First Name: _____ Surname:_____
(Print neatly) (Print neatly)

Student Number: _____

YORK UNIVERSITÉ UNIVERSITY

KINESIOLOGY AND HEALTH SCIENCE

KINE 2050 3.0 Analysis of Data in Kinesiology

Quiz #1

February 16, 2011

This exam is worth 20% of the total course mark.

INSTRUCTIONS:

- Record your name and student number on the Scantron sheet provided. Ensure that your student number is correctly filled in. Failure to do so will result in a loss of 2 marks.
- Answer all questions on the Scantron sheet. Use an HB pencil. Ink or hard lead pencils will not be scored.
- If you change an answer use a high quality eraser to completely remove the previous mark.
- At the conclusion of the exam you MUST SUBMIT both the exam question sheet and the Scantron answer sheet. Failure to submit both will result in a grade of zero [0].

EXAM AIDS:

- This is a closed book exam and **NO ADDITIONAL AIDS ARE PERMITTED**. This includes formula sheets, memory aids, notes, and electronic devices like computers, cell phones, etc.
- Calculators without alphanumeric programmable memories and statistical functions may be used.
- Dictionaries are NOT permitted.

- Time allotted: - 45 minutes.

VERSION A

For questions 1 to 4 fill in the blanks using the answers listed below this question. An answer may be used more than once.

In an experiment to determine the effectiveness of a drug for lowering cholesterol, a number of variables were measured/computed for each participant in the study. When we record the age of subjects we use a [1]_____ level of measurement. By including the gender (1=male; 2=female) we have utilized [2] _____ level of measurement. Initial cholesterol levels of subjects, [which can range from 0 to 15 mml/kg], were then measured. This is an example of [3]_____ measurement. Finally, the subjects were sorted from highest to lowest levels of cholesterol which requires [4] _____ measurement.

A) Nominal
B) Ordinal
C) Interval
D) Ratio
E) Generic
F) Independent
G) Dependent

5. Statistical methods may be described as methods for drawing conclusions [or reaching decisions] as a result of _____ calculated from _____ taken from _____:

A) statistics, samples, populations
B) populations, parameters, samples
C) statistics, parameters, samples
D) parameters, statistics, populations
E) populations, statistics, samples

6. A continuous variable is:

A) one that can only assume certain numerical values
B) one that may assume any value between minimum and maximum limits
C) one that allows for qualitative classification
D) one whose values are either in a decreasing or increasing order
E) none of the above

7. If you are told the mean is 14 and the mode is 21, which of the following statements is possible?

A) median = 28 and the distribution is negatively skewed
B) median = 28 and the distribution is positively skewed
C) median = 17 and the distribution is positively skewed
D) median = 17 and the distribution is negatively skewed
E) median = 7 and the distribution is positively skewed

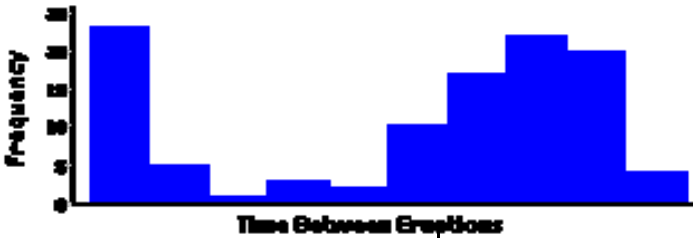
8. Last year a several Ontario universities challenged each other to a fundraising competition. Five schools raised $4,000, 3 schools raised $9,000, 4 schools raised $16,000 and 4 schools raised $20,000. How many schools raised funds less than the mean?

A) 5
B) 8
C) 12
D) 0

9. When drawing a figure to represent a frequency distribution, upon which axis are frequencies generally located?

A) X axis
B) Y Axis
C) Z axis
D) secondary Axis
E) either a or c

10. Researchers have been measuring the time between eruptions of the Kilauea volcano in Hawaii. The following distribution of the data has been graphed below. This type of distribution is considered to be:



A) Leptokurtic
B) Bimodal
C) Platykurtic
D) positively skewed
E) both a and c

11. Pam finished second, and Sue finished fourth in a flower-growing contest. Pam is:

A) twice as good at gardening as Sue
B) half as good at gardening as Sue
C) 50 percent better at gardening then Sue
D) both a) and c)
E) none of the above

12. In a unimodal and symmetrical distribution, the mean and median are _____. In a negatively skewed distribution, the mean is _____ than the median value. In a positively skewed distribution, the mean is _____ than the median value.

A) the same numerical value, a larger numerical value, a smaller numerical value
B) the same numerical value, a smaller numerical value, a larger numerical value
C) a smaller numerical value, a larger numerical value, the same numerical value
D) There is not enough information about the sample of the distribution to answer this question

13. An undergraduate class of 96 students wrote a statistics quiz. Using the data below, determine the score that falls at the 65th percentile.

Test Scores %	Frequency	Cumulative frequency
91-100	3	96
81-90	13	93
71-80	15	80
61-70	6	65
51-60	19	59
41-50	22	40
31-40	9	18
21-30	6	9
11-20	2	3
1-10	1	1

A) 66
B) 65
C) 68
D) 84
E) none of the above

14. What is the percentile for a student who scored 64 on the exam?

A) 62nd percentile
B) 64th percentile
C) 67 percentile
D) 68th percentile
E) 24th percentile

15. What is the real lower limit for the interval containing the score of 15?

A) 2.5
B) 10.5
C) 14.5
D) 20.5
E) 70.5

16. What is the size of the class interval for this distribution?

A) 1
B) 9
C) 10
D) 96

17. Jake had a z score of + 0.35 on a test with a mean of 71 and a standard deviation of 4. What was his raw score on the test?

A) 72.4
B) 73.6
C) 77.1
D) 75.3
E) None of the above values is correct.

18. [2 marks] An experiment conducted by a researcher from the Kinesiology Department at York University. A sample of 50 undergraduate students (25 men and 25 women), ran a 150 meter race and were timed in seconds. The means and standard deviations are presented below. What was the time [in seconds] required by men to be at the 80^{th} percentile?

Men $\mu = 36.6$ seconds	Women $\mu = 37.7$ seconds
$\sigma = 2.1$	$\sigma = 1.9$

A) 37.7 seconds
B) 38.4 seconds
C) 34.8 seconds
D) 35.5 seconds

19. Sally handed in her statistics homework assignment and had calculated the standard deviation for one of her answers as – 10.3. What would you conclude about this?

A) Since the standard deviation calculation requires deviance scores to be squared a negative value is not possible..
B) When calculating variance or standard deviation, the formula uses negative values and indicates the bulk of the data lies on the left side of the distribution curve.
C) There is a large spread (variability) in scores around the mean.
D) There is a large spread (variability) in scores around the median.
E) Nothing can be concluded without more statistical information.

20. In attempting to calculate the monthly income from a hair dressing salon, the accountant found the monthly median to be $6000 and the mean to be $7500. What kind of distribution is the accountant dealing with?

A) one in which the mode should be the measure of central tendency
B) positively skewed
C) negatively skewed
D) Bimodal distribution
E) none of the above are correct

21. Calculate the standard deviation using the following data:

A) -0.26
B) +0.26
C) -0.22
D) + 0.22
E) + 0.51

	raw data [x]	x^2	deviation from mean
	1.2	1.44	-0.29
	1.3	1.69	-0.19
	0.8	0.64	-0.69
	2.1	4.41	0.61
	1.7	2.89	0.21
	1.9	3.61	0.41
	2	4	0.51
	0.9	0.81	-0.59
sum	11.9	19.49	0
mean	1.4875	2.44	0.00

Answer the **next two questions** using the information given below.

A group of professional Elvis Sky Divers, [people who parachute from a plane dressed like Elvis Presley], competed in an event in Las Vegas. Each of the sky divers jumped and attempted to land as close as possible to a target on the ground. The average distance landed from the target was 5 meters. The standard deviation was calculated to be 3m.

22. What distance would a sky diver need to be at the 90^{th} percentile for accuracy? (Calculate to the closest whole number)?

A) 6 meters
B) 3 meters
C) 1 meter
D) 8 meters
E) 9 meters
F) the bulls eye

23. What proportion of the sky divers landed between 3 meters and 8 meters from the target?

A) 0.75
B) 0.25
C) 0.59
D) 0.34
E) 0.63

24. Mary has to form a team. She has to pick 2 names from a hat that contains 10 names. These two events are said to be:

A) Independent
B) Empirical
C) Random variables
D) Mutually exclusive
E) Co-joined variables

25. What is the probability of pulling out a Queen or a Jack from a well-shuffled deck of cards?

A) 0.50
B) 0.15
C) 0.30
D) 0.25
E) 0.08

26. Calculate the most appropriate measure of central tendency to describe the following scores: 2, 2, 2, 3, 4, 6, 6, 8, 995?

A) 2
B) 4
C) 114.22
D) 330.30
E) 993

27. If you add 20 more scores to your original sample, which of the following statistics must have a value at least as large for the new sample as it was for the old sample?

A) the mean
B) the mode
C) the median
D) the range
E) the standard deviation

28. **[2 marks]** A researcher obtained the typing speeds [words per minute] for 300 men and 100 women. The male group has a mean of 100 wpm and a standard deviation of 8 wpm. The female group had a mean of 84 wpm and a standard deviation of 10 wpm. How many females typed faster than the average male?

A) 2.28 women
B) 5.48 women
C) 16 women
D) 44.52 women
E) 94.52 women

Use this information for the next 2 questions. The grades of five different tutorial groups were collected and the following means and standard deviations were calculated:

Tutorial A: Mean=75.7, SD=0.01
Tutorial B: Mean= 65.3, SD=0.10
Tutorial C: Mean=95.5, SD=0.50
Tutorial D: Mean=55.2, SD=0.05
Tutorial E: Mean=44.7, SD=1.00

29. Judging from these statistics, which tutorial group is the most **homogenous** sample?

A) Tutorial A
B) Tutorial B
C) Tutorial C
D) Tutorial D
E) Tutorial E

30. Judging from these statistics, which tutorial group would have the more platykurtic curve?

A) Tutorial A
B) Tutorial B
C) Tutorial C
D) Tutorial D

The results of a dart throwing study [similar to Lab # 3 where you were trying to get close to the bulls-eye], are presented below. Answer the next questions using the information given below. The question appears on the following page.

Trial #

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
312	253	230	207	195	250	213	225	107	212	288	177
115	163	110	60	57	107	115	193	98	127	80	66
223	75	177	78	165	90	160	90	58	82	67	42
450	183	257	267	174	200	127	243	250	181	97	131
222	328	190	112	125	132	203	63	287	110	195	131
340	281	415	260	327	373	260	293	267	205	203	183
278	195	235	257	160	173	165	237	192	238	228	218
162	183	100	64	167	158	132	82	112	212	157	123
177	293	178	224	135	140	220	215	126	168	165	151
297	235	195	100	172	168	322	153	209	161	236	226
273	407	195	229	216	251	238	204	124	226	223	121

A student analyzed the data presented above using the Excel [Descriptive Statistics Analysis]. The results for the first 4 trials are presented below:

Trial 1		**Trial 2**		**Trial 3**		**Trial 4**	
Mean	259	Mean	236	Mean	207.45	Mean	168.909
Standard Error	28.1854	Standard Error	27.273	Standard Error	25.271	Standard Error	25.7426
Median	273	Median	235	Median	195	Median	207
Mode	#N/A	Mode	183	Mode	195	Mode	#N/A
Standard Deviation	93.4805	Standard Deviation	90.453	Standard Deviation	83.816	Standard Deviation	85.3785
Sample Variance	8738.6	Sample Variance	8181.8	Sample Variance	7025.1	Sample Variance	7289.49
Kurtosis	0.51811	Kurtosis	0.3804	Kurtosis	3.5884	Kurtosis	-2.0649
Skewness	0.47359	Skewness	0.1868	Skewness	1.4249	Skewness	-0.1741
Range	335	Range	332	Range	315	Range	207
Minimum	115	Minimum	75	Minimum	100	Minimum	60
Maximum	450	Maximum	407	Maximum	415	Maximum	267
Sum	2849	Sum	2596	Sum	2282	Sum	1858
Count	11	Count	11	Count	11	Count	11

31. What would be the percentile score for the subject who scored 178 on Trial #3?

A) 50^{th}
B) 64^{th}
C) 36^{th}
D) 10^{th}
E) 85^{th}

Table A: Z Scores – Areas Under the Normal Curve

	Area between mean and z									
	0	**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	0.0910	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	0.2910	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

Formula Sheet

$\bar{X} = \frac{\sum X}{n}$ location of median = $\frac{(n+1)}{2}$

Sample standard deviation: $s = \sqrt{\frac{\sum X^2 - N(\bar{X}^2)}{N-1}}$ Standard Error of Mean = $\frac{std\ deviation}{\sqrt{N}}$

Percentile Rank = $\left[\frac{\left(\frac{(x-LL)}{(i)}\right)(fw) + \Sigma fb}{N}\right]100$

? Score = $LL + \left(\frac{(P)(N) - \Sigma fb}{fw}\right)(i)$ 95% CI = $\bar{X} \pm (1.96)(SEM)$

df = N - 1

99% CI = $\bar{X} \pm (2.58)(SEM)$

$Z = \frac{X - \bar{X}}{SD}$ $SD = \sqrt{Variance}$ T-score = 10z + 50

Simple probability $p(A) = \frac{\#A}{\#O}$ Conditional Probability $p(B/A) = \frac{\#B/A\ has\ occurred}{\#O/A\ has\ occurred}$

Compound Probability

Dependent Events p(A and B) = p(A) · p(B/A)
Independent Events p(A and B) = p(A) · p(B)

Not mutually exclusive p(A or B) = p(A) + p(B) - p (A and B)

Mutually exclusive p(A or B) = p(A) + p(B)

Methods of Counting

Permutations $_{n}P_{r} = \frac{n!}{(n-r)!}$

Combinations $_{n}C_{r} = \frac{n!}{(n-r)!r!}$

Binomial Probability $_{n}C_{r}p^{r}q^{n-r} = \frac{n!}{(n-r)!r!}\ p^r q^{n-r}$

Calculations: