Questions 1 to 7 are based on the following scenario:

A random sample of n = 150 customers of a large bank in Johannesburg was selected and the following information collected:

- Suburb where the customer lives in Johannesburg
- The total number of credit cards the customer has
- The total monthly expenditure (in Rand) on all the credit cards
- A series of questions measuring the customer's satisfaction with the bank, which were combined to construct an overall satisfaction score, ranging from 1 to 50 (high score implies high satisfaction)

Question 1

What is the scale of measure of the variable "overall satisfaction?

a) Nominal
b) Ordinal
c) Interval
d) Ratio

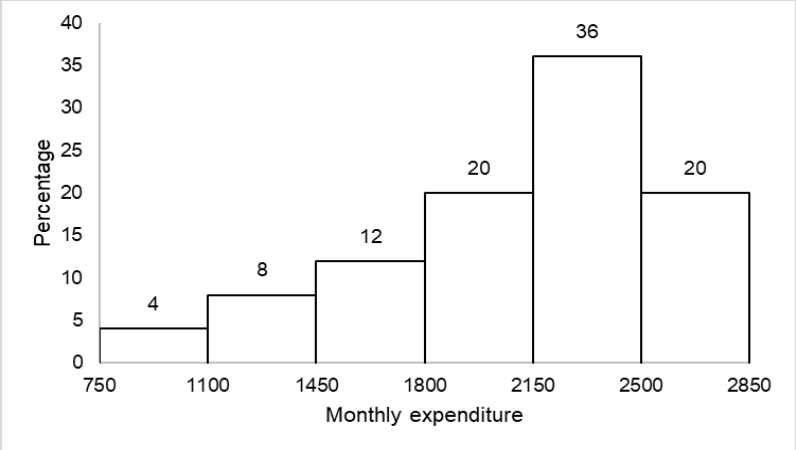
Question 2

Which one of the following statements is false?

a) The population of interest is all people living in Johannesburg
b) The variable "Suburb" is a categorical variable measured on a nominal scale
c) The sampling unit is a customer of the bank
d) The average number of credit cards used by the 150 customers is a sample statistic

Questions 3 and 4 are based on the following histogram:

The following histogram shows the distribution (with percentages) of total monthly expenditure on all the credit cards for the sample of 150 customers, where the first class interval is (750, 1100].



Question 3

Which one of the following statements is true?

a) The estimated mode is R2300
b) The estimated range is R2850
c) 4% of customers spend R1100 per month on their credit cards
d) 48 customers spend between R1450.01 to R2150 per month on their credit cards

Question 4

Describe the shape of the distribution of total monthly expenditure on all the credit cards.

a) Symmetric
b) Negatively skewed
c) Positively skewed
d) Relative frequency distribution

Question 5

The following table summarises the overall satisfaction scores for the sample of customers:

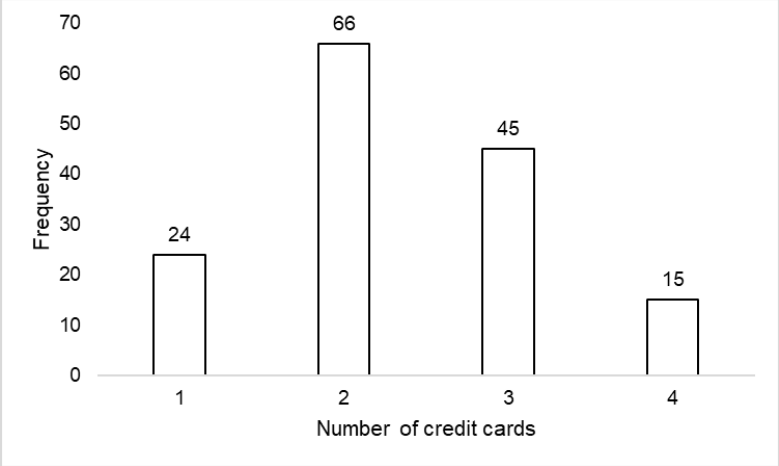
Class	Frequency	Relative frequency	Relative frequency percentage	Cumulative frequency
(0, 10]	24	**B**	?	?
(10, 20]	8	0.05	5	**D**
(20, 30]	**A**	?	?	64
(30, 40]	53	?	35	117
(40, 50]	33	0.22	**C**	150
Total	150	1		

Which one of the following values of the missing values (A to D) in the table is incorrect?

a) A = 32
b) B = 0.16
c) C = 33
d) D = 32

Question 6

The total number of credit cards that customers have are summarised in the following bar graph:



Which one of the following statements is incorrect?

a) 15% of customers have 4 credit cards
b) 84% of customers have more than 1 credit card
c) All customers have a credit card
d) The mode is equal to 2

Question 7

Use the bar graph in Question 6 to calculate the average number of credit cards of the customers.

a) 2.00
b) 2.50
c) 2.17
d) 2.34

Questions 8 and 9 are based on the following scenario:

At a market research company there are 12 upper-level managers. Their years of service at the company are as follows:

3 4 4 7 8 9 12 15 16 18 21 25

Question 8

The 60th percentile value of years of service at the company, to 1 decimal place, is equal to:

a) 7.8
b) 12.8
c) 13.5
d) 14.4

Question 9

Calculate the coefficient of variation of years of service at the company. Round off your final answer to 1 decimal place. Do not round off intermediate calculations.

a) 51.8%
b) 55.3%
c) 60.8%
d) 164.4%

Question 10

The skewness coefficient of a variable is found to be equal to 0.023. For this variable, which is the best measure of central tendency to use?

a) The mean, because the variable is approximately symmetric
b) The median, because the variable is positively skewed
c) The variance, because the variable is approximately symmetric
d) The inter-quartile range, because the variable is positively skewed

Question 11

A regression model to predict test marks (M), in percentages, based on the number of hours (H) that a student studied for the test is given as $\hat{m} = 16 + 4h$, $5 \leq h \leq 20$. Which one of the following statements is correct?

a) It is statistically valid to predict H for a valid value of M
b) A student is predicted to pass the test if he/she studied for at least 8 hours and 30 minutes (a student passed if he/she scored at least 50% on the test)
c) The coefficient of determination shows the direction of the correlation between H and M
d) A value of $h = 5$ will lead to extrapolation of the regression model

Questions 12 to 14 are based on the following scenario:

At a grocery store, the allocated shelf space (in metre) and weekly sales (in thousands of Rand) were recorded for $n = 12$ products. Let X = shelf space and Y = sales. The summary values are:

$\sum x = 9.4 \qquad \sum x^2 = 8.7$

$\sum y = 47.0 \qquad \sum y^2 = 192.6$

$\sum xy = 38$

$\min(X) = 0.2 \qquad \max(X) = 1.2$

$\min(Y) = 2.3 \qquad \max(Y) = 5.0$

Question 12

Calculate the correlation coefficient for this data. Round off all intermediate and final calculations to 2 decimal places.

a) 0.03
b) 0.12
c) 0.35
d) 0.89

Question 13

The least squares regression model of Y on X is given by the equation $\hat{y} = 3.2 + 0.89x$. Which one of the following statements is the correct interpretation of the slope?

a) For every 1*m* increase in shelf space, weekly sales are predicted to increase by R890
b) For every 1*m* increase in shelf space, weekly sales are predicted to increase by 4.09 units
c) For every R1000 increase in weekly sales, shelf space is predicted to increase by 0.89 units
d) There is a strong, positive, linear relationship between shelf space and weekly sales

Question 14

Use the regression model given in Question 13 to predict the weekly sales units (to 1 decimal place) for a product that occupies 0.8*m* shelf space.

a) 2.3 units
b) 3.3 units
c) 3.9 units
d) This is not a valid prediction

Question 15

A fast-food outlet has 2 delivery vehicles. The probability that a vehicle is available for deliveries at any time is 0.78. The availability of the 2 vehicles is independent of one another. An order for delivery has just been placed. What is the probability, to 4 decimal places, that at least 1 of the 2 vehicles is available to deliver the order?

a) 0.3432
b) 0.6084
c) 0.7800
d) 0.9516

Question 16

A telecommunications company asks people who phone the customer service call centre to rate the service at the end of the call as either poor, average or good. Customers are classified according to the reason for the call (log a call for a faulty line or query an invoice).

The data of the last 623 calls received at the call centre are summarised as follows:

		Service rating			
		Poor	Average	Good	Total
Reason for the call	Faulty line	56	151	115	322
	Invoice query	21	77	203	301
	Total	77	228	318	623

Which one of the following probabilities is incorrect? Round off all calculations to 2 decimal places.

a) The probability that a customer who queried an invoice gave a poor rating, is equal to 0.03
b) The probability that a customer logs a call for a faulty line and rates the service as poor, is equal to 0.09
c) The probably that a customer queries an invoice is 0.48
d) The probability that a customer rates the call as either average service or good service, is equal to 0.88

Question 17

Consider two events *A* and *B*, where $P(A) = 0.2$, $P(B) = 0.7$. Event A is mutually exclusive of event B. Then $P(\bar{A} \cup \bar{B})$, correct to 1 decimal place, is equal to:

a) 0.5
b) 0.9
c) 1.0
d) Not enough information provided to calculate the probability

Questions 18 and 19 are based on the following scenario:

At a small convenience store, 80% of customers buy bread. Of those who buy bread, 35% will also buy milk, while 45% of customers who do not buy bread, will buy milk.

Question 18

What is the probability, to 2 decimal places, that a customer will buy both bread and milk?

a) 0.28
b) 0.35
c) 0.44
d) 0.80

Question 19

A customer just bought milk. What is the probability, to 2 decimal places, that the customer also bought bread?

a) 0.28
b) 0.39
c) 0.76
d) 0.80

Questions 20 to 22 are based on the following scenario:

From historical records, an insurance company noted that the probability that a customer will not submit any insurance claims is equal 0.3. The company has just signed up 14 new customers.

Question 20

How many of them are expected to submit an insurance claim at the company?

a) 3.0
b) 4.2
c) 7.0
d) 9.8

Question 21

What is the probability that exactly 4 of the 14 new customers will not submit any claims at the company? Round off your final answer to 3 decimal places.

a) 0.001
b) 0.229
c) 0.286
d) 0.355

Question 22

What is the probability that all 14 new customers will submit a claim at that company? Round off your final answer to 3 decimal places.

a) 0.007
b) 0.229
c) 0.700
d) 1.000

Questions 23 to 25 are based on the following scenario:

The South African National Roads Agency (SANRAL) noted that, on average, 2.7 cars pass through a particular toll gate every 2 minutes, according to a Poisson process.

Question 23

The variance (to 2 decimal places) of the number of cars passing through the toll gate in 1.2 minutes, is equal to:

a) 1.27
b) 1.62
c) 2.62
d) 2.70

Question 24

What is the probability that at most 1 car pass through the toll gate in 2 minutes? Do not round off intermediate calculations. Only round off the final answer to 3 decimal places.

a) 0.067
b) 0.181
c) 0.249
d) 0.519

Question 25

What is the probability, to 3 decimal places, that exactly 6 cars pass through the toll gate in a 6-minutes period?

a) 0.002
b) 0.036
c) 0.081
d) 0.119

Question 26

For a normal random variable X with a mean of 100 and a variance of 25, which one of the following statements is true?

a) The 30th percentile value of X is greater than the mean of 100
b) The standardised *z*-score of a value of $x = 108$, is z = 0.32
c) Approximately 68% of the distribution of X lies between 75 and 125
d) All three other statements are incorrect

Question 27

For the standard normal random variable Z ~ *N*(0, 1), determine the value of *k* (to 2 decimal places) such that $P(Z > k) = 0.8289$.

a) $k = -0.95$
b) $k = -0.80$
c) $k = +0.80$
d) $k = +0.95$

Questions 28 to 30 are based on the following scenario:

The time (X) that a subscriber spends reading *The Wall Street Journal* is assumed to be normally distributed with a mean of 49 minutes and a standard deviation of 16 minutes.

Question 28

If $x = 53$, then the standardised z-score is equal to:

a) 0.02
b) 0.25
c) 1.00
d) 1.08

Question 29

What is the probability (to 4 decimal places) that a subscriber spends between 41 and 45 minutes reading *The Wall Street Journal*?

a) 0.0928
b) 0.3085
c) 0.4013
d) 0.5987

Question 30

Find the 67th percentile value of the time that a subscriber spends reading *The Wall Street Journal*, correct to 2 decimal places.

a) 25.00
b) 52.68
c) 56.04
d) 60.98

Questions 31 to 33 are based on the following scenario:

The following table shows the number of customers who dined at a certain restaurant from Monday to Thursday last week, selected quantity relatives (using Monday as the base period), and selected quantity link relatives.

Day	Monday	Tuesday	Wednesday	Thursday
Number of customers	15	12	?	21
Quantity relative	100	80	140	?
Quantity link relative	-	?	175	100

Question 31

How many people dined at the restaurant on Wednesday?

a) 14
b) 21
c) 26
d) 40

Question 32

Which one of the following statements is incorrect?

a) The number of customers at the restaurant increased by 40% from Monday to Thursday
b) The number of customers at the restaurant decreased by 20% from Monday to Tuesday
c) The quantity link relative for Tuesday is the same as the quantity relative for Tuesday as both use Monday as the reference period
d) The number of customers at the restaurant increased by 175% from Tuesday to Wednesday

Question 33

Calculate the average period-by-period (day-by-day) percentage increase/decrease in the number of customers at the restaurant during this time period, correct to 3 decimal places.

a) 11.869% increase, on average
b) 11.902% increase, on average
c) 15.000% increase, on average
d) 18.333% increase, on average

Questions 34 and 35 are based on the following scenario:

A small pharmacy recorded the price and quantity of a basket of toiletries sold over a two-year period. The price (in Rand) and quantity sold (in hundreds of units) are as follows:

	Year 1 (base period)		Year 2 (current period)	
	Price	Quantity	Price	Quantity
Soap	13.99	15	15.99	14
Deodorant	29.90	6	31.50	8
Toothpaste	31.95	4	29.95	7

Question 34

Which one of the following is the correct weighted aggregate current value of the price of soap, using Paasche's weighting method? Round off your answer to 2 decimal places.

a) 114.30
b) 195.86
c) 223.86
d) 685.51

Question 35

The following table shows selected values (correct to 1 decimal place) of the weighted average of quantity relatives using Laspeyres' weighting method.

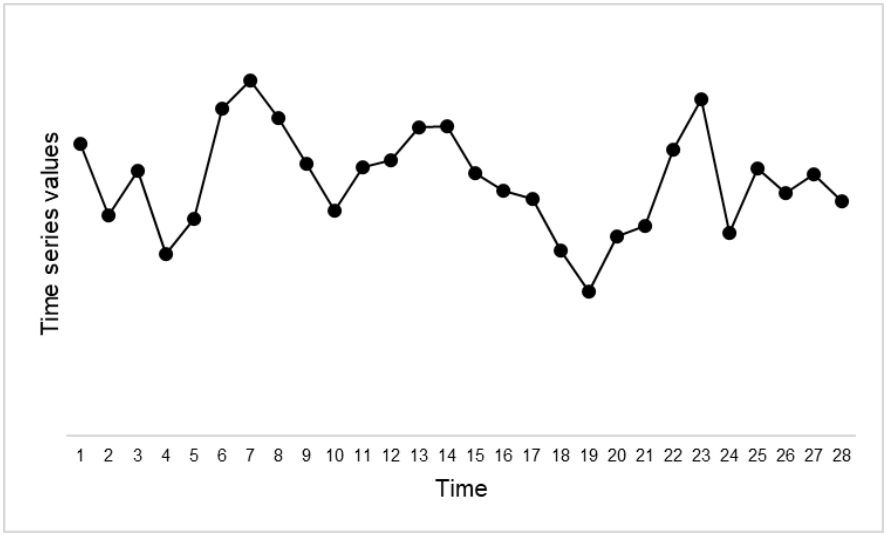
Basket	Quantity relative	Base value	Weighted average of quantity relative
Soap	93.3	209.9	**C**
Deodorant	133.3	179.4	?
Toothpaste	**A**	127.8	?
	TOTAL	**B**	65862.7
		INDEX	**D**

Which one of the following values of the missing numbers A, B, C and D is incorrect? Round off all intermediate and final calculations to 1 decimal place.

a) A = 93.7
b) B = 517.1
c) C = 19583.7
d) D = 127.4

Question 36

The following graph shows a time series of unemployment figures in a certain country over 28 years.



Which of the following components is/are present in this time series?

I. Irregular
II. Increasing linear trend
III. Seasonal

a) Only component I
b) Only component II
c) Only components I and II
d) Only components I and III
e) All three components I, II and III

Questions 37 to 40 are based on the following scenario:

The quarterly milk production (in thousands of litres) of a small dairy, with selected values for a time series analysis, are given in the following table. The time series consists of a linear trend component and a seasonal component with 4 seasons (quarters).

Time	Quarter / Year	Milk produced	4-quarter moving average	Seasonal ratios	Adjusted seasonal index
1	Quarter 1, 2018	2.95	-	-	?
2	Quarter 2, 2018	3.18	-	-	101.31
3	Quarter 3, 2018	3.30	3.20	103.13	?
4	Quarter 4, 2018	3.23	3.26	99.08	**C**
5	Quarter 1, 2019	3.18	3.32	95.78	?
6	Quarter 2, 2019	3.45	**A**	?	101.31
7	Quarter 3, 2019	3.51	3.43	102.33	?
8	Quarter 4, 2019	3.46	3.47	99.71	**C**
9	Quarter 1, 2020	3.36	3.51	95.73	?
10	Quarter 2, 2020	3.58	3.57	**B**	101.31
11	Quarter 3, 2020	3.76	3.62	103.87	?
12	Quarter 4, 2020	3.65	3.67	99.46	**C**
13	Quarter 1, 2021	3.55	3.70	95.95	?
14	Quarter 2, 2021	3.78	3.74	?	101.31
15	Quarter 3, 2021	3.86	3.80	101.58	?
16	Quarter 4, 2021	3.87	-	-	**C**
17	Quarter 1, 2022	3.80	-	-	?

Question 37

Calculate the missing value for A in the table. Round off all intermediate and final calculations to 2 decimal places.

a) 3.32
b) 3.34
c) 3.37
d) 3.40

Question 38

The missing value for B in the table, correct to 2 decimal places, is equal to:

a) 99.72
b) 99.80
c) 100.28
d) 104.46

Question 39

The median seasonal indices (unadjusted seasonal indices) for Quarter 1 is equal to 95.78 and for Quarter 2 is equal to 101.07, and the adjusted seasonal index for Quarter 2 is equal to 101.31 (as given in the table). Round off the adjustment factor to 4 decimal places and find the missing value for C in the table, correct to 2 decimal places.

a) C = 99.46
b) C = 99.70
c) C = 99.89
d) C = 100.09

Question 40

The estimate trend for milk production, based on a least squares regression analysis, is given as $\hat{T} = 3.05 + 0.05x$. Forecast the milk production for Quarter 2 of 2022, correct to 2 decimal places.

a) 3.19 units of a thousand litres
b) 3.18 units of a thousand litres
c) 3.95 units of a thousand litres
d) 4.00 units of a thousand litres

ROUGH WORK

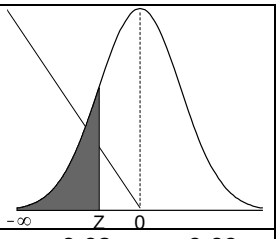
ROUGH WORK

ROUGH WORK

ROUGH WORK

Standard Normal Distribution

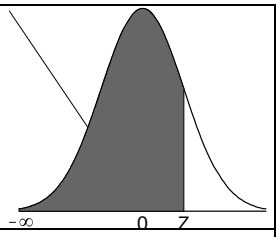
Entry represents area under the cumulative standard normal distribution from $-\infty$ to z



z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.4	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
-3.3	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003
-3.2	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
-3.1	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007
-3.0	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
-0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641

Standard Normal Distribution (continued)

Entry represents area under the cumulative standard normal distribution from $-\infty$ to z



z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998

Arithmetic Mean	$\bar{x} = \frac{1}{n}\sum x$	Variance	$s^2 = \frac{\sum x^2 - n\bar{x}^2}{n-1}$
Geometric mean	$\mathrm{GM} = \sqrt[n]{x_1 \times x_2 \times \ldots \times x_n}$	Coefficient of variation	$CV = \frac{s}{\bar{x}} \times 100$
r^{th} percentile	Position $= \frac{r}{100}(n+1)$ $P_r = x_{(k)} + 0.d\left(x_{(k+1)} - x_{(k)}\right)$	Coefficient of skewness	$SK = \frac{3(\text{mean} - \text{median})}{\text{standard deviation}}$

Correlation	$r = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{\sqrt{\left[n\sum x^2 - \left(\sum x\right)^2\right]\left[n\sum y^2 - \left(\sum y\right)^2\right]}}$		
Linear regression	$b = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{n\sum x^2 - \left(\sum x\right)^2}$	$a = \frac{\sum y - b\sum x}{n}$	$\hat{y} = a + bx$
Coefficient of determination	$r^2 \times 100\%$		

Complement rule	$P\left(\bar{A}\right) = 1 - P(A)$
Addition rule	$P(A \cup B) = P(A) + P(B) - P(A \cap B)$
	$P(A \cup B) = P(A) + P(B)$, if and only if A and B are mutually exclusive
Conditional probability	$P(A \mid B) = \frac{P(A \cap B)}{P(B)}$
Statistical independence	$P(A \cap B) = P(A) \times P(B)$, if and only if A and B are independent
Multiplication rule	$P(A \cap B) = P(B)P(A \mid B)$
Bayes' rule	$P\left(A_j \mid B\right) = \frac{P\left(A_j \cap B\right)}{P(B)} = \frac{P\left(B \mid A_j\right)P\left(A_j\right)}{\sum_{i=1}^{k} P\left(B \mid A_i\right)P\left(A_i\right)}$

Distribution	Formula	Mean	Variance
Binomial	$P(X=x)={}_nC_x p^x (1-p)^{n-x}$ for $x=0,1,2,\ldots,n$	np	$np(1-p)$
Poisson	$P(X=x)=\dfrac{e^{-\lambda}\lambda^x}{x!}$ for $x=0,1,2,\ldots$	λ	λ
Standard normal	$Z=\dfrac{X-\mu}{\sigma}$	0	1

Price relative	$\dfrac{p_1}{p_0}\times 100\%$
Quantity relative	$\dfrac{q_1}{q_0}\times 100\%$

	Laspeyres	Paasche
Weighted aggregates price index	$\dfrac{\sum(p_1\times q_0)}{\sum(p_0\times q_0)}\times 100\%$	$\dfrac{\sum(p_1\times q_1)}{\sum(p_0\times q_1)}\times 100\%$
Weighted average of relatives price index	$\dfrac{\sum\left[\dfrac{p_1}{p_0}\times 100\times(p_0\times q_0)\right]}{\sum(p_0\times q_0)}$	$\dfrac{\sum\left[\dfrac{p_1}{p_0}\times 100\times(p_0\times q_1)\right]}{\sum(p_0\times q_1)}$
Weighted aggregates quantity index	$\dfrac{\sum(p_0\times q_1)}{\sum(p_0\times q_0)}\times 100\%$	$\dfrac{\sum(p_1\times q_1)}{\sum(p_1\times q_0)}\times 100\%$
Weighted average of relatives quantity index	$\dfrac{\sum\left[\dfrac{q_1}{q_0}\times 100\times(p_0\times q_0)\right]}{\sum(p_0\times q_0)}$	$\dfrac{\sum\left[\dfrac{q_1}{q_0}\times 100\times(p_1\times q_0)\right]}{\sum(p_1\times q_0)}$

Price link relative	$\dfrac{p_i}{p_{i-1}}\times 100\%$
Quantity link relative	$\dfrac{q_i}{q_{i-1}}\times 100\%$

Components	$Y = T \times S \times I$
Least squares trend estimate	$\hat{y} = a + bx$
Number of seasons	k
Seasonal ratio	$\frac{\text{actual } y}{\text{moving average } y} \times 100$
Adjustment factor	$\frac{k \times 100}{\sum(\text{median seasonal indices})}$
Adjusted seasonal index	$(\text{median seasonal index}) \times (\text{adjustment factor})$
De-seasonalised data	$\frac{\text{actual } y}{\text{adjusted seasonal index}} \times 100$
Forecast	$\hat{y} = (a + bx) \times \left(\frac{\text{adjusted seasonal index}}{100} \right)$