UNIVERSITY OF JOHANNESBURG

Department of Finance and Investment Management

Advanced Diploma in Property Valuation and Management / Bridging Programme in Finance

Business Mathematics

ADPVM04/BPIF001

LAST ASSESSMENT OPPORTUNITY

INFORMATION SHEET

October 2015

Time: 2½ hours **Marks: 100**

Assessor: Prof G Els

Moderators: Prof I Botha (UJ)
Dr Y Stander (Investec)

INSTRUCTIONS:

- This information sheet consists of 7 pages (including annexures)
- Silent, non-programmable calculators may be used, unless otherwise instructed
- Round all calculations to TWO decimal places unless instructed otherwise

Surname | | | | | | | | | | | | | | | **Initial(s)** | | |

Student number | | | | | | | | | |

Module code | | | | | | 0 | |

Refer to the following diagram and information and answer question 21.:

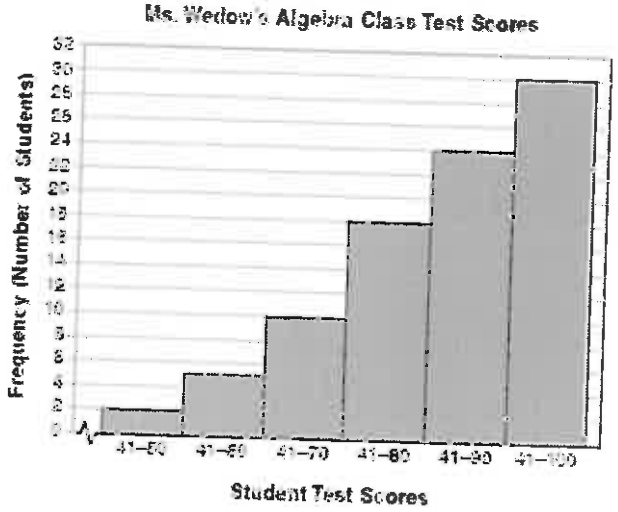
The test scores for 18 students in a Mathematics class are listed below:

86, 81, 79, 71, 58, 87, 52, 71, 87, 87, 93, 64, 94, 81, 76, 98, 94, 68

Interval	Tally	Frequency
51 – 60		
61 – 70		**(A)**
71 – 80		
81 – 90		
91 – 100		

Refer to the following diagram and answer questions 25. – 28.:

The diagram below shows a cumulative frequency histogram of the students' test scores in an algebra class.



Refer to the following diagram and information and answer questions 32. – 38.:

The following diagram indicates values in a data set in increasing order and no value is repeated.

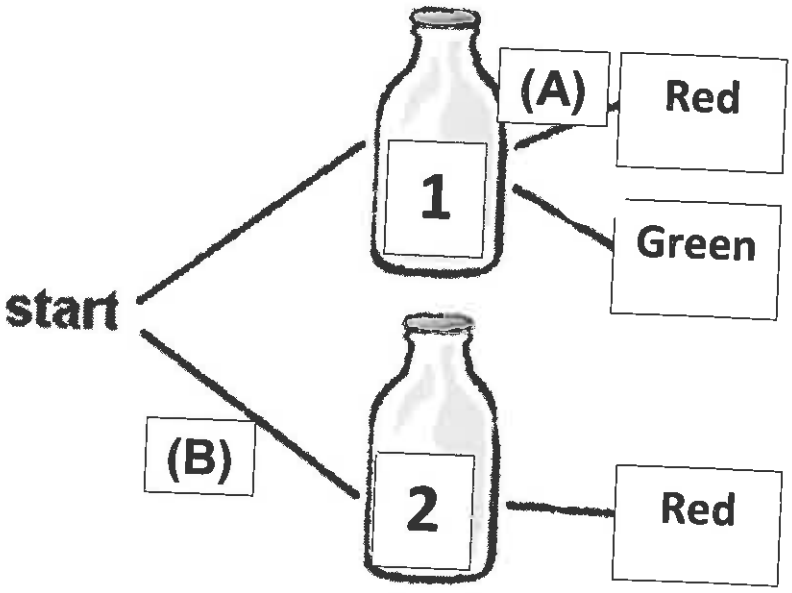
a	b	c	d	e	f	g

We also know that:

- The maximum value is 42
- The range is 35
- The median value is 23
- The difference between the median and the upper quartile is 14
- Inter-quartile range is 22
- $e = 2c$
- the mean value is 25

Refer to the following information to answer the questions 50. - 52.:

For an experiment there are two identical bottles. Bottle 1 contains 2 green balls and 1 red ball. Bottle 2 contains 2 red balls.



Refer to the following information to answer the questions 53. - 55.:

Sixty people were interviewed on their views of violence on TV and the results were recorded in the following table:

	For violence	Against violence	TOTAL
Under 25	10	20	30
Over 25	3	27	30
TOTAL	13	47	60

Refer to the following information to answer the questions 57. - 59.:

A physical fitness association is including the mile run in its high school fitness test. The time for this event for boys in high school is known to possess a normal distribution with a mean of 440 seconds and a standard deviation of 60 seconds. There is a probability that a randomly selected boy at secondary school can run the mile in less than 302 seconds.

Refer to the following information to answer the questions 60. – 62.:

The tread life of a particular brand of tire is a random variable best described by a normal distribution with a mean of 60 000 km and a standard deviation of 1 700 km.

Refer to the following information to answer the questions 70. – 74.:

The average home price in a popular metropolitan neighbourhood has been charted over the past few years as follows:

Year	Price (R)
2007	1 950 000
2008	2 092 600
2009	2 088 310
2010	2 155 090
2012	2 288 390
2014	2 267 870
2014	2 373 900

In order to formulate a trend, the following calculations were performed:

Year	Period (x)	Price (y)	xy	x^2
2007	1	1 950 000		
2008	2	2 092 600		
2009	3	2 088 310	(A)	
2010	4	2 155 090		
2012	5	2 288 390		(B)
2014	6	2 267 870		
2014	7	2 373 900		
Σ	(C)	15 216 160	62 686 960	140
Averages	(D)	2 173 737		

Refer to the following information to answer the questions 76. & 77.:

The following linear trend equation was developed for annual sales from 2005 to 2011 with 2005 being year zero:

$$\hat{Y} = 500 + 60t$$

Refer to the following information to answer question 85.:

You are given the following information on the seasonal-irregular component values for a quarterly time series:

Quarter	Seasonal-Irregular Component Values (S_tI_t)
1	1.23, 1.15, 1.16
2	.86, .89, .83
3	.77, .72, .79
4	1.20, 1.13, 1.17

FORMULAE AND NORMAL DISTRIBUTION TABLE

$$k = 1 + 3{,}3\log(n)$$

$$w = \frac{max - min}{k}$$

$$M = l + i\left(\frac{\frac{n}{2} - cf}{f}\right)$$

$$\bar{x} = \frac{\sum x}{n}$$

$$\bar{x} = \frac{\sum fx}{\sum f}$$

$$\bar{x} = \frac{\sum fx_{mid}}{\sum f}$$

$$IQR = Q_3 - Q_1$$

$$\text{SIQR} = \frac{Q_3 - Q_1}{2}$$

$$\text{SD} = \sqrt{\frac{\sum x^2}{n} - \bar{x}^2}$$

$$\text{s} = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$$

$$\text{s} = \sqrt{\frac{\sum fx_{mid}^2}{\sum f} - \bar{x}^2}$$

$$P(\bar{E}) = 1 - P(E)$$

$$P(\text{A or B}) = P(\text{A} \cup \text{B}) = P(\text{A}) + P(\text{B})$$

$$P(\text{A or B}) = P(\text{A} \cup \text{B})$$

$$= P(\text{A}) + P(\text{B}) - P(\text{A and B})$$

$$P(\text{A and B}) = P(\text{A} \cap \text{B}) = P(\text{A}) \times P(\text{B})$$

$$P(\text{A and B}) = P(\text{A} \cap \text{B}) = P(\text{B}) \times P(\text{A}|\text{B})$$

$$z = \frac{x - \mu}{\sigma}$$

$$y = a + bx$$

$$b = \frac{\sum xy - n\bar{x}\bar{y}}{\sum x^2 - n\bar{x}^2}$$

$$a = \bar{y} - b\bar{x}$$

$$r = \frac{\sum xy - n\bar{x}\bar{y}}{\sqrt{(\sum x^2 - n\bar{x}^2)(\sum y^2 - n\bar{y}^2)}}$$

$$r_{rank} = 1 - \frac{6\sum d^2}{n(n^2 - 1)}$$

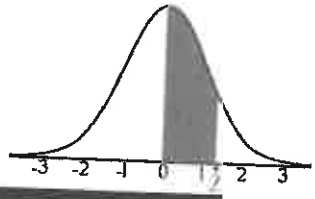
$$Y = T \times S \times C \times I$$

$$Y = T + S + C + I$$

FORMULAE AND NORMAL DISTRIBUTION TABLE

Areas under the normal distribution curve

This table provides the area under normal curve between the mean and the point z standard deviations above the mean. The corresponding area for deviations below the mean can be found by symmetry.



z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.091	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.291	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998