0	p_t	q_t	p_0q_0	p_tq_0	p_tq_t	p_0q_t
Aluminuam (cent per pound)	0.31	1000	0.76	1200	310	760	912	372
Natural Gas (1,000 cu. ft.)	0.31	5000	2.50	4000	1550	12500	10000	1240
Petroleum (barrel)	3.31	60000	26.00	60000	198600	1560000	1560000	198600
Platinum (troy ounce)	133.31	500	490.00	600	66655	245000	294000	79986
Total	137.24	66500	519.26	65800	267115	1818260	1864912	280198

a. Simple Price Index

Aluminuam (cent per pound)	245.2
Natural Gas (1,000 cu. ft.)	806.5
Petroleum (barrel)	785.5
Platinum (troy ounce)	367.6

Interpritation:

The largest price increase was for Natural Gas 706.5%, Petrolium was second with 685.5%, Platinum was third with 267.6% and Aluminuam was the lowest increase with 145.2% from the base year 2001 to the curent year 2005.

b. Simple Aggregrate Price Index   378.4

Interpritation: The aggregate group of prices had increased 278.4% in 2005 from the base year 2001.

c. Laspeyer's Price Index   680.7

Interpritation: The price of this group of items has increased 580.7% in 2005 from the base year 2001.

d. Paaches' Price Index   665.6

Interpritation: The price of this group of items has increased 565.6% in 2005 from the base year 2001.

e. Fisher's Ideal Index   673.1

Interpritation: The price of this group of items has increased 573.1% in 2005 from the base year 2001.

f. Value Index   698.2

Interpritation: The price of this group of items has increased 598.2% in 2005 from the base year 2001.

Answer of Exercise 02:

a.

Year	Quarter	Sales ($ 000)	Four-Quarter Total	Four-Quarter Moving Average	Centered Moving Average	Specific Seasonal
2001	Winter	210				
	Spring	181				
			697	174.25		
	Summer	60			174.750	0.343
			701	175.25		
	Fall	246			179.750	1.369
			737	184.25		
2002	Winter	214			187.000	1.144
			759	189.75		
	Spring	217			187.750	1.156
			743	185.75		
	Summer	82			189.750	0.432
			775	193.75		
	Fall	230			195.250	1.178
			787	196.75		
2003	Winter	246			197.875	1.243
			796	199.00		
	Spring	229			205.250	1.116
			846	211.50		
	Summer	91			213.000	0.427
			858	214.50		
	Fall	280			217.250	1.289
			880	220.00		
2004	Winter	258			222.750	1.158
			902	225.50		
	Spring	251			227.750	1.102
			920	230.00		
	Summer	113			232.625	0.486
			941	235.25		
	Fall	298			237.375	1.255
			958	239.50		
2005	Winter	279			239.875	1.163
			961	240.25		
	Spring	268			241.000	1.112
			967	241.75		
	Summer	116				
	Fall	304				

Year	Winter	Spring	Summer	Fall			
2001			0.343	1.369			
2002	1.144	1.156	0.432	1.178			
2003	1.243	1.116	0.427	1.289			
2004	1.158	1.102	0.486	1.255			
2005	1.163	1.112					
Total	4.709	4.486	1.688	5.091			
Mean	1.177	1.121	0.422	1.273	3.993	C.F.	1.002
Adjusted	1.179	1.123	0.423	1.275	4.000		
Index	117.9	112.3	42.3	127.5			

Interpritation:

Sales for fall quarter is 27.5% above the typical quarter and for summer it is 57.7% below the typical quarter. The sales of other two quarter winter is 17.9% and spring is 12.3% above the typical quarter.

b.

Year	Quarter	Sales ($ 000)	Seasonal Index	Deseasonal Sales (Y)	t	tY	t^2
2001	Winter	210	1.179	178.09	1	178.09	1
	Spring	181	1.123	161.14	2	322.28	4
	Summer	60	0.423	141.91	3	425.72	9
	Fall	246	1.275	192.97	4	771.90	16
2002	Winter	214	1.179	181.48	5	907.42	25
	Spring	217	1.123	193.19	6	1159.14	36
	Summer	82	0.423	193.94	7	1357.57	49
	Fall	230	1.275	180.42	8	1443.39	64
2003	Winter	246	1.179	208.62	9	1877.60	81
	Spring	229	1.123	203.87	10	2038.74	100
	Summer	91	0.423	215.23	11	2367.48	121
	Fall	280	1.275	219.65	12	2635.75	144
2004	Winter	258	1.179	218.80	13	2844.38	169
	Spring	251	1.123	223.46	14	3128.44	196
	Summer	113	0.423	267.26	15	4008.87	225
	Fall	298	1.275	233.77	16	3740.26	256
2005	Winter	279	1.179	236.61	17	4022.34	289
	Spring	268	1.123	238.59	18	4294.71	324
	Summer	116	0.423	274.35	19	5212.71	361
	Fall	304	1.275	238.47	20	4769.45	400
Total				4201.83	210	47506.25	2870

Trend Equation:

b 5.0933   a 156.6122

y' = 156.6122 + 5.0933t

Interpretation:

The Slope of the trend line is 5.0933. That shows over the 20 quarters the deseasonalized sales increased at a rate of 5093.3 per quarter. The value 156.6122 is the intercept of the trend line on Y-axis (for t=0).
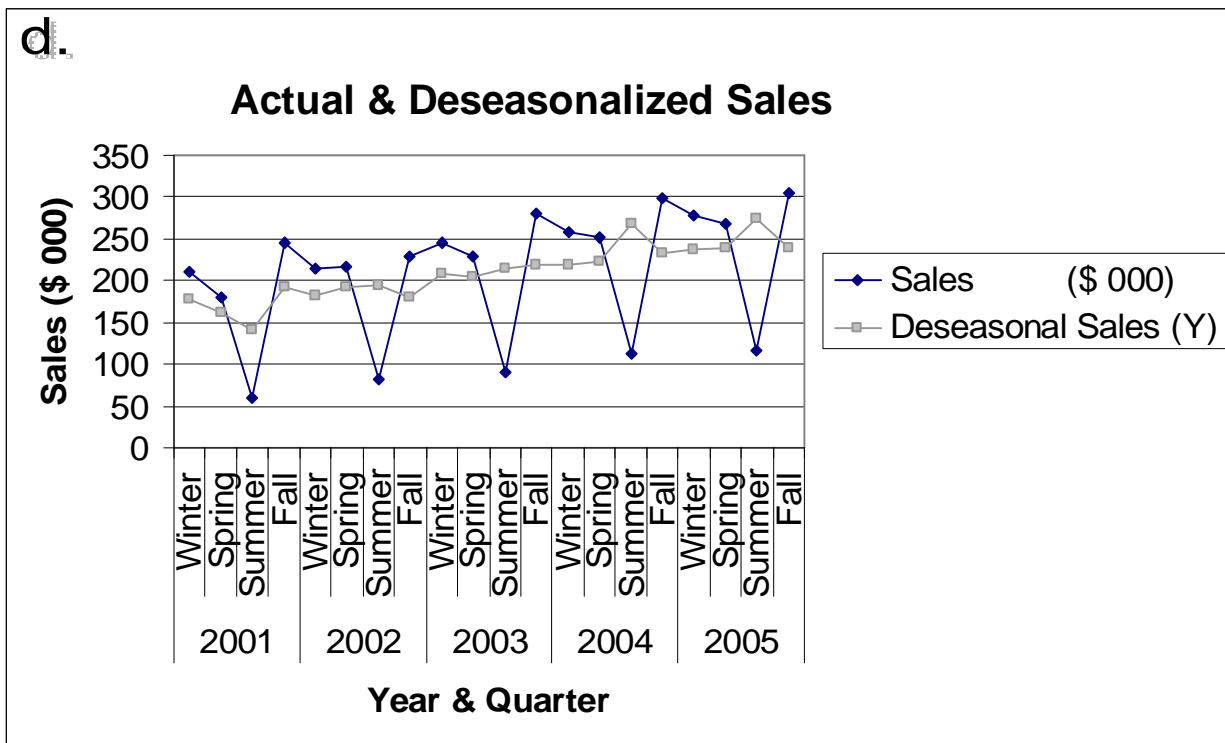
c.

Projected Sales for 2007

Quarter	t	Estimated Sales	Seasonal Index	Quarterly Forecast
Winter	25	283.945	1.179	334.818
Spring	26	289.038	1.123	324.660
Summer	27	294.131	0.423	124.362
Fall	28	299.225	1.275	381.445

Interpritation:

Sales during the fall quarter is the highest & least in the summer & this is consistent with the original data.

d.

Actual & Deseasonalized Sales

a.

Year	Amount ($ million) Y	log Y	t	t log Y	t2
1995	88.1	1.9450	1	1.9450	1
1996	94.1	1.9736	2	3.9472	4
1997	102.1	2.0090	3	6.0271	9
1998	109.1	2.0378	4	8.1513	16
1999	118.1	2.0722	5	10.3612	25
2000	125.1	2.0973	6	12.5835	36
2001	132.1	2.1209	7	14.8463	49
2002	141.1	2.1495	8	17.1962	64
2003	150.1	2.1764	9	19.5874	81
2004	157.1	2.1962	10	21.9618	100
2005	162.1	2.2098	11	24.3076	121
Total	1379.1	22.9877	66	140.9147	506

Logaradthmic Trend Equation

b   0.02717
a   1.92678

So, the logaradthmic trend equation is
y' = 1.92678 + 0.02717t

b.
The Anti Log of b 0.02717 is 1.06456. Substructing 1 yield is 0.06456. Sales Increased by 6.5% annually.

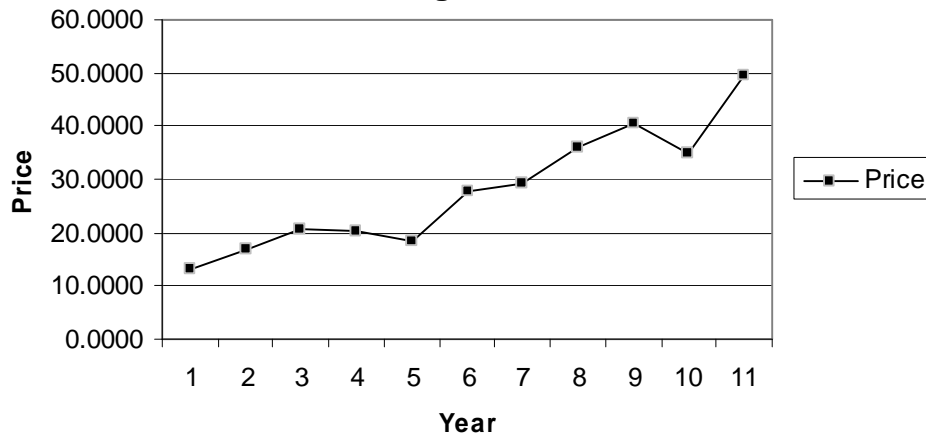**c.**

2.307136, found from the log trend equation Y'=1.92678+0.02717(14) by antilog the value we found about 202.8 ($ million) sales for 2008.

Answer of Exercise 04:

a.

Selling Price

b.

Year	Price (Y)	t	tY	t^2
1995	12.9445	1	12.9445	1
1996	16.8560	2	33.7120	4
1997	20.6435	3	61.9305	9
1998	20.3334	4	81.3336	16
1999	18.3470	5	91.7350	25
2000	27.7848	6	166.7088	36
2001	29.0891	7	203.6237	49
2002	36.0465	8	288.3720	64
2003	40.6421	9	365.7789	81
2004	35.0540	10	350.5400	100
2005	49.5935	11	545.5285	121
Total	**307.3344**	**66**	**2202.2075**	**506**

Least Square Trend Equation

b   3.25637

a   8.40131

So, The Least Square Trend Equation is

$Y' = 8.40131 + 3.25637t$

c.

The points for the year 2000 is 27.9395 found from Y' = 8.40131 + 3.25637(6).

The points for the year 2003 is 37.7086 found from Y' = 8.40131 + 3.25637(9).

d.

Estimated selling price for 2007 is 50.7341 found from Y' = 8.40131 + 3.25637(13).

Questions for Assignment 01
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Exercise 01: The prices of selected items for 2001 and 2005 follow. Production figures for those periods are also given. Use 2001 as base period.

Item	2001		2005	
	Price	**Quantity**	**Price**	**Quantity**
Aluminuam (cent per pound)	0.31	1000	0.76	1200
Natural Gas (1,000 cu. ft.)	0.31	5000	2.50	4000
Petroleum (barrel)	3.31	60000	26.00	60000
Platinum (troy ounce)	133.31	500	490.00	600

Compute the followings:
  a. Simple Price Indexes for each of four items.
  b. Simple Aggregrate Price Index
  c. Laspeyer's Price Index
  d. Paaches' Price Index
  e. Fisher's Ideal Index
  f. Value Index

Interpret your result in each cases.

Exercise 02: Sales of materials by quarter, since 2001 for Carolina Home Construction, Inc. are shown below ($ 000)

Year	Quarter				
	Winter	Spring	Summer	Fall	
2001	210	181	60	246	
2002	214	217	82	230	
2003	246	229	91	280	
2004	258	251	113	298	
2005	279	268	116	304	

  a. Determine the typical seasonal patterns for sales using Ration-To-Moving-Average Method.

  b. Deseasonalize the data and determine the trend equation
  c. Project the sales for 2007 and then seasonally adjust each quarter.
  d. Draw a line chart of actual & deseasonalized sales.

Interpret your result in each cases.

Exercise 03: Reported below are the amount s spent on advertising ($ million) by a large firm from 1995 to 2005.

Year	Amount	Year	Amount
1995	88.1	2001	132.1
1996	94.1	2002	141.1
1997	102.1	2003	150.1
1998	109.1	2004	157.1
1999	118.1	2005	162.1
2000	125.1		

a. Determine the logarithmic trend equation.
b. By what percent did imports increase on the average during the period?
c. Estimate imports for year 2008?

Exercise 04: Listed below is the selling price for a share of Pepsi Co., Inc. at the close of the year.

Year	Price	Year	Price
1995	12.9445	2001	29.0891
1996	16.8560	2002	36.0465
1997	20.6435	2003	40.6421
1998	20.3334	2004	35.0540
1999	18.3470	2005	49.5935
2000	27.7848		

a. Plot the data.
b. Determine the least squares trend equation.
c. Calculate the points for the year 2000 and 2003.
d. Estimate the selling price in 2007.