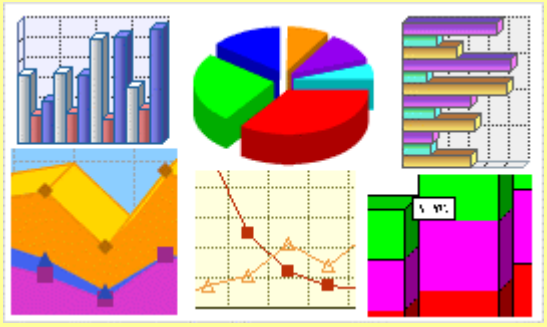
NQF Level: 2 **US No: 9009**

Assessment Guide

Primary Agriculture

The use of statistics & probability to investigate life related problems



Assessor: . . . . . .

Workplace / Company: . . . . . .

Commodity: . . . . . Date: . . . . . .

The availability of this product is due to the financial support of the National Department of Agriculture and the AgriSETA.

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Department:
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AgriSETA

Before we start...

This assessment guide contains all necessary activities and instructions that will enable the assessor and learner to gather evidence of the learner's competence as required by the unit standard. This guide was designed to be used by a trained and accredited assessor whom is registered to assess this specific unit standard as per the requirements of the AgriSETA ETQA.

Prior to the delivery of the program the facilitator and assessor must familiarise themselves with content of this guide, as well as the content of the relevant Learner Guide.

Please Note:

This Unit Standard **9009** Assessment Guide must be read in conjunction with the generic Assessor Guide as prescribed and published by the AgriSETA.

The assessor, facilitator and learner must plan the assessment process together, in order to offer the learner the maximum support, and the opportunity to reflect competence.

The policies and procedures that are required during the application of this assessment are available on the website of the AgriSETA and should be strictly adhered to. The assessor must familiarise him/herself with this document before proceeding.

This guide provides step-by-step instructions for the assessment process of:

Title:	**Apply basic knowledge of statistics and probability to influence the use of data and procedures in order to investigate life related problems**				
US No:	**9009**	**NQF Level:**	2	**Credits:**	3

T

This unit standard is one of the building blocks in the qualification listed below. Please mark the qualification you are currently assessing, because that will be determined by the context of application:

Title	ID Number	NQF Level	Credits	Mark
National Certificate in Animal Production	48976	2	120	❒
National Certificate in Mixed Farming Systems	48977	2	120	❒
National Certificate in Plant Production	48975	2	120	❒

Please mark the learning program you are enrolled in:

Are you enrolled in a:	Y	N
Learnership?	❒	❒
Skills Program?	❒	❒
Short Course?	❒	❒

Note to Assessor:

If you are assessing this module as part of a full qualification or learnership, please ensure that you have familiarized yourself with the content of the qualification.

Activity Answers

1

SO 1

Instructions to learner:

Please answer each question, writing neatly and clearly so that your answers can be clearly understood

Learner Guide: Page 22 **Facilitator Guide: Page 11**

1. The weather Bureau collected data from 25 weather stations in the Free State area concerning the number of hours of bright sunshine during January and June 2005.

Hours of bright sunshine January 2005					
211	221	193	182	210	227
214	207	205	206	194	207
217	171	225	181	189	192
209	209	175	169	189	203
206					

Hours of bright sunshine June 2005					
152	142	132	164	152	105
115	105	121	126	171	121
117	136	104	121	126	126
119	142	135	148	139	147
131					

a) Draw up a frequency table (tally format) for both January and June. Use the class intervals 100 – 109, 110-119 etc

Model Answer(s):

January		
class	**tally**	**frequency**
160 – 169	I	1
170 – 179	II	2
180 – 189	IIII	4
190 – 199	III	3
200 – 209	~~IIII~~ III	8
210 – 219	IIII	4
220 – 229	III	3
Total		**25**

June		
class	**tally**	**frequency**
100 - 109	III	3
110 - 119	III	3
120 – 129	~~IIII~~ I	6
130 – 139	~~IIII~~	5
140 – 149	IIII	4
150 – 159	II	2
160 – 169	I	1
170 – 179	I	1
Total		**25**

b) What is the modal class for January?

Model Answer(s):

200 – 209 hours

c) What is the modal class for June

Model Answer(s):

120 – 129 hours

d) What can you conclude if you compare the two modal classes calculated above?

Model Answer(s):

There are more hours of sunshine in January than June

e) Calculate the mean for both January and June.

Model Answer(s):

January: 5012/25 = 200,48
June: 3297/25 = 131,88

f) Calculate the range for both January and June.

Model Answer(s):

January: 225 – 169 = 56
June: 171 – 104 = 67

g) What conclusion can you reach if you compare the ranges calculated in f)? Is your conclusion the same as the conclusion that you reached in d)?

Model Answer(s):

Hours of sunlight vary more in June than in January. This is not the same conclusion you reach if you look at modal classes.

2. A farmer kept count of the number of litres of milk his cows produced per day.

35, 47, 34, 46, 62, 41, 35, 47, 51, 56, 73, 38, 41, 44, 51, 45, 74

a) Determine suitable class intervals.

Model Answer(s):

30-39; 40-49; etc

b) Construct a stem-and-leaf diagram to show the data.

Model Answer(s):

3	4 5 5 8	4
4	1 1 4 5 6 7 7 7	7
5	1 1 2 6	3
6	2	1
7	3 4	2
Total		**19**

c) Determine the modal class of your distribution

Model Answer(s):

40 – 49 l

d) On how many days were less than 40l of milk produced?

Model Answer(s):

4 days

e) Rewrite the numbers in ascending (from smallest to biggest) and determine the median value.

Model Answer(s):

34, 35, 35, 38, 41, 41, 44, 45, 46, 47, 47, 47, 51, 51, 52, 56, 62, 73, 74,

47 l

f) Give a reasonable explanation why the amount of milk produced varied so much from day to day.

Model Answer(s):

Any reasonable explanation is acceptable.

Activity Answers

2

SO 1

Instructions to learner:

Please answer each question, writing neatly and clearly so that your answers can be clearly understood

Learner Guide: Page 25 **Facilitator Guide: Page 11**

1. In a Mathematics examination 40 learners scored the following marks in percentages (%):

61	43	92	78	94	66	63	59	29	82
39	68	89	95	96	45	48	49	35	54
69	84	83	85	74	73	83	59	74	72
85	36	25	63	63	83	40	54	67	84

a) Draw up and complete a frequency table.

Model Answer(s):

Percentage	Tally	frequency
20 – 29	II	2
30 – 39	III	3
40 – 49	~~IIII~~	5
50 – 59	IIII	4
60 – 69	~~IIII~~ III	8
70 – 79	~~IIII~~	5
80 – 89	~~IIII~~ IIII	9
90 – 99	IIII	4
Total		**40**

b) How many learners obtained more than 80%?

Model Answer(s):

13

c) 60% is the accepted competency pass mark. How many learners are not yet competent?

Model Answer(s):

14

d) Show the data on a stem-and-leaf table. Answer the following questions:

Model Answer(s):

2	5 9	2
3	5 6 9	3
4	0 3 5 8 9	5
5	4 4 9 9	4
6	1 3 3 3 6 7 8 9	8
7	2 3 4 4 8	5
8	2 3 3 3 4 4 5 5 9	9
9	2 4 5 6	4
Total		**40**

- What is the median of the group?

Model Answer(s):

63

- What is the mode of the group?

Model Answer(s):

63 and 83%

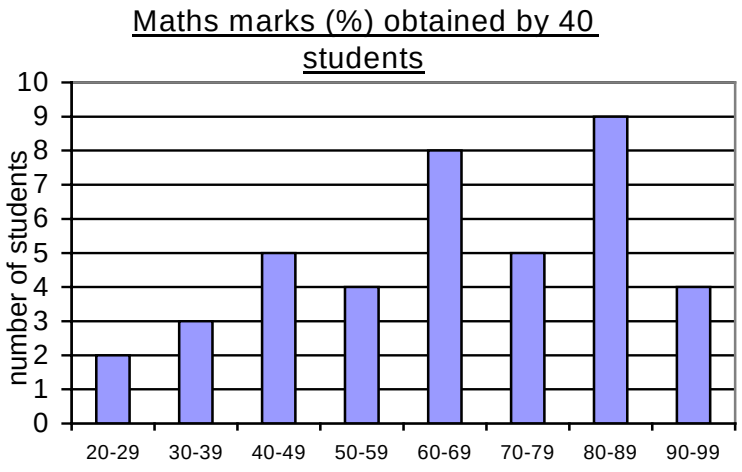
- What is the group average for mathematics?

Model Answer(s):

2641/40 = 66,03%

e) Draw a histogram using the frequency table.

Model Answer(s):



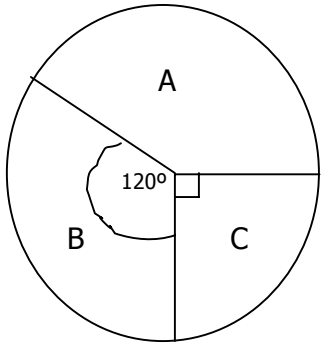
Note: there should be no gaps between the bars.

2. In an election there were three candidates: A, B and C. The number of votes cast for each candidate is represented in the pie chart below. Candidate A got 1170 votes.

a. How many votes did candidate B get?
A = 150^0 = 1170 votes
B = 120^0
B = $^{1170}/_{150}$ x 120 = 936 votes

b. How many people voted altogether?
C = 90^0
C = $^{1170}/_{150}$ x 90 = 702
Total votes = 1170 + 936 + 702
= 2808 votes

c. What percentage of the votes went to candidate C?
C = $^{90}/_{360}$ x $^{100}/_{1}$ = 25%



3. There are 52 playing cards in a pack of cards. What is the probability that the first card to be drawn is .....

a. a queen

Model Answer(s):
$^4/_{52} = {}^1/_{13}$

b. an Ace

Model Answer(s):
$^4/_{52} = {}^1/_{13}$

c. a heart

Model Answer(s):
$^{13}/_{52} = {}^1/_4$

d. the king of clubs

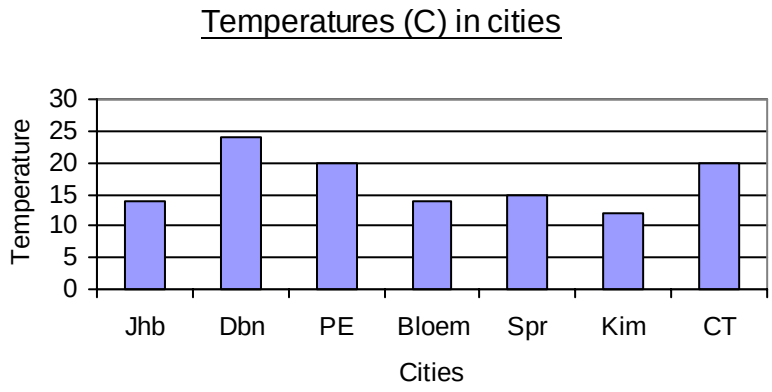
Model Answer(s):
$^1/_{52}$

4. A tour operator is given the following temperatures, in degrees Celsius, of the following places in South Africa, in the middle of winter:

Johannesburg	= 14
Durban	= 24
Port Elizabeth	= 20
Bloemfontein	= 14
Springbok	= 15
Kimberley	= 12
Cape Town	= 20

a. Draw a bar graph to represent this data.

Model Answer(s):



b. What is the range of this data?

Model Answer(s):

What is the range of this data? 24 – 12 = 12 C^0

c. What is the median temperature?

Model Answer(s):

15 C^0

d. What is the mean temperature?

Model Answer(s):

119/7 = 17C^0

Activity Answers

3

SO 2

Instructions to learner:

Please answer each question, writing neatly and clearly so that your answers can be clearly understood

Learner Guide: Page 36 **Facilitator Guide: Page 12**

1. The pictograph below shows the number of hours of sunshine per month in 1998 from January to June in Cape Town.

Jan	✷	✷	✷	✷	✷	✷	✷	✷	✷	✷	✷
Feb	✷	✷	✷	✷	✷	✷	✷	✷	✷	✷	✷
March	✷	✷	✷	✷	✷	✷	✷	✷	✷		
April	✷	✷	✷	✷	✷	✷	✷				
May	✷	✷	✷	✷	✷	✷					
June	✷	✷	✷	✷	✷	✷					

✷ = 1 Hr

a) Which month had the most hours of sunshine?

Model Answer(s):
January and February

b) Which month had the least hours of sunshine?

Model Answer(s):
May and June

c) Which month had 9 hours of sunshine?

Model Answer(s):
March

d) How many hours of sunshine did May have?

Model Answer(s):
6 hours per day

e) How many hours of sunshine did June have?

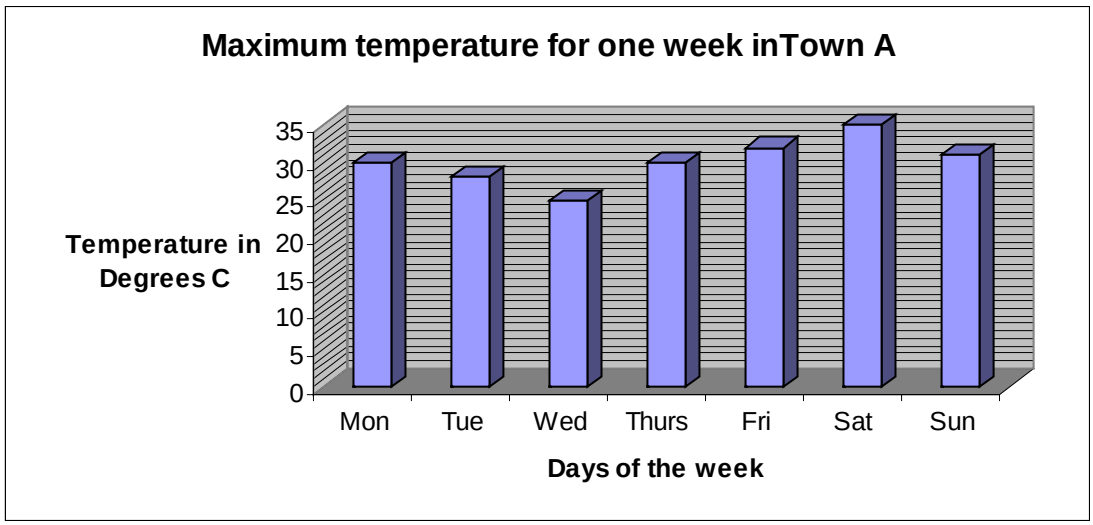
Model Answer(s):
6 hours per day

f) How many hours of sunshine were there altogether in the whole period January to June?

Model Answer(s):

January: 11x31 = 341
Feb: 11x28 = 308
March 9x31=279
April 7 x 30 = 210
May 6x31 = 186
June 6x30 = 180
Total 1504 hours

2. In this bar graph the highest daily temperature for one week in a town is shown.



a) Which was the hottest day of the week?

Model Answer(s):

Saturday

b) Which was the coolest day of the week?

Model Answer(s):

Wednesday

c) What was the temperature on Friday?

Model Answer(s):

32C^0

d) On which day was the temperature 29ºC?

Model Answer(s):

Monday & Thursday

e) On which day was the temperature 31ºC?

Model Answer(s):

Friday

f) What was the average temperature for the week shown?

Model Answer(s):

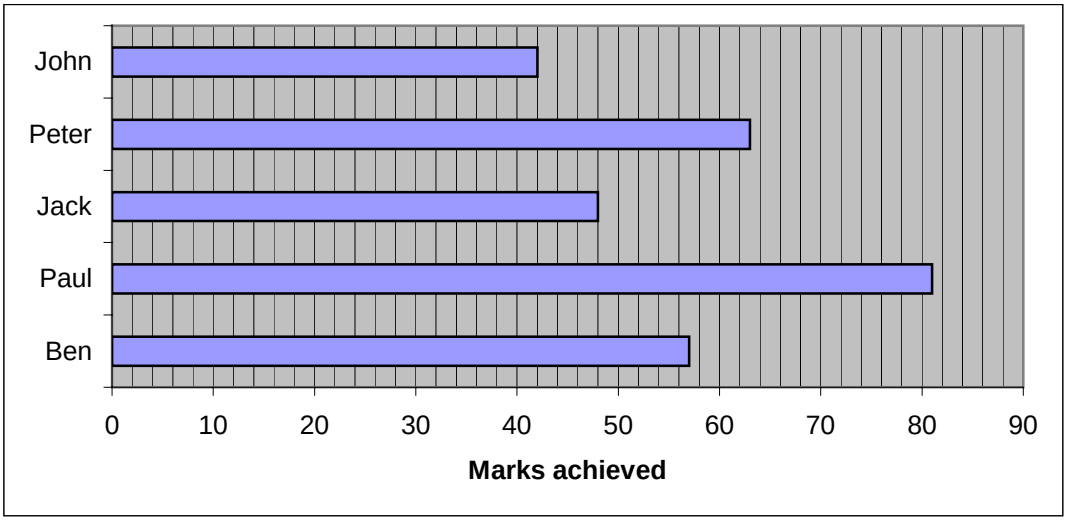
204/7 = 29,14C^0

g) Is this the correct type of graph? Justify your answer.

Model Answer(s):

It should be a histogram or a line graph as time is continuous

3. This graph shows the number of baskets of tea leaves harvested in one week by various workers.



a) Who harvested the most tea?

Model Answer(s):

Paul

b) Who harvested the least tea?

Model Answer(s):

John

c) How many baskets full did Paul harvest?

Model Answer(s):

81

d) How many baskets full did peter harvest?

Model Answer(s):

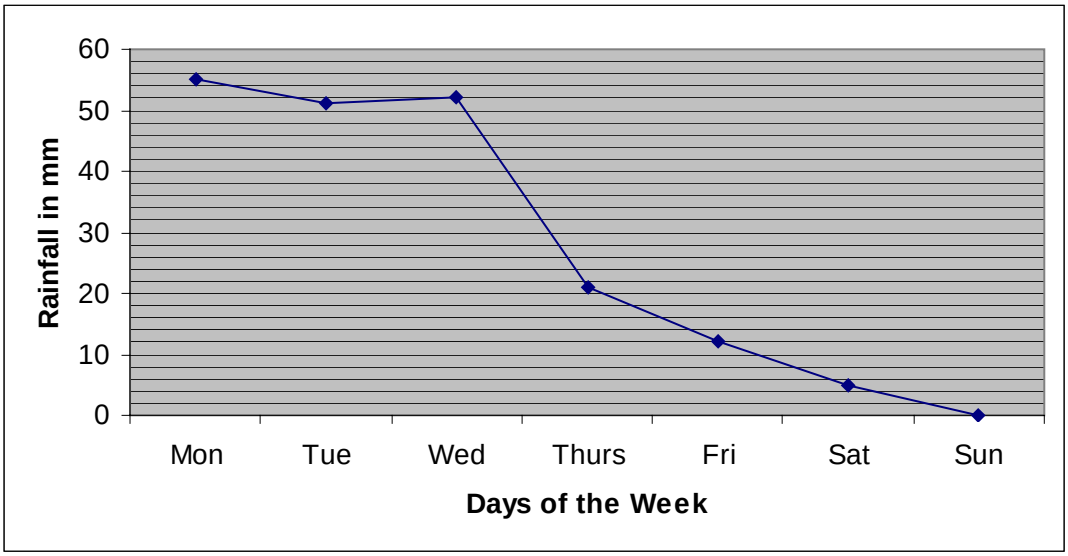
63

e) Those who harvested less than 50 baskets got less pay. Who were they?

Model Answer(s):

John and Jack

4. The graph underneath shows the amount of rainfall in a certain area from Monday to Saturday.



a) Which day had the most rainfall?

Model Answer(s):

Monday

b) Which day had the least rainfall?

Model Answer(s):

Sunday

c) How much rainfall fell on Thursday?

Model Answer(s):

21mm

d) Which day had 52 mm of rainfall?

Model Answer(s):

Wednesday

e) What was the average rainfall for the 6 days?

Model Answer(s):

Monday:	55mm
Tuesday:	51mm
Wednesday:	52mm
Thursday:	21mm
Friday:	12mm
Saturday:	5mm
Sunday:	0 mm
Total:	184mm

Average = 184mm/7 = 26,29mm

5. The following stem-and-leaf diagram shows the total number of points scored in a series of basketball games.

160	2
170	1
180	2, 7
190	5, 7, 2
200	9, 4, 8, 0
210	5, 9, 7, 0, 3, 3
220	4, 9

a) How many scores of 170 were registered?

Model Answer(s):

none

b) How many scores of 213 were registered?

Model Answer(s):

two

c) What was the lowest score?

Model Answer(s):

162

d) What was the highest score?

Model Answer(s):

229

e) What were the common most scores?

Model Answer(s):

213

f) Were most scores above or below 200?

Model Answer(s):

above

Summative Test and Attitude & Attribute Evaluation

Before the knowledge test is undertaken, the learner must be reminded of what is expected from him / her in terms of summative and reflexive competence. Read and explain to the learner, the **Preparation for Your Final Assessment** section in the Learner Guide. Learners and assessor should sign off this section to acknowledge that this step was completed.

The following assessment will contribute to the necessary assessment criteria being met on all the outcomes specified in this unit standard Please set up a knowledge test from the questions given as a guideline to learners and supply each learner with a test sheet.

Supply each report with the following heading:

Unit Standard:	Apply basic knowledge of statistics and probability to influence the use of data and procedures in order to investigate life related problems	**NQF Level:**	2
Learner Name:			

- ✓ You are to answer each question.
- ✓ Please write neatly and clearly so that your answers can be clearly understood

Question 1: A farmer wants to see how well his sheep do on different feeds. Before he starts his experiment, he determines the mass of his sheep. The results are shown in the table below in kilograms:

65	72	54	58	67	92	74	77	83	68	73	81
70	95	56	74	85	66	93	60	78	60	82	77
76	85	59	71	60							

a) Construct a frequency table to show these data.

Mass class	Tally	Frequency
50-54	I	1
55-59	III	3
60-64	III	3
65-69	IIII	4
70-74	~~IIII~~ I	6
75-79	IIII	4
80-84	III	3
85-90	II	2
90-94	II	1
95-100	I	1
total		29

b) What was the mass of the lightest sheep? *54kg*
a) What was the mass of the heaviest sheep? *95kg*
b) Comment on the distribution of masses. *There are very few sheep below 54 kg and very few that have a mass of more than 90 kg. The most common mass is between 70 and 74 kg.*
c) Construct a stem-and-leaf plot and calculate the following

5	4 6 8 9	4
6	0 0 0 5 6 7 8	6
7	0 1 2 3 4 4 6 7 7 8	10
8	1 2 3 5 5	5
9	2 3 5	3
Total		29

d) The median. *73kg*
e) The mode. *60kg*
f) The mean (average) mass. Total score/no of sheep = *2111/29 = 72,79kg*

(18)

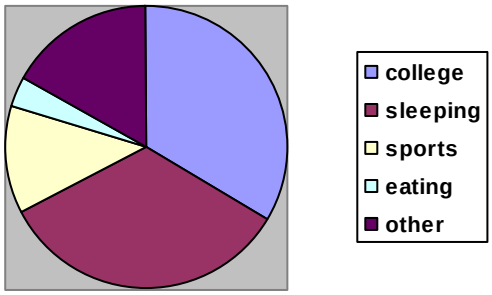
Question 2: This table shows how an agriculture student spends his day.

Activity	College	Sleeping	Sports	Eating	Other
No. of hours	8	8	3	1	4

a. Start by working out the fractions and then change it to degrees.

Activity	College	Sleeping	Sports	Eating	Other	Total
No. of hours	8	8	3	1	4	24
Fraction	$^{8}/_{24}$	$^{8}/_{24}$	$^{3}/_{24}$	$^{1}/_{24}$	$^{4}/_{24}$	$^{24}/_{24}$
Degrees	120	120	45	15	60	360

b. Show the information on a pie chart.

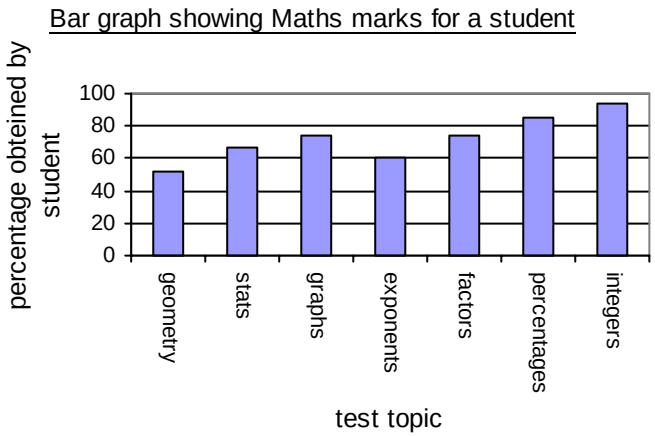


(15)

Question 3: The following table shows a student's Mathematics Test results.

	Geometry	Statistics	Graphs	Exponents	Factorization	Percentages	Integers
Test no.	1	2	3	4	5	6	7
% obtained	52	67	74	60	74	85	94

a) Show this data on a bar graph.



b) What is the mean? 506/7 = 72.28%
c) Which tests were above average? Graphs, factorisation, percentages, integers

(9)

Question 4: When you throw a dice, what is the probability to throw a:

a) Six.

$$\text{Probability (P)} = \frac{number\ of\ successful\ outcomes}{total\ number\ of\ possible\ outcomes} = {}^{1}/_{6}$$

b) Four ${}^{1}/_{6}$
c) And even number. ${}^{3}/_{6} = {}^{1}/_{2}$
d) A number larger than 4. ${}^{2}/_{6} = {}^{1}/_{3}$

(8)

TOTAL: [50]

2. Project on Crime – Interpreting Crime Statistics.

Examine the following table taken from the South African Police Service (SAPS) Crime Information Analysis Centre 2001.

Crime	East Cape	Free State	Gauteng	KZN	Mphumu langa	North West	North Cape	Lim popo	West Cape	S. Africa
Murder	7376	2469	13219	13801	2815	3356	1069	2477	7639	54293
Robbery	13149	5079	63257	28894	6465	8979				
Rape	6514	3469	11808	8525	3034	4461	1438	3800	6204	49280
Assault	66563	37259	88143	53339	25749	36282	21646	35464	68964	433369
Burglary	39702	23805	96939	61379	24707	23615	8765	19070	62919	360919
Theft	79521	48718	230297	128540	47229	46444	17604	32905	132225	736573
Drugs	8469	4377	13009	13613	3549	3296	2158	2155	14810	65436
Car Hijacking	744	160	9123	3143	678	566	18	190	399	15111
TOTAL	222 038	125 390	525 885	311 261	114 262	126 999	54 711	101 538	310 327	1 892 411

Use the information gained above to answer the following questions:

1. Which province has the highest crime? *Gauteng*
2. In which province was drug related crimes the highest? *Western Cape*
3. How many cases of the following were reported in 2001?
    1. Car hijacking *15111*

2. Rape *49280*
3. Murder *54293*

4. Which province has the highest number of rapes in 2001? *Gauteng*
5. Which province has the lowest crime statistics? *Northern cape*
6. Why do you think that crime is so low in this province? *It is the least densely populated*

3. Project – Home language within population groups.

Home language within population groups					
Home Language	African Black	Coloured	Indian	White	Total
Afrikaans	0.7%	79.5%	1.7%	59.1%	13.3%
English	0.5%	18.9%	93.3%	93.3%	8.2%
IsiNdebele	2.0%	0.0%	0.3%	0.1%	1.6%
IsiXhosa	22.3%	0.3%	0.1%	0.1%	17.6%
IsiZulu	31.1%	0.3%	0.2%	0.1%	23.8%
Sepedi	11.9%	0.1%	0.0%	0.0%	9.4%
Sesotho	10.0%	0.2%	0.0%	0.0%	7.9%
Setswana	10.3%	0.4%	0.0%	0.1%	8.2%
SiSwati	3.4%	0.1%	0.0%	0.0%	2.7%
Tshivenda	2.9%	0.0%	0.0%	0.0%	2.3%
Xitsonga	5.6%	0.0%	0.0%	0.0%	0.5%
Other	0.3%	0.2%	3.8%	1.1%	0.5%

Use the information gained above to answer the following questions:

a) Which language is the most spoken in South Africa? *IsiZulu*
b) Which language is the least spoken? *Xitsonga*
c) Which population group speak the most languages? *African black*
d) Which population group speak the least languages? *Indian*
e) In the category 'others', can you think of any languages that will fall in this category? *Chinese, German, French, Portuguese, Greek etc*
f) How do you feel the vast number of languages that we have in our country can disadvantage people in the workplace?
   People may not be able to communicate with each other effectively
   Not everyone would be able to understand written communication equally well
   Instructions could be misunderstood
   Any reasonable other explanation

Assessment Feedback Form

Comments / Remarks	
Feedback to learner on assessment and / or overall recommendations and action plan for competence:	
Feedback from learner to assessor:	
Assessment Judgement You have been found: ❍ Competent ❍ Not yet competent in this unit standard	Actions to follow: ❍ Assessor report to ETQA ❍ Learner results and attendance certification issued
Learner's Signature:	**Date:**
Assessor's Signature:	**Date:**
Moderator's Signature:	**Date:**