Worksheet 11: Statistics
## Grade 11 Mathematics

1. Give the definition of each of the following:

    a)   mean   b)   variance

    c)   histogram   d)   bar graph

    e)   ogive   f)   symmetric

    g)   skewed   h)   outlier

2. Below is a table with data for the number of people driving under the influence of drugs and alcohol (found on CrimeStats, 2013). Look at the data carefully and answer the questions that follow:

Year	Number of Crimes	Year	Number of Crimes
2004	24 886	2009	56 165
2005	29 927	2010	62 939
2006	33 116	2011	66 697
2007	38 261	2012	69 232
2008	48 405	2013	71 029

    a)   What scale would you use on the x- and y-axes?   (K)
    b)   Draw a histogram to represent the data above.   (R)
    c)   Find the average number of crimes a year and determine the standard deviation. (R)
    d)   Looking at the histogram, what would you say the general trend is and why would you say that?   (C)
   e)   Is the data skewed to the left or the right, or is it symmetrical?   (R)
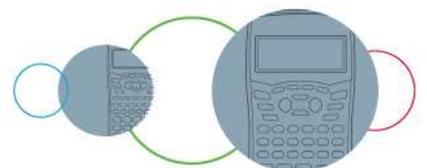
3.	Given below are the petrol prices for January 2010 to October 2010. Study them carefully then answer the questions that follow.

16 October 2010	7.96	**05 May 2010**	8.54
01 September 2010	7.92	**07 April 2010**	8.40
04 August 2010	8.02	**03 March 2010**	7.91
14 July 2010	8.12	**03 February 2010**	7.85
02 June 2010	8.27	**06 January 2010**	7.67

a)	Draw a histogram of the petrol prices given above.	(R)

b)	Determine the mean and standard deviation of the data.	(R)

c)	Is the histogram symmetric or skewed to the left or the right?	(C)

4.	Given below is a table with different African countries and the percentage of children below the age of 5 years that are underweight first measured between 1993 and 2000 and measured a second time between 2005 and 2008 taken from the data collected by the World Health Organisation.

Country	1993 - 2000	2005-2008	Difference
Angola	37%	15.6%	
Botswana	15.1%	11.2%	
Cameroon	17.8%	16.6%	
Central African Republic	20.4%	28%	
Democratic Republic of Congo	30.7%	28.2%	
Ethiopia	42%	34.6%	
Ghana	25.1%	13.9%	
Kenya	17.6%	18.4%	
Lesotho	18.9%	16.6%	
Malawi	26.5%	15.5%	
Mozambique	28.1%	18.3%	
South Africa	8.0%	8.7%	
Tanzania	19.6%	14.9%	
Zambia	26.9%	16.7%	
Zimbabwe	11.5%	14.0%	

a)	Determine the difference between the first measurement and the second measurement.	(R)
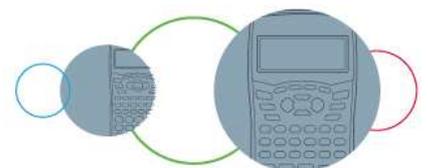
b) Draw a box and whisker plot to represent the measurements between 1993 and 2000.

(C)

c) Draw a box and whisker plot below the box and whisker plot in question b to represent the measurements between 2005 and 2008. (C)

d) Compare the two box and whisker plots. (P)

e) Are there any outliers for the data? (R)

f) Draw a box and whiskers plot for the differences between the two measurements.(C)

g) What do these box and whisker plots tell you about the nourishment of children in African countries under the age of 5? (C)

5. Test anxiety is the experience of worry and anxiety when faced with an assessment task such as a test or exam. Many psychologists believe that test anxiety affects the performance of a student. To prove this a researcher measured 20 students test anxiety (on a scale of 1 to 20) before a test and then wrote down the mark the student received as well (out of 100). These are his results:

Student	Test Anxiety Score	Mark for Exam	Student	Test Anxiety Score	Mark for Exam
1	13	49	11	18	76
2	2	86	12	14	53
3	7	57	13	6	95
4	11	48	14	7	53
5	8	62	15	6	55
6	16	35	16	9	73
7	13	98	17	17	21
8	15	27	18	15	36
9	1	77	19	10	54
10	9	54	20	9	77

a) Draw a scatter diagram to represent the data in the table. (R)

b) Are there any outliers? Can you think of a reason for this outlier? (C)

c) Is there a relationship for this data? What kind of relationship is it? (C)

d) Do you think that the researcher proved his theory? Give a reason for your answer?

(P)
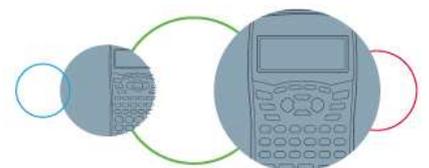
6.   The table below gives the weights of different rugby players from around the world.

Weight (in Kg)	Frequency	Cumulative Frequency
$85 \leq x < 90$	4	
$90 \leq x < 95$	6	
$95 \leq x < 100$	6	
$100 \leq x < 105$	7	
$105 \leq x < 110$	8	
$110 \leq x < 115$	11	
$115 \leq x < 120$	9	
$120 \leq x < 125$	6	
$125 \leq x < 130$	2	

a)   Complete the cumulative frequency for the data above.   (R)

b)   Draw a frequency polygon for the above data.   (R)

c)   Draw an ogive to represent the weights of the different rugby players.   (C)

d)   Find the first quartile, median and third quartile for the ogive.   (C)

e)   How many rugby players' weights are in the top 25% of the weights?   (P)

7.   Given below are the maximum temperatures for the month of September.

19°   20°   24°   25°   25°   28°   25°   26°   29°   27°   28°

26°   27°   30°   30°   31°   29°   30°   30°   29°   21°   22°

25°   31°   32°   32°   29°   27°   26°   20°

a)   Find the mean, median and mode for the data.   (R)

b)   Find the standard deviation for the data.   (R)

c)   Create a frequency table with a column for cumulative frequency and fill it in using the data for September. Use an interval of 2° for each group.   (R)

d)   Draw a cumulative frequency curve for the temperatures.   (C)

e)   Find the first and third quartile and indicate them on the graph using labels A and B respectively.   (C)

f)   Give the range for the middle 50% of the data.   (P)