

Question 1

The *Alpha Electric Ltd* sells new and refurbished motors. The monthly least squares trend equation, based on the company's sales data from the past 60 months, is

$$Y' = 44.3 + 0.5t$$

where, Y' is the trend monthly sales (in \$000), and t is the time relative to February 2010 when extensive data gathering commenced.

The company has also developed the following seasonal indexes for the months of February, June, and October, respectively.

Month	February	June	October
Seasonal Index	120	95	57

Complete and use the monthly coding chart below to answer the following:

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010		0	1	2	3	4	5	6	7	8	9	10
2011	11	12	13	14	15	16	17	18	19	20	21	22
2012	23	24	25	26	27	28	29	30	31	32	33	34
2013	35	36	37	38	39	40	41	42	43	44	45	46
2014	47	48	49	50	51	52	53	54	55	56	57	58
2015	59	60	61	62	63	64	65	66	67	68	69	70

- Interpret the coefficient ' a ' and ' b ' in the least squares trend equation.
- What are the predicted or the sales forecast for the month of June 2015, and for the month of October 2015?
- Assuming the actual sales for the month of June 2015 are \$75.4 (\$000), compute or isolate the time series components T.S and C.I. Interpret the Cyclical - Irregular component (C.I).

Question 2

A busy restaurant in Gatineau, Quebec, conducted a survey to determine the wait times before customers are seated. A random sample of 8 customers revealed the wait times in the table below.

Wait Time (X)				
28				
39				
34				
28				
23				
29				
34				
44				

Compute the following statistical measures (round your answer to 2 decimals).

- ✓ (a) Mean
- ✓ (b) Variance and standard deviation
- ✓ (c) Median
- ✓ (d) Mode
- ✓ (e) Coefficient of variation
- ✓ (f) Range
- ✓ (g) Determine the coefficient of skewness using the Pearson's method. What is your conclusion regarding the skewness of the data?

Question 3

- ✓ Algonquin College School of Business will like to compare the variation in 2014 grades in Quantitative Methods I and Communication II courses. A summary of the pertinent statistics of the grades in the two courses is given in the following table.

Course	Mean	Standard Deviation
Quantitative Method I	64.8	8.9
Communications II	72.6	15.3

Which of the two courses show a higher variation in grade?

Question 4

Canola seed production data by Prairie Farms Inc. since year 2000 is given in the table below.

Year	Production (Tonnes)	moving Average total	moving average (SCMA)
2000	5		
2001	6		
2002	8	$5+6+8+10+5 = 34$	$34/5 = 6.8$
2003	10	$6+8+10+5+3 = 32$	$32/5 = 6.4$
2004	5	$8+10+5+3+7 = 33$	$33/5 = 6.6$
2005	3	$10+5+3+7+10 = 35$	$35/5 = 7$
2006	7	$5+3+7+10+12 = 37$	$37/5 = 7.4$
2007	10	$3+7+10+12+11 = 43$	$43/5 = 8.6$
2008	12	$7+10+12+11+9 = 49$	$49/5 = 9.8$
2009	11	$10+12+11+9+13 = 55$	$55/5 = 11$
2010	9	$12+11+9+13+15 = 60$	$60/5 = 12$
2011	13	$11+9+13+15+12 = 60$	$60/5 = 12$
2012	15		
2013	12		

(a) Compute the five-year centered moving average for the production data.

(b) What is the usefulness of the moving-average computation in (a).

It is a good visual presentation, more accurate. Smoother trend.

Question 5

Betts Electronics purchases three replacement parts for robotic machines used in its manufacturing process. Information on the price of the replacement parts and the quantity purchased is given in the following table:

Part No.	2010		2015		P _t 90	P ₀ 90
	Price (\$)	Quantity	Price (\$)	Quantity		
RC-33	\$0.50	320	\$0.60	340	192	160
SM-14	1.20	110	0.90	130	99	132
WC-50	0.85	230	1.00	250	230	195.5

total : 521 487.5

(a) Compute Laspeyres's price index for 2015 using 2010 as the base period.

(b) Interpret the index obtained in (a).

Price index = 107.

$$107 - 100 = 7$$

It increased by 7%.

Question 6

The Consumer Price Index (CPI) for Ontario, Canada is reported for January 2015 as **124.3** (2002=100).

(a) Interpret this number.

(b) Using the base period of 2002 and the base value of 100, compute the purchasing power of the dollar in January 2015 in Ontario.

(c) The take-home pay of Joanne Gibson and the CPI for Jan 2013 and Jan 2015 are as indicated in the table below.

Month	Take-Home Pay (\$)	CPI (2002=100)
January 2013	\$3900	122.8
January 2015	\$4130	124.3

Has Joanne's income actually increased considering inflation? Show your calculations.