SENIOR SECONDARY IMPROVEMENT PROGRAMME 2013

education
Department: Education
GAUTENG PROVINCE

GRADE 12

MATHEMATICAL LITERACY

TEACHER NOTES

The SSIP is supported by

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TEACHER NOTES

SESSION 1: TOPIC: MEAN, MEDIAN, MODE, RANGE, QUARTILES AND PERCENTILES

Teacher Note: Make sure learners know and understand how (a) data is collected (b) how to work with mean, median, mode, range, quartiles and percentiles.

LESSON OVERVIEW

1. Introduce session: 5 minutes
2. Typical exam questions: 55 minutes
3. Review/solutions/memo: 30 minutes

SECTION A: TYPICAL EXAM QUESTIONS

QUESTION 1: 16 minutes *(Taken from DoE Exemplar 2008)*

Mrs Long is the high-jump coach at Roseland High School. She records the heights jumped by the five boys in the high-jump team.

1.1. Lerato is one of the members of the team. The following are the heights, in metres, of his last 12 jumps:

1,70; 1,68; 1,78; 1,90; 1,74; 1,85; 1,81; 1,95; 1,98; 2,00; 2,02; 1,80

Determine the following:

1.1.1. The median height jumped by Lerato during his last 12 jumps (4)

1.1.2. The height that is his lower quartile (Q1) (2)

1.1.3. The height that is his upper quartile (Q3) (2)

1.1.4. His Interquartile range (IQR), *in centimetres*, using the formula: (2)

Interquartile Range = Upper Quartile – Lower Quartile
OR IQR = Q3 – Q1.

1.2. The athletes in the high-jump team were told that if their 75th percentile was at 1,95 m or higher, they would qualify to take part in the inter-high competition.

1.2.1. Which of the heights jumped by Lerato is at his 75th percentile? (4)

1.2.2. The 75th percentiles for the other four members of the team were as follows:

Charles	1,94 m	Lebo	1,80 m
Mohamed	1,95 m	Siyabonga	2,00 m

Which of the five athletes did NOT qualify to take part in the inter-high competition? Give a reason for your answer. (2)

[16]

HINTS:

- When dealing with data handling order the list of items first.
- When finding the median for an even number of data items in a set, remember to find the average of the middle two items in the ordered list (i.e. add the middle two items and divide the answer by 2)

QUESTION 2: 26 minutes

A school counsellor conducted a survey among a group of high school students using the following survey slip:

Survey (please circle the correct option)

Gender	Male	Female	
Age	13-14	15-16	17-18

How much pressure do you feel to achieve at school?			
None	A little	A lot	An unbearable amount

2.1. The counsellor has summarised the data from all of the completed survey forms in the table below. Use this summary to answer the questions that follow:

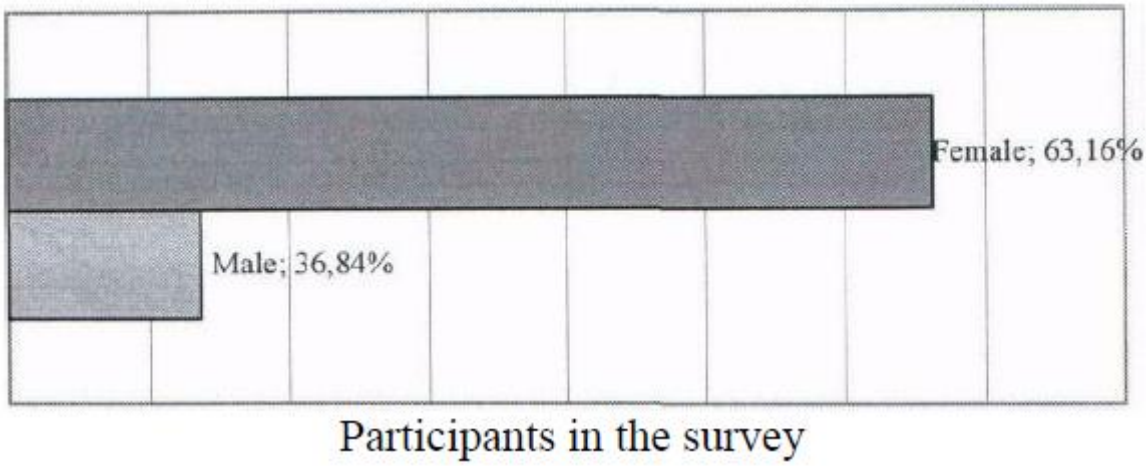
	Male			Female		
	13-14	15-16	17-18	13-14	15-16	17-18
None	4	1	-	5	4	4
A little	9	4	3	7	4	6
A lot	1	3	1	3	6	8
An unbearable amount	3	4	2	2	4	7

How many males and how many females participated in the survey? (2)

2.2. The counsellor wrote in his report: "more than two out of every five teenagers feel either a lot or an unbearable amount of pressure to achieve at school". Show how the counsellor could have come to this conclusion. (3)

2.3. Do boys and girls experience this pressure equally or differently? Justify your answer using the information in the table? (3)

2.4. The counselor illustrated his report with the following graph:



Participants in the survey

i) What impression does the graph create about the number of male and female participants? (2)

ii) Is this impression correct? Justify your response, (3)

iii) What has the counselor done in developing the graph to create that impression? (2)

2.5. The counsellor has summarised the data in a different way in the table below:

	Male			Female		
	13-14	15-16	17-18	13-14	15-16	17-18
None A little	65%	42%	(a)	71%	44%	40%
A lot An unbearable amount	35%	58%	(b)	29%	56%	60%

i) By referring to the earlier table show that the values of a and b are both 50%. (3)

ii) By comparing the responses for the females according to age describe the trend in the data by rewriting the sentence, making the best choices from the words in brackets: "(Older/younger) girls are more likely to experience a lot or an unbearable amount of pressure than (older/younger) girls". Substantiate your claim. (4)

iii) What type of graph would you choose to illustrate the observation described in (ii)? Why would this type of graph illustrate the point most effectively? (4)

[26]

SECTION B: SOLUTIONS AND HINTS TO SECTION A

Teacher Note: Learners must understand where the data comes from and how it is collected before summarising of data can be tackled. Be sure that you emphasise the impact of bias when data is collected, as this will affect interpretation and provide skewed results

QUESTION 1: 16 minutes *(Taken from DoE Exemplar 2008)*

1.1. Ordered data:

1,68 1,70 1,74 1,78 1,80 1,81 1,85 1,90 1,95 1,98 2,00 2,02 ✓✓ ordering

1.1.1. Median = $\frac{1{,}81+1{,}85}{2}$ ✓= 1,83✓ (4)

1.1.2. Lower Quartile = $\frac{1{,}74+1{,}78}{2}$ ✓ = 1,76 ✓ (2)

1.1.3. Upper Quartile = $\frac{1{,}95+1{,}98}{2}$ ✓ = 1,965 ✓ (2)

1.1.4. IQR = 1,965 – 1,76 ✓ = 0,205 ✓ (2)

1.2. Percentile

1.2.1. 75th percentile ✓ = Q_3 ✓ = 1,965 ✓✓ (4)

1.2.2. Charles and Lebo did not qualify. ✓ Their 75th percentile is less than 1,95m ✓ (2)

[16]

QUESTION 2: 26 minutes

2.1. Males 35 ✓Females 60✓ (2)

2.2. $\frac{44}{95}$ ✓ = 0,46 ✓. More than $\frac{4}{10}$ thus more than $\frac{2}{5}$ ✓ (3)

2.3. Very different ✓. Boys don't seem to feel much pressure but girls do especially in the higher grades ✓.
In 17 – 18 age group 3 boys are stressing compared to 15 boys ✓ (3)

2.4. (i) Big difference ✓✓ (2)

(ii) Scale is not correct ✓✓ . Boys have been halved ✓ (3)

(iii) Drawing of scale lines in background emphasises the difference. ✓✓ (2)

2.5. (i) 0+3 = 3 1+2 = 3 ✓ $\frac{3}{6}$ = 50% ✓ so a = b = 50% ✓ (3)

(ii) Older than younger. ✓
29% stress at 13-14 yrs ✓,56% at 15-16 yrs ✓ and the 60% stress at 17-18yrs ✓(4)

(iii) Own opinion – must justify ✓✓✓✓ (4)
e.g., I would choose the line graph ✓✓ so that we can clearly see the steep gradient.✓✓

[26]

SECTION C: HOMEWORK

QUESTION 1: 22 minutes (*Taken from Hilton College Trial Examination Aug 2008)*

1.2. Describe what is meant by the following: "the student taking the test scored in the 75th percentile". (2)

1.3. Test results for a particular test are summarised in the table below.

Test Scores	Frequency
66 – 70	4
71 – 75	3
76 – 80	2
81 – 85	6
86 – 90	3
91 – 95	2

In which quartile would a person with a test score of 88 fall? (2)

1.4. Body Mass Index (BMI) is a number calculated from a person's mass and height. BMI number is plotted on the CDC BMI-for-age growth charts (for either male or female) to obtain a percentile ranking. BMI-for-age weight status categories and the corresponding percentiles are shown in the following table.

Weight Status Category	Percentile Range
Underweight	Less than the 5th percentile
Healthy weight	5th percentile to less than the 85th percentile
At risk of overweight	85th percentile to less than the 95th percentile
Overweight	Equal to or greater than the 95th percentile

2 to 20 years: Boys
Body mass index-for-age percentiles

i) At what percentile would an 8 year old with a BMI of 17 be? (2)

ii) What is the BMI of a 5 year old boy if his BMI places him at the 90th percentile? (2)

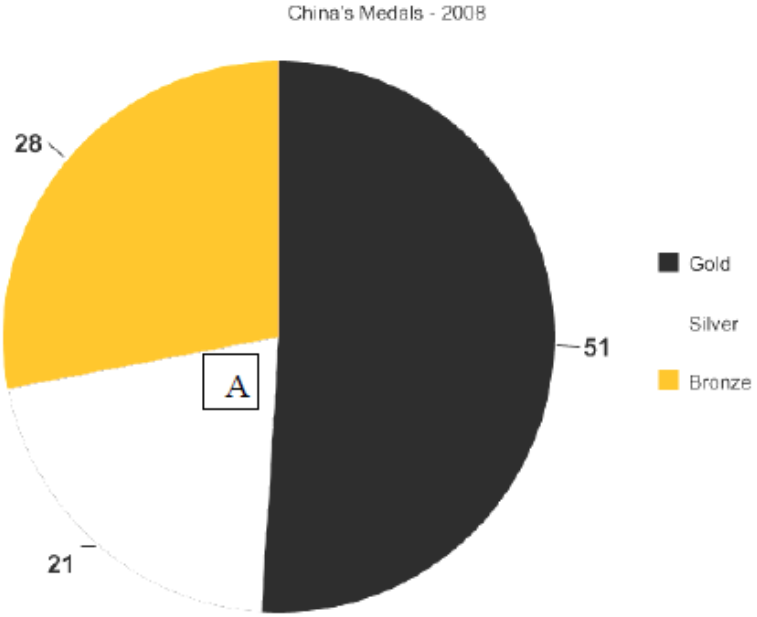
iii) Within what range can a 10 year old boy's BMI be if his weight is considered to be healthy? (4)

1.4. BMI is calculated using the formula: $\frac{\text{mass in kg}}{(\text{height in m})^2}$

i) What is the weight status of an 18 year old boy who is 1,86m tall and weighs 90kg? (5)

ii) How heavy would a 16 year old boy be if he is 1,65m tall and his BMI is at the 50th percentile? (5)

QUESTION 2: 7 minutes (*Taken from Hilton College Trial Examination Aug 2008)*



2.1. How many gold medals did China win? (1)

2.2. What percentage of the medals China won, were bronze? (3)

2.3. Determine the size of ∠A.(the angle for the silver medals) (3)

[7]

SECTION D: SOLUTIONS TO HOMEWORK

QUESTION 1

1.1. This means that 75% of the class scored a lower mark than he did ✓ and 25% of the class scored a mark higher than he did. ✓ (2)

1.2. Total number of participants = 20.
Each quartile has 14 of 20 = 5 participants.✓
∴ 88 falls in the fourth quartile. ✓ (2)

1.3. (i) 75th percentile ✓✓ (2) **(ii)**17,2 ✓✓ (2) **(iii**) 13,2 < ✓✓ BMI < 19,4 ✓✓ (4) (8)

1.4. (i) BMI = 301.2² ✓ = 20,8 ✓✓
Falls above the 95 percentile ✓ and is therefore overweight. ✓ (5)

(ii) BMI = 20,6 ✓

$$20,6 = \frac{w}{(1,65\ m)^2}\ \checkmark$$

20,6 × 1,65² = w ✓
W = 56 kg ✓✓ (5)

[22]

QUESTION 2

2.1. 51 ✓ (1)

2.2. 28 ÷ 100 ✓ = 28% ✓✓ (3)

2.3. 21 ÷ 100 ✓ × 360 ✓ = 75,6^{o} ✓ (3)

[7]

SESSION 2 SELF STUDY: TOPIC 1: COMPARE, SUMMARISE AND DISPLAY DATA – DESCRIBE TRENDS.

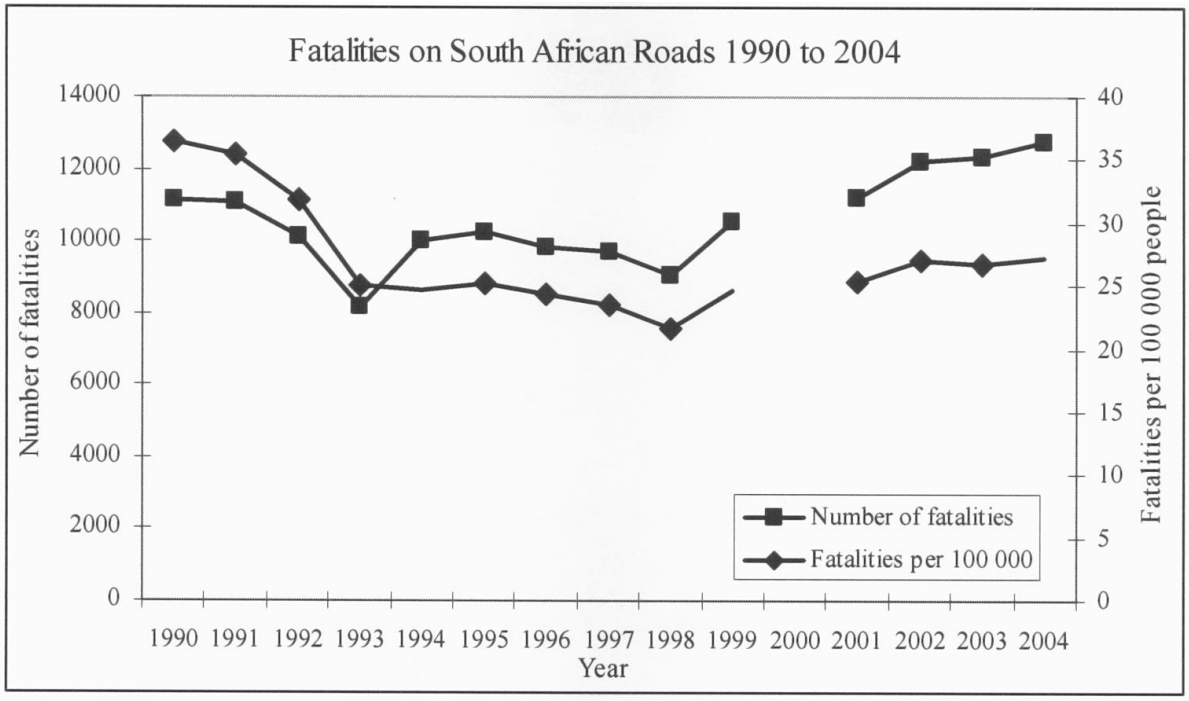
Teacher Note: Ensure that learners:

a) are able to draw and interpret line and broken line graphs, histograms, bar graphs (multiple/compound bar graphs) and pie charts.
b) know, understand and are able to use tally and frequency tables.
c) know and understand the differences between continuous and discrete data and how to display each.
d) know how to use the five-point summary to analyse two or more sets of data.

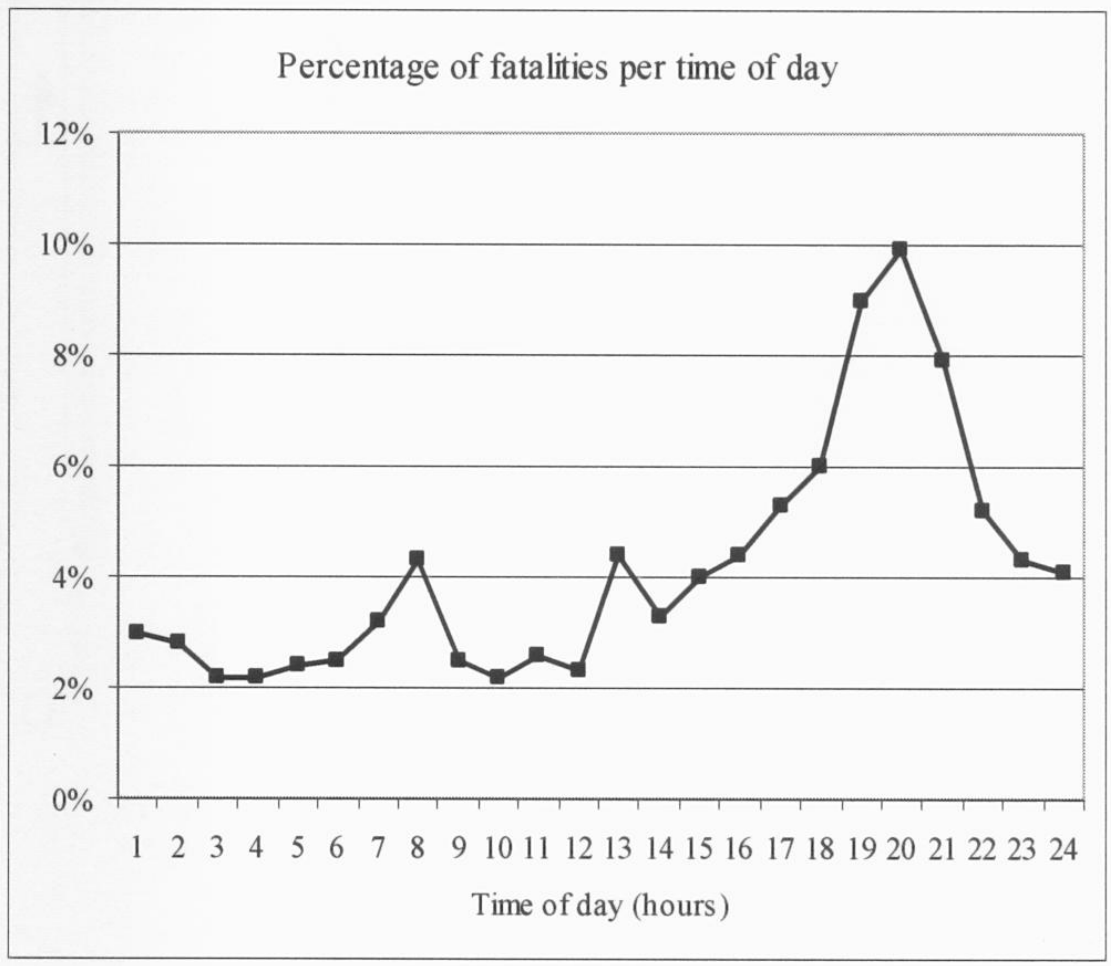
SECTION A: TYPICAL EXAM QUESTIONS

QUESTION 1: 46 minutes

Arrive Alive (www.arrivealive.co.za) publishes a large number of statistics related to fatalities (deaths) as a result of motor car accidents. The questions that follow are based on the information supplied in the graphs and tables below.



Fatalities on South African Roads 1990 to 2004			
	Number of road fatalities	***South African population (millions)***	***Number of fatalities per 100 000 people***
1990	11 157	30,6	36,46
1991	11069	31,2	35,48
1992	10142	31,9	31,79
1993	8 140	32,6	24,97
1994	9981	40,4	**a**
1995	10256	40,63	25,24
1996	9848	40,58	24,27
1997	9691	41,27	23,48
1998	9068	41,95	21,62
1999	**b**	42,64	24,8
2000	not available	43,33	not available
2001	11201	44,25	25,31
2002	12 198	45,17	27,00
2003	12354	46,13	26,78
2004	12727	46,59	27,32



The fatalities on the South African Roads have been reported in terms of both the actual number of fatalities and as a rate: the number of fatalities per 100 000 in the population. Consider the graph that reports the percentage of fatalities per time of day.

1.1. What percentage of all fatalities occurs between 17h00 and 22h00? (1)

1.2. Why do you think there is a sharp rise in the graph from about 06h00? (2)

1.3. At what times of the day are you at the greatest risk of being killed in a motor vehicle related accident? Substantiate your claim. (3)

1.4. Refer to the table and graph that report on the fatalities from 1990 to 2004.

1.4.1. Why is there a gap in each of the broken line graphs? (1)

1.4.2. Calculate the missing values, **a** and **b**, in the table. (7)

1.4.3. Calculate the percentage change in the number of fatalities from 1994 to 1999. (3)

1.4.4. Calculate the change in the number of fatalities per 100 000 people from 2001 to 2004. (2)

1.5. Consider the graphs of the two statistics and discuss which graph might be used by the Minister of Transport to support an argument that claims there is progress in managing road accident fatalities **and** which graph might be used by somebody trying to contradict the Minister. Provide a detailed motivation for your answer. (6)

1.6 Which statistic, actual number of fatalities OR number of fatalities per 100 000, best represents the probability of dying in a motor vehicle related accident. Motivate your answer (4)

1.7 The same general knowledge test was given to Grade 12 learners at two schools. The results were given as a mark out of 100. The learners' test results are summarised in the following tables:

School A 199 learners wrote the test		**School B 180 learners wrote the test**	
	Mark		Mark
Minimum	0	Minimum	35
First quartile	0	First quartile	40
Median	32	Median	67
Third quartile	56	Third quartile	78
Maximum	65	Maximum	100

Use the information provided in the above tables to decide which of the following statements are definitely true. In each case, either give reasons why you agree with the statement or correct the statement if it is false.

i) Exactly 25% of the learners who wrote the test from School A did not get any answers correct. (2)

ii) At least half the learners from School B passed the test. In other words, they got more than 50% for the test. (2)

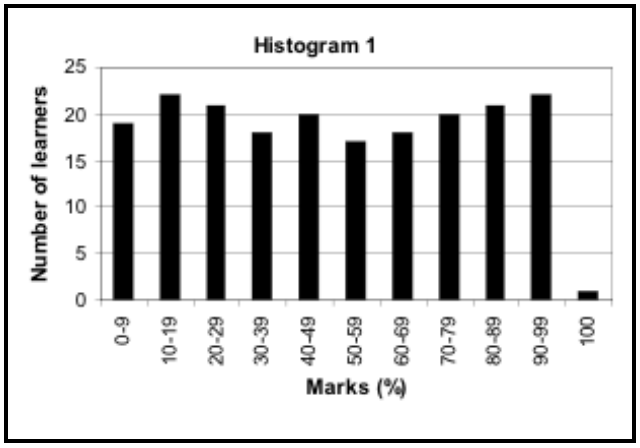
iii) The range of marks was the same for both schools. (3)

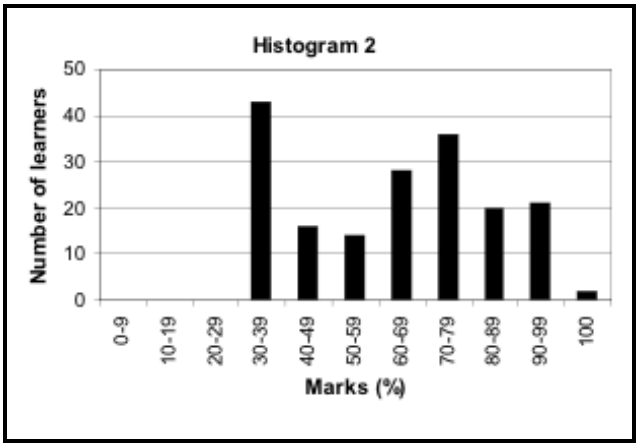
iv) At least 90 learners from School B got a better mark than the learner with the best mark from School A. (4)

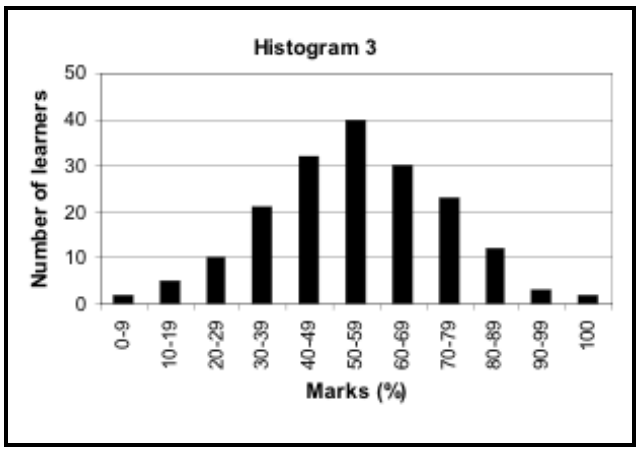
v) A learner from School A got a mark that was between the 50th and 70th percentile of School B. (2)

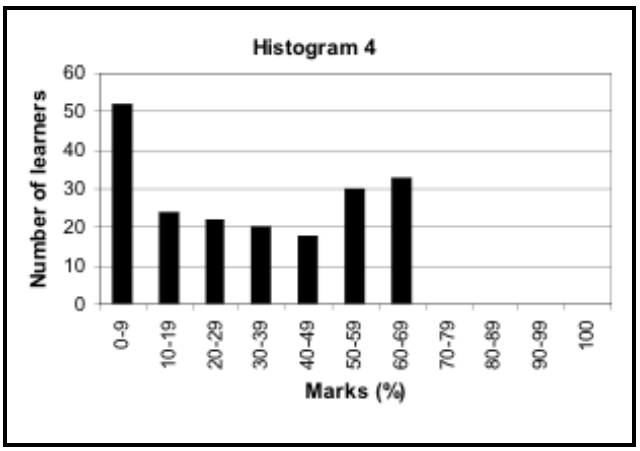
1.8 Which of the following four histograms is most likely to be the histogram that represents the distribution of marks scored on the test for School A? Give clear reasons for your answer. (2)

1.9 Which of the following four histograms is most likely to be the histogram that represents the distribution of marks scored on the test for School B? (2)









[46]

QUESTION 2: 9 minutes *(Taken from DoE Nov Exam 2009 Paper 1)*

2.1. The Geography examination marks, expressed as a percentage, of the 52 learners were recorded as follows:

54	67	83	34	49	56	78	89	90	79	20	49	50
70	89	57	27	48	56	65	70	22	98	89	29	56
47	95	49	67	89	48	46	89	63	75	45	50	58
73	67	45	76	70	38	46	37	47	36	38	99	100

2.2. Determine the:

a) Lowest percentage mark (1)

b) Highest percentage mark (1)

2.3. The NCS (National Curriculum Statement) requires that results be expressed in terms of seven performance levels rather than percentages. As a result, the Geography teacher needs to work out the number of learners per performance level.

Draw a frequency table to work out the number of learners per performance level. (7)

[9]

SECTION B: SOLUTIONS AND HINTS TO SECTION A

QUESTION 1

1.1. 5,4 + 6 + 9 + 10 + 8 + 5 = 43.4% ✓ (1)

1.2. More cars on the road. ✓ People are at work and school.✓ (2)

1.3. Between 17h00 and 22h00. ✓✓ The graph shows a peak between those. ✓ (3)

1.4. 1.4.1 The data was unavailable.✓ (1)

1.4.2

$\frac{9981}{40400000} = \frac{a}{100000}$ ✓
$\frac{40400000}{40400000}\ a = \frac{998100000}{40400000}$ ✓
a = 24,7 ✓
$\frac{b}{426400001} = \frac{24,8}{100000}$ ✓
$\frac{10000b}{100000} = \frac{1057472000}{100000}$ ✓
b = 10574,72 ✓
b ≈ 10575 ✓

(7)

1.4.3 $\frac{10575-9981}{9981} \times 100$ ✓✓

= 5,95% ✓ (3)

1.4.4 27,32 - 25,31 = 2,01 ✓✓ (2)

1.5 (6)

The minister would use the graph of fatalities per 100 000 √ as it shows a steady decline in fatalities per 100 000 √ from 1990 to 1998.√
Someone trying to contradict √ the minister would use the graph showing the number of fatalities √ as it shows a general increase in the number of fatalities.√

1.6 Fatalities per 100 000. ✓ This statistic gives you a ratio of deaths per 100 population no matter how large or small the population is. ✓ If you are only given the fatalities you are unable to compare it with the size.✓ A large number of fatalities could only be a small percentage of a population or it could be a big percentage of a small population.✓ (4)

1.7. The following:

i. FALSE. ✓ At least 25% of the learners who wrote the test from School A did not get any answers correct.✓ (2)
(There may have been a number of learners who got 0 from the 25th percentile to the median).

ii. TRUE. ✓ The median shows that 50% of the learners obtained 67% and above. Therefore, at least 50% passed with 50%. ✓ (2)

iii. TRUE. ✓ School A: Range = 65 – 0 = 65 ✓
School B: Range = 100 – 35 = 65✓ (3)

iv. TRUE ✓ School B has 180 learners. Therefore, the 90th learner has the median score of 67%. ✓ This means that 90 learners received a higher mark than 67% which is higher than 65% ✓, the highest mark in School A. ✓ (4)

v. FALSE ✓ No learner from School A got a mark that was between the 50th and 70th percentile of School B. ✓ (2)

1.8. Histogram 4 ✓ Marks do not go beyond 60-69 interval. Over 50 learners (approx 25%) scored 0, and 25th percentile is 0. ✓ (2)

1.9. Histogram 2 ✓✓ (2)

[46]

QUESTION 2

2.1 (a) 20% (1)

(b) 100% (1)

2.2

PERFOR-MANCE LEVEL	PERCENTAGE RANGE	TALLY	FRE-QUENCY
1	0 to 29	////	4
2	30 to 39	~~////~~	5
3	40 to 49	~~////~~ ~~////~~ /	11
4	50 to 59	~~////~~ ///	8
5	60 to 69	~~////~~	5
6	70 to 79	~~////~~ ///	8
7	80 to 100	~~////~~ ~~////~~ /	11

✓ per performance level

(7)

[9]

SECTION C: HOMEWORK

QUESTION 1: 13 minutes

The ages (in years) of patients treated for Malaria at two different clinics during a certain month was recorded as follows:

Clinic A:	**5**	**7**	**18**	**24**	**24**	**32**	**46**	**52**	**63**	
Clinic B:	**37**	**28**	**17**	**56**	**43**	**55**	**39**	**40**	**26**	**35**

1.1. Calculate the median of Clinic B. (4)
1.2. What is the mode of Clinic A. (1)
1.3. Calculate the range of Clinic B. (2)
1.4. Calculate the mean age of Clinic B. (4)
1.5. Which clinic could possibly be located in a rural area? Provide a reason for your answer. (2)
[13]

QUESTION 2: 15 minutes

When involved in a motor vehicle accident, wearing a seatbelt could determine the difference between *life* and *death*. The table on the following page, taken from (www.arrivealive.co.za), refers to information that was obtained from roadblocks when vehicles were stopped for inspection of wearing safety belts.

PROVINCE	ITEM	DRIVERS	FRONT PASSENGERS	BACK PASSENGERS
gn etuaG	reb muN	948	959	225
	reb muNNatM	236	528	993
	% not wearing	2449%	5545%	8642%
NKwa-Zulu Natal	Number	9009	9009	250
	reb muNNatM	976	484	247
	% not wearing	9744%	48%	9848%
n uetuNa ena u	reb muN	9942	9944	229
	reb muNNatM	200	583	295
	% not wearing	9745%	5940%	9349%
Eastern ena u	reb muN	9065	9068	399
	reb muNNatM	927	464	396
	% not wearing	9949%	4344%	9942%
eNuuN tntu	reb muN	900	903	903
	reb muNNatM	974	357	899
	% not wearing	9943%	3945%	9847%
Mpumalanga	reb muN	9299	9305	367
	reb muNNatM	994	622	308
	% not wearing	9540%	4747%	8340%
Limpopo	reb muN	826	835	978
	reb muNNatM	963	405	956
	% not wearing	9947%	4845%	8746%
rmNttuNa ena u	uNeb m	995	998	236
	reb muNNatM	938	442	228
	% not wearing	9549%	4849%	9646%

2.1. What can you conclude about the percentage drivers that wear a safety belt? Do you think that this is an accurate reflection of drivers in general? (3)

2.2. Draw a compound bar graph that shows the percentage of drivers, front passengers and back passengers that do not wear safety belts. Show only Gauteng, Eastern Cape and Mpumalanga. (Let 1 block on the vertical axis represent 4%.) (12)

[15]

SECTION D: SOLUTIONS TO HOMEWORK

QUESTION 1

The ages (in years) of patients treated for Malaria at two different clinics during a certain month was recorded as follows:

Clinic A:	**5**	**7**	**18**	**24**	**24**	**32**	**46**	**52**	**63**	
Clinic B:	**37**	**28**	**17**	**56**	**43**	**55**	**39**	**40**	**26**	**35**

1.1. Arrange in ascending order: 17, 26, 28, 35, 37, 39, 40, 43, 55, 56 ✓✓ (4)

Median = $\frac{37+39}{2}$ ✓ = 38 ✓

1.2. Mode = 24 ✓ (1)

1.3. Range = highest – lowest

65 -17 ✓ = 39 years ✓ (2)

1.4. Mean = $\frac{17+26+28+35+37+39+40+43+55+56}{10}$ ✓✓

= $\frac{376}{10}$ ✓

= 37,6

≈ 38 years old ✓ (4)

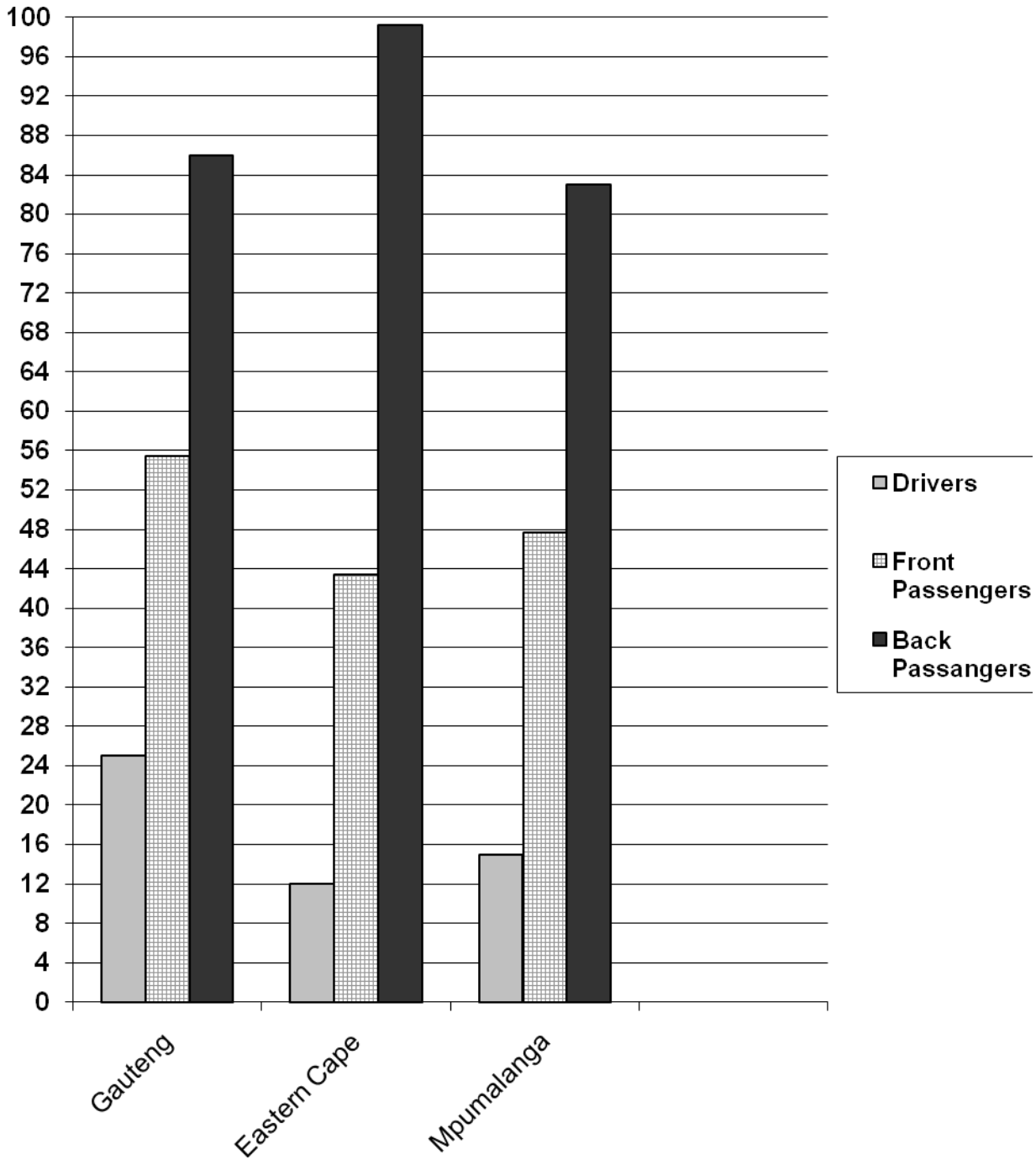
1.5. Clinic A ✓ because the data shows young children and very old people go to the clinic✓. (2)

[13]

QUESTION 2

2.1. More drivers wear safety belts than front or back passengers. ✓ This may not be, as people tend to put their seatbelts on when they see a roadblock. ✓✓ (3)

2.2. Y axis correct ✓✓, key ✓✓✓, X axis shows Gauteng✓ , EC ✓ and Mpumalanga✓ all three bars correctly represented. ✓✓✓ compound bar graph ✓ (12



[15]

SESSION 2 SELF STUDY: TOPIC 2: PROBABILITY AND MISUSE OF STATISTICS IN SOCIETY

Teacher Note: Make sure learners know and understand:
(a) that probability is the mathematical term for „chance'. It refers to the chance that something will take place
(b) that probability is measured on a scale from 0 to 1 and can be written as a fraction, a decimal fraction or as a percentage.
(c) how to draw and analyse tree diagrams.

LESSON OVERVIEW

1. Introduce session: 5 minutes
2. Typical exam questions: 52 minutes
3. Review/solutions/memo: 33 minutes

SECTION A: TYPICAL EXAM QUESTIONS

QUESTION 1: 12 minutes

A dressmaker has 48 white buttons, 39 green buttons and 33 blue buttons in a tin.

1.1 (a) If she takes a button from the tin without looking, what is the probability that the button is blue? (4)

(b) She replaces the button because she realises that a green one would be more suitable for the mending she is doing. What are the chances that when she takes a button from the tin without looking, that it will be green? (4)

(c) She used the green button and an additional three green ones before she finished her mending. Thereafter she had to finish the white blouse she started last week. She had to sew the white buttons on. What is the probability that when she next takes a button out of the tin without looking, that it will be white. (4)

[12]

QUESTION 2: 12 minutes

Pizza is everyone's favourite. The following choices are available.

Size	Base	Topping
Medium (M)	Regular (R)	Bacon (B)
Large (L)	Thick (T)	Pineapple (P)
		Ham (H)

2.1. Draw a tree diagram to find all the possible combinations for the pizza choices above. (8)

2.2. What is the probability that a pizza with ham topping will be ordered? (4)

[12]

QUESTION 3: 7 minutes

A box has two red, two green and two white balls inside it. If you choose two balls without looking, what is the probability of getting two balls of the same colour i.e. red, red (RR) or green, green (GG) or white, white (WW). Use a tree diagram to identify all the possible outcomes. (7)

QUESTION 4: 16 minutes *(Taken from DoE November 2008 Paper 2)*

Jason Reed is a professional soccer player. In 2005, he negotiated a five-year contract with Shaya FC (Shaya Football Club).

Jason's starting salary with the club was R178 500 per year (excluding bonuses), with an assured salary increase of 5% per year.

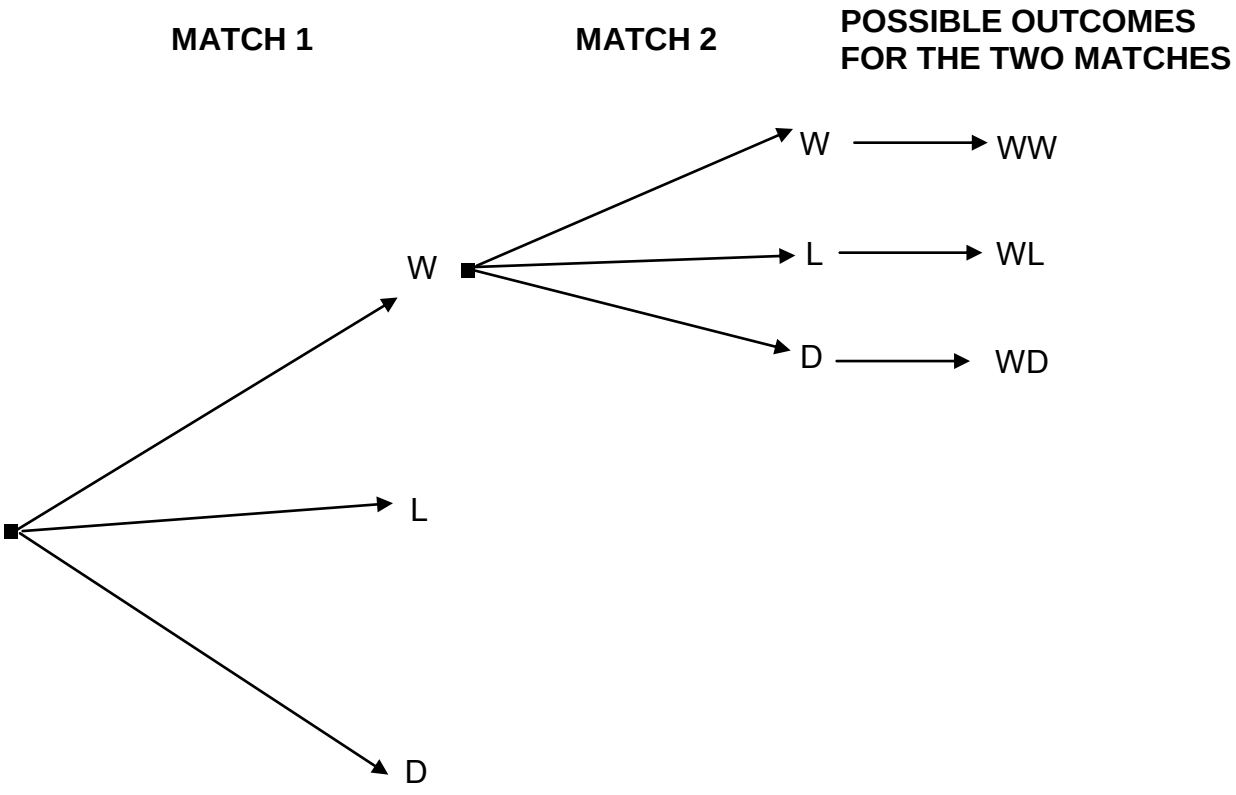
The table below shows Jason's annual salary (excluding bonuses) for the first five years.

TABLE 4: Jason's annual salary

YEAR	2005	2006	2007	2008	2009
Salary (in rand)	178 500	…	196 796,25	…	216 967,87

Shaya FC plays two matches in March. There are THREE possible outcomes for each match: win (W), lose (L) or draw (D).

A tree diagram is drawn to work out the possible outcomes for the two matches.



4.1. Complete the tree diagram to show all the possible outcomes of the two matches. (6)

4.2. Use the completed tree diagram to predict the probability that Shaya FC will:

a) win both matches (3)

b) win only one of the matches (3)

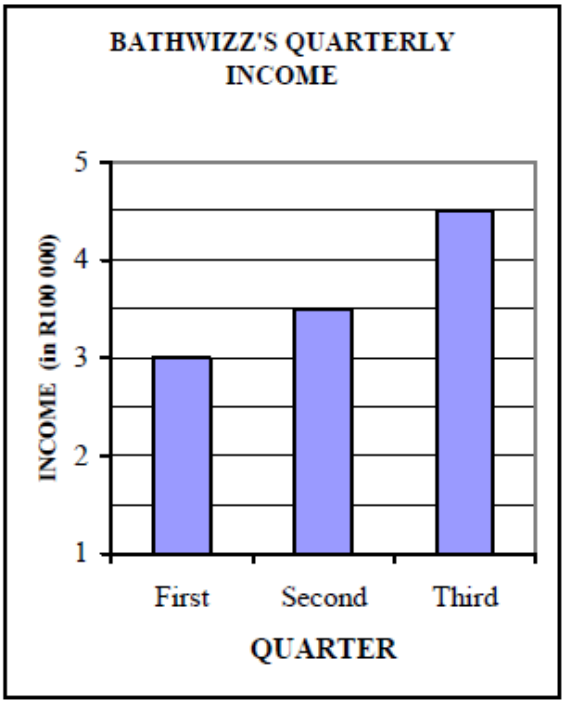
c) draw at least one of the matches (4)

[16]

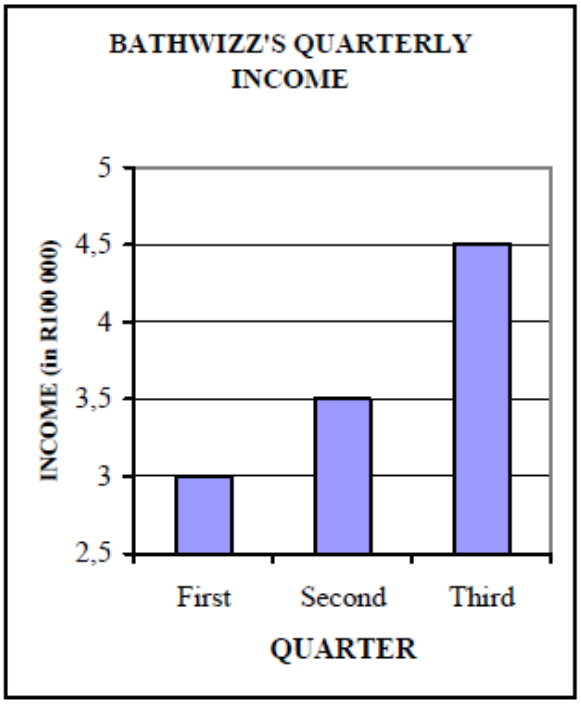
QUESTION 5: 5 minutes *(Taken from DoE Feb 2009 Paper 2)*

Bathwizz is a company that installs and renovates bathrooms. The general manager had to present the company's earnings for the first three quarters of the year to the company directors. He drew the two graphs below.

GRAPH 1



GRAPH 2



5.2. What possible trend do you notice with regard to Bathwizz's quarterly income? (2)

5.3. The general manager wanted to prove to the company directors that Bathwizz's income was increasing and that the company was doing well.

Which graph would be the better one to show to the company directors?
Give a reason for your answer. (3)

[5]

SECTION B: SOLUTIONS AND HINTS TO SECTION A

QUESTION 1: 12 minutes

A dressmaker has 48 white buttons, 39 green buttons and 33 blue buttons in a tin.

1.1 (a) Blue = $\frac{33}{120}$ ✓✓ = $\frac{11}{40}$ ✓✓ (4)

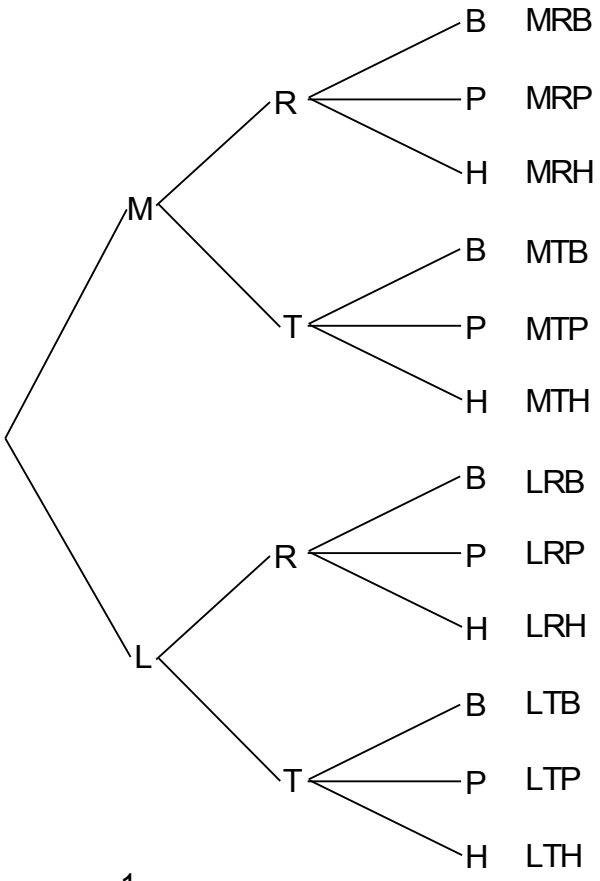
(b) Green = $\frac{39}{120}$ ✓✓ = $\frac{13}{40}$ ✓✓ (4)

(c) White = $\frac{48}{116}$ ✓✓ = $\frac{12}{29}$ ✓✓ (4)

[12]

QUESTION 2: 12 minutes

2.1 ✓✓ ✓✓ ✓✓ ✓✓

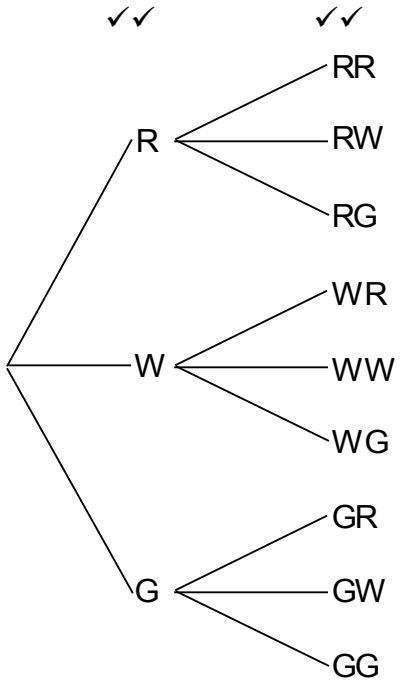


(8)

2.2 $P(H) = \frac{4}{12}$ ✓✓ $= \frac{1}{3}$ ✓✓ (4)

[12]

QUESTION 3: 7 minutes



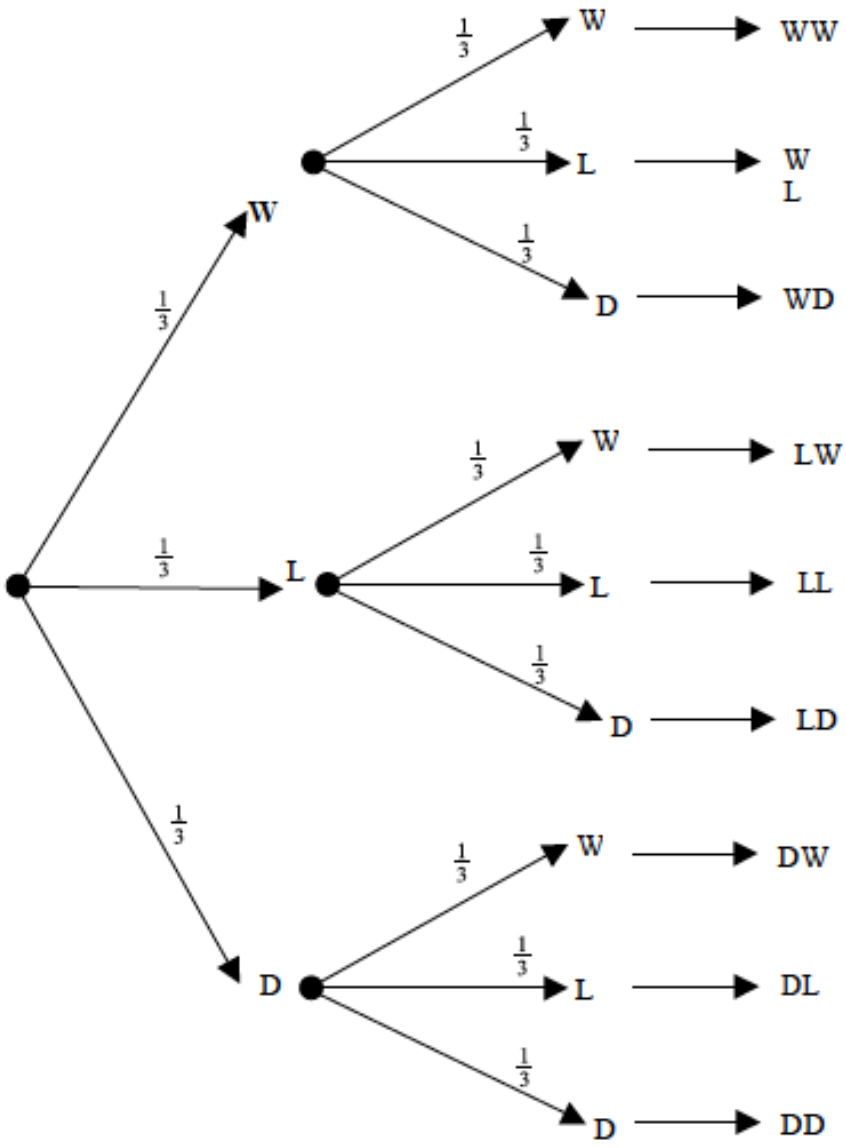
Probability = $\frac{3}{9}$ ✓✓ = $\frac{1}{3}$ ✓

(7)

[7]

QUESTION 4: 16 minutes *(Taken from DoE November 2008 Paper 2)*

4.1 ✓✓ ✓✓ ✓✓



(6)

4.2 a) P(win) = $\frac{1}{3}$; P(lose) = $\frac{1}{3}$ P(draw) = $\frac{1}{3}$ ✓

P(win both matches) = $\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$ ✓✓ (3)

b) P(WL) + P(WD) + P(LW) + P(DW)

$= \left(\frac{1}{3} \times \frac{1}{3}\right) + \left(\frac{1}{3} \times \frac{1}{3}\right) + \left(\frac{1}{3} \times \frac{1}{3}\right) + \left(\frac{1}{3} \times \frac{1}{3}\right)$ ✓

$= \frac{1}{9} + \frac{1}{9} + \frac{1}{9} + \frac{1}{9} = \frac{4}{9}$ ✓✓ (3)

c) P(WD) + P(LD) + P(DW) + P(DL) + P(DD) ✓

$= \left(\frac{1}{3} \times \frac{1}{3}\right) + \left(\frac{1}{3} \times \frac{1}{3}\right) + \left(\frac{1}{3} \times \frac{1}{3}\right) + \left(\frac{1}{3} \times \frac{1}{3}\right) + \left(\frac{1}{3} \times \frac{1}{3}\right)$ ✓

$= \frac{1}{9} + \frac{1}{9} + \frac{1}{9} + \frac{1}{9} + \frac{1}{9} = \frac{5}{9}$ ✓✓ (4)

[16]

QUESTION 5: 5 minutes *(Taken from DoE Feb 2009 Paper 2)*

5.1. There is a steady increase in income ✓✓
OR any other suitable explanation of trend. ✓✓ (2)

5.2. Graph 2. ✓ The vertical scale starts at 2,5 and gives the impression that the quarterly increase is larger than it actually is. ✓✓ (3)

[5]

SECTION C: HOMEWORK

QUESTION 1: 20 minutes

A dressmaker has 48 white buttons, 39 green buttons and 33 blue buttons in a tin.

1.1 If she takes a button from the tin without looking, what is the probability that the button is:

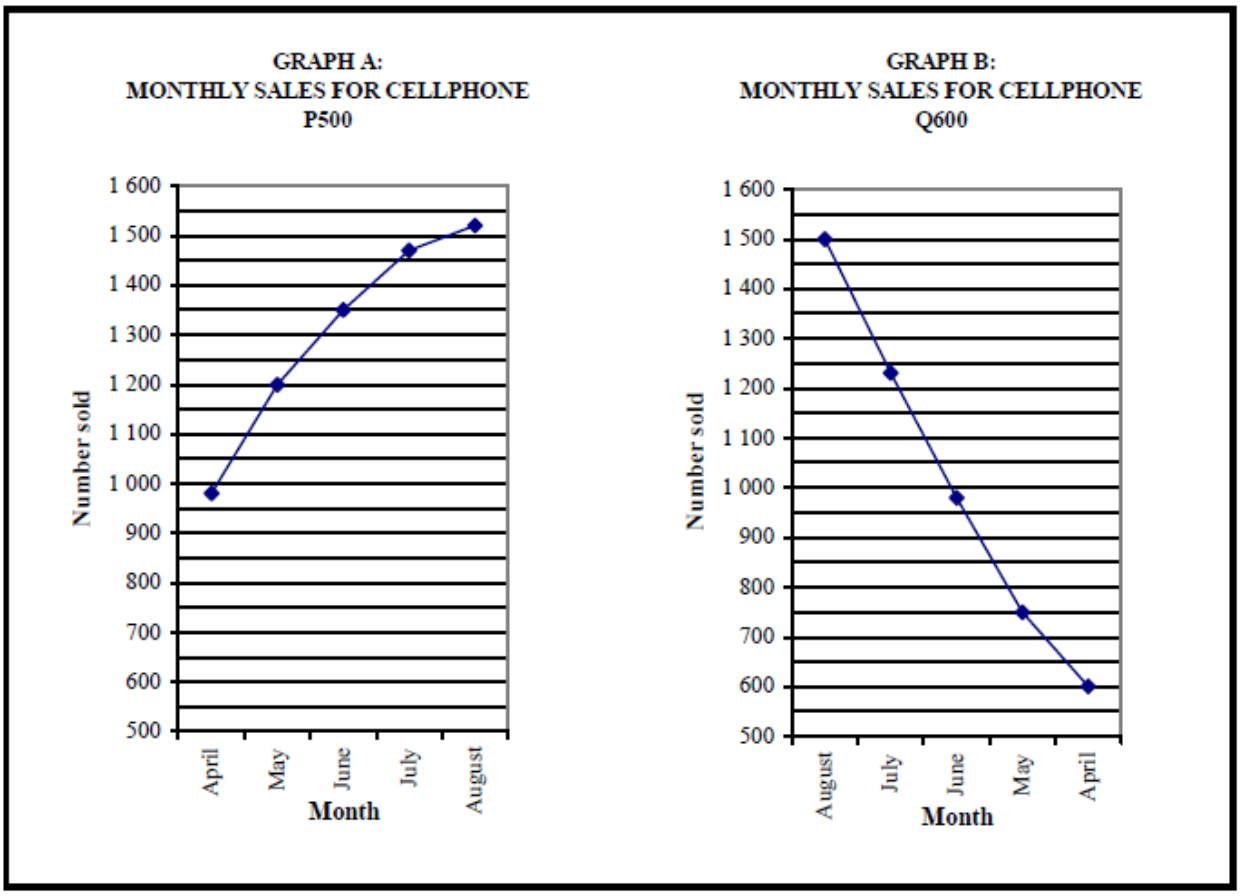
a) red? (3)
b) not white (3)
c) green or blue (4)

1.2. (a) You toss a coin twice. Draw a tree diagram to determine the probability of Getting two tails? (7)
(b) What is the probability of getting a head and a tail in any order? (3)

[20]

QUESTION 2: 3 minutes (*Taken from DoE Nov 2009 Paper 2)*

The salesman for cell phone P500 claimed that the monthly sales for cell phone Q600 were decreasing while the sales of cell phone P500 were increasing. To support his claim, he used the two graphs on the following page:



The manager of the cell phone shop noted that one of the graphs was misleading. Identify the misleading graph and explain why it is misleading. (3)
[3]

QUESTION 3: 9 minutes

3.1. Mr Mandela, the Headmaster, did a survey to see how many junior boys play sport. He only had some of the values in his table. Help him to determine how many junior boys play rugby and soccer in each grade by completing the table below. (5)

	Soccer	Rugby	Total
Grade 8			35
Grade 9	10		28
Total	25		

3.2. What is the probability that a Grade 8 boy chosen randomly will be a soccer player? (2)

3.3. What is the probability that a boy chosen randomly will be a rugby player? (2)
[9]

SECTION D: SOLUTIONS TO HOMEWORK

QUESTION 1: 20 minutes

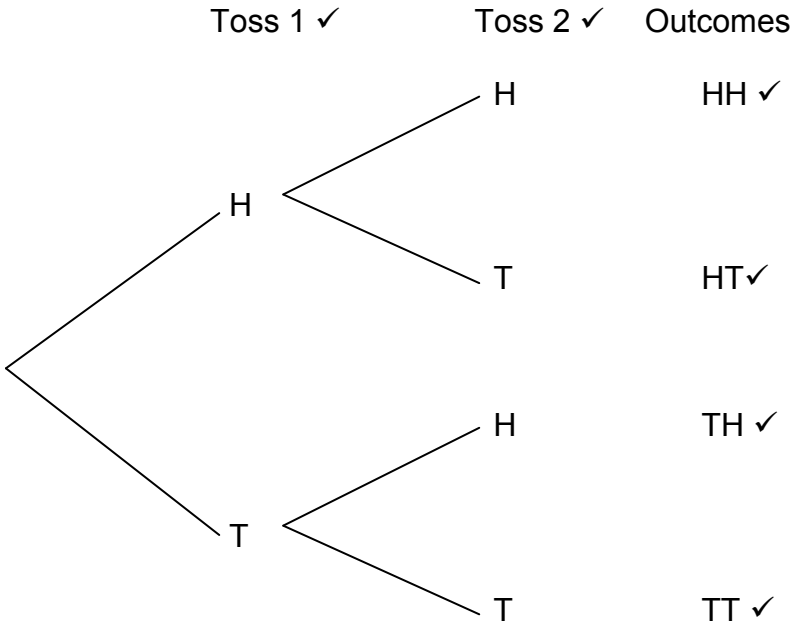
1.1 Probability

a) Red = $\frac{0}{120}$ ✓✓ = 0 ✓ (3)

b) Not white = $\frac{72}{120}$ ✓✓ = $\frac{3}{5}$ ✓ (3)

c) Green or blue = $\frac{39}{120} + \frac{33}{120}$ ✓✓= $\frac{72}{120}$ ✓ = $\frac{3}{5}$ ✓ (4)

1.2. (a) Probability = $\frac{1}{4}$ ✓



(7)

(c) Probability = $\frac{2}{4}$ ✓✓ = $\frac{1}{2}$ ✓ (3)

[20]

QUESTION 2

Graph B **OR** Q600 ✓✓ The graph was drawn with the months reversed. ✓ (3)

[3]

QUESTION 3

	Soccer	Rugby	Total
Grade 8	15 ✓	20 ✓	35
Grade 9	10	18 ✓	28
Total	25	38 ✓	63 ✓

(5)

3.1. What is the probability that a Grade 8 boy chosen randomly will be a soccer player? (2)

$= \frac{15}{35}$ ✓ $= \frac{3}{7}$ ✓

3.2. What is the probability that a boy chosen randomly will be a rugby player? (2)

$= \frac{38}{63}$ ✓✓

[9]

SESSION 3

TOPIC: MIXED EXERCISES: AREA AND VOLUME

Teacher Note: When attempting mixed exercises, learners must determine the specific section to which each question pertains. Make sure learners know and understand how to use and apply formulae.

For Pi use it is better for the learners to use the value 3,14 instead of the Pi button on the calculator or $\frac{22}{7}$

LESSON OVERVIEW

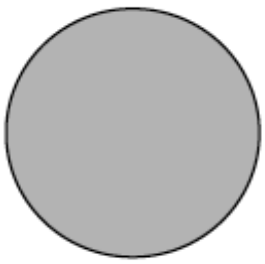
1. Introduce session 5 minutes
2. Typical exam questions 55 minutes
3. Review/solutions/memo 30 minutes

SECTION A: TYPICAL EXAM QUESTIONS

QUESTION 1: 16 minutes *(Taken from DoE/November Exam 2009 Paper 2)*

Ronwyn and Bronwyn are twins. They plan to celebrate their 21st birthday by having a big party. Ronwyn has decided that she wants a round cake while Bronwyn has decided to have a ring cake as shown in the pictures below:

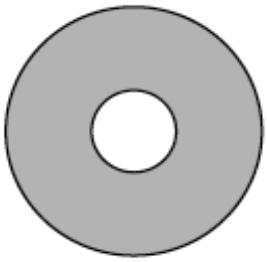
The dimensions of each cylindrical cake are as follows:



RONWYN'S ROUND CAKE

Diameter = 50cm

Height = 15 cm



BRONWYN'S RING CAKE

Outer Diameter = 56 cm
Inner diameter = 18cm
Height = 14cm

The following formulae (using $\pi = 3.14$) may be used:

Volume of cylinder = π x **(radius)^2** x **height**

Volume of cylindrical ring = π x **(R - r)^2** x **height** where **R** = outer radius and **r** = inner radius

Total surface area of an open cylinder = π x **(radius)^2** + **2 x π x radius x height.**

1.11 Using the volume of each cake, determine which of the two cakes is better value for money if the costs of the two cakes are the same. Give reasons for your answer, showing ALL your calculations. (10)

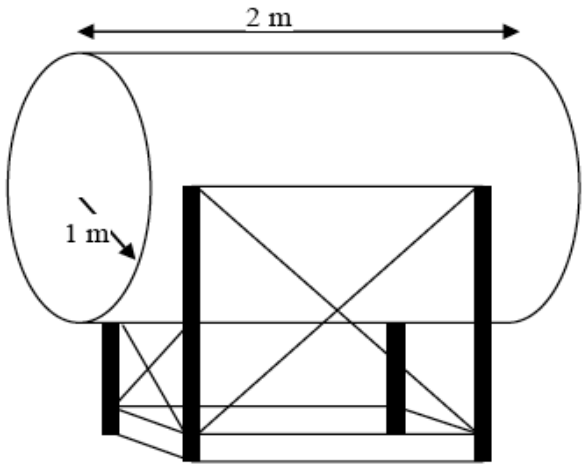
1.12 Ronwyn decides that her round cake will be a fruitcake. The cake will be covered with marzipan icing on the top of the cake as well as around the sides. Determine the total outer surface area of the cake that the marzipan icing will cover. (6)

[16]

QUESTION 2: 12 minutes *(Taken from DoE/Feb – Mar Exam 2009 Paper 2)*

As a result of load shedding, Wayne, a chicken farmer, goes back to using a generator to provide dependenable power for his chicken sheds and his farmhouse.

He buys a second-hand diesel tank with a radius of 1m and a length of 2m to store the fuel for the generator.



He decides to paint both the outside surface area of the tank and the stand on which it rests. The surface area of the stand is 1m^2. It takes 1 litre of paint to paint 3m^2 of the surface area.

2.1. Calculate the surface area (SA) of the tank in m^2.
Use the formula **SA = 2 π r^2 + 2 π r h,** where r = radius, h = height and π = 3,14 (3)

2.2. Calculate the quantity of paint (in litres) needed to paint both the outside of the tank and the stand. Round off your answer to the nearest litre. (5)

2.3.

2.4. Calculate the capacity (volume) of the diesel tank in litres where 1m^3 = 1000 litres.
Use the formula **V = π r^2 h,** where r = radius, h = height and π = 3,14 (4)

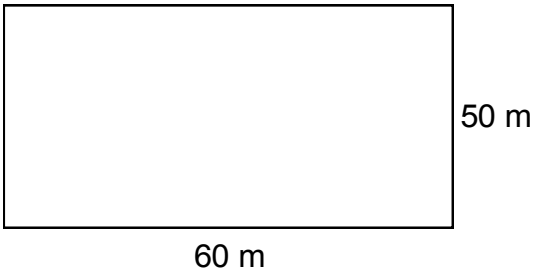
[12]

QUESTION 3: 15 minutes *(Taken from DoE/Feb – Mar Exam 2009 Paper 2)*

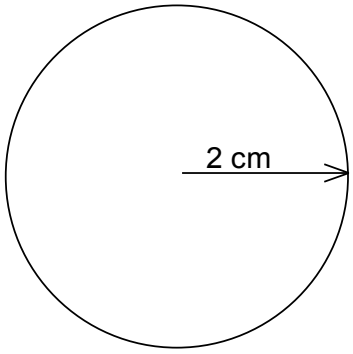
3.1. Calculate the areas of the shapes (a) – (d) (8)

3.2. Calculate the perimeter of the shapes (a) – (c) (8)

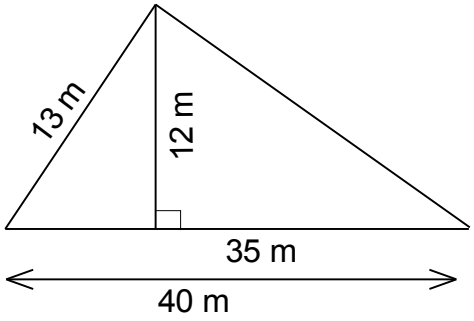
a)



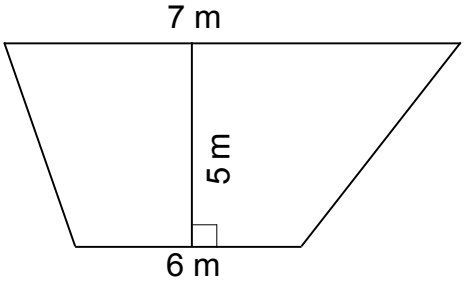
b)



c)



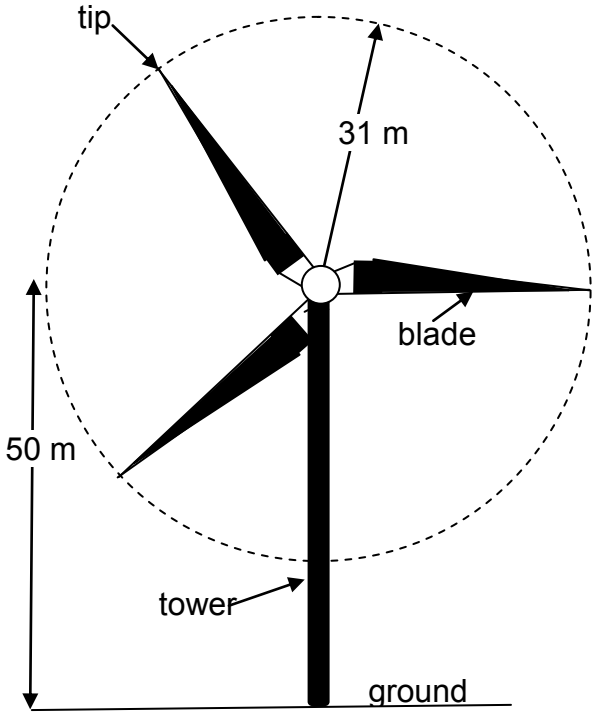
d)



[16]

QUESTION 4: 12 minutes *(Taken from DoE/Feb – November 2008 Paper 1)*

Electricity has become a scarce resource in South Africa. As a result the country is investigating alternative sources of generating electricity. One alternative source of generating electricity is a wind turbine using rotating blades as shown in the picture and diagram below.



The wind turbine is mounted on the top of a 50 m high tower.
The length of each blade is 31 m.

4.1. What is the length of the diameter of the circle that the blades create as they rotate? (1)

4.2. Calculate the circumference of the circle made by the blades when they rotate. (**Circumference = 2** $\times \pi \times$ **radius**, using $\boldsymbol{\pi}$ = 3,14) (2)

4.3. Calculate the area of the circle made by the blades when they rotate. (**Area =** $\boldsymbol{\pi} \times$ **(radius)**^{2}, using $\boldsymbol{\pi}$ = 3,14) (5)

4.4. Calculate the maximum height from the ground that the tip of a blade will be, if the turbine is rotating? (3)

[11]

SECTION B: SOLUTIONS AND HINTS TO SECTION A

QUESTION 1: 16 minutes *(Taken from DoE/November Exam 2009 Paper 2)*

1.1. **Volume of a round cake (Ronwyn)**

= π × (radius)^2 × height ✓

= 3,14 × ($\frac{50}{2}$ ✓ cm) × 15cm ✓

= 29 437,5 cm^3 ✓

Volume of ring cake (Bronwyn)

= π × (R^2 – r ^{2}) × height ✓

= 3,14 × [(28cm ✓)^2 – (9cm ✓)^2] × 14cm

= 30 903,88cm^3 ✓

The ring cake as it is the cake with the largest volume ✓✓ (10)

1.2. Total outer surface area

= π × (radius)^2 + 2 π × radius × height

= 3,14 × (25cm ✓)^2 + 2 × 3,14 × 25cm × 15cm ✓

= 1 962,5cm^2 ✓+ 2 355 cm^2 ✓

= 4 317,5 ✓ cm^2 ✓ (6)

[16]

QUESTION 2: 12 minutes *(Taken from DoE/Feb – Mar Exam 2009 Paper 2)*

2.1 Surface area

= 2 π × (radius)^2 + 2 π × radius × height

= 2 × 3,14 × (1m)^2 ✓ + 2 × 3,14 × 1m × 2m ✓

= 6,28m^2 + 12,56m^2

= 18,84m^2 ✓ (3)

2.2 Area to be painted

= surface area of tank + area of stand

= 18,84m^2 + 1m^2 ✓

= 19,84m^2 ✓

3 m^2 of surface needs 1 litre paint

3 m^2 : 1 litre = 19,84 m^2 : x

$\frac{3}{1} = \frac{19,84}{x}$ ✓

$3x = 19,84$

$\frac{3x}{3} = \frac{19,84}{3}$

= 6,613333333….. ✓

Therefore: 7 litres of paint is needed. ✓ (5)

2.3 $V = \pi \times (\text{radius})^2 \times \text{height}$
$= 3{,}14 \times (1\text{ m} \checkmark)^2 \times 2\text{ m} \checkmark$
$= 6{,}28\text{m}^3 \checkmark$
$= 6\,280$ litres ✓ (4)
[12]

QUESTION 3: 15 minutes *(Taken from DoE/Feb – Mar Exam 2009 Paper 2)*

3.6. a) $A = \text{length} \times \text{breadth}$
$A = 50\text{ m} \times 60\text{ m} \checkmark$
$A = 3\,000\text{ m}^2 \checkmark$

b) $A = \pi \times r^2$
$A = 3{,}14 \times (2\text{ cm})^2 \checkmark$
$A = 12{,}56\text{ cm}^2 \checkmark$

c) $A = \frac{1}{2}$ base × height
$A = \frac{1}{2} \times 40\text{ m} \times 12\text{ m} \checkmark$
$A = 240\text{ m}^2 \checkmark$

d) $A = \frac{\text{height}\,(\text{// line a} + \text{// line b})}{2}$
$A = \frac{5\text{ m}\,(7\text{ m} + 6\text{ m})}{2} \checkmark$
$A = \frac{5\text{ m}\,(13\text{ m})}{2}$
$A = 32{,}5\text{ m} \checkmark$ (8)

3.7. a) $P = 2(\text{length} + \text{breadth})$
$P = 2(60\text{ m} + 50\text{ m}) \checkmark$
$P = 2 \times 110\text{m} \checkmark$

b) $\text{Circumference} = 2\,\pi\,r$
$\text{Circumference} = 2 \times 3{,}14 \times 2\text{ cm} \checkmark$
$\text{Circumference} = 12{,}56 \checkmark$

c) $(\text{Hypotenuse})^2 = (\text{Side 1})^2 + (\text{Side 2})^2$
$(\text{Hypotenuse})^2 = (12\text{ m})^2 + (35\text{ m})^2$
$(\text{Hypotenuse})^2 = 1\,369\text{ m}^2 \checkmark$
$\text{Hypotenuse} = 37\text{ m} \checkmark$
$P = 37\text{ m} + 40\text{ m} + 13\text{ m} \checkmark$
$P = 90\text{ m} \checkmark$ (8)
[16]

QUESTION 4: 12 minutes *(Taken from DoE/ November 2008 Paper 1)*

4.1. Diameter = 62 m ✓ (1)

4.2. Circumference = $2 \times \pi \times$ radius
= 2 × 3,14 × 31 m ✓
= 194,68 m ✓

OR
C = $\pi \times$ diameter
C = 3,14 × 62 m ✓
C = 194,68 m ✓ (2)

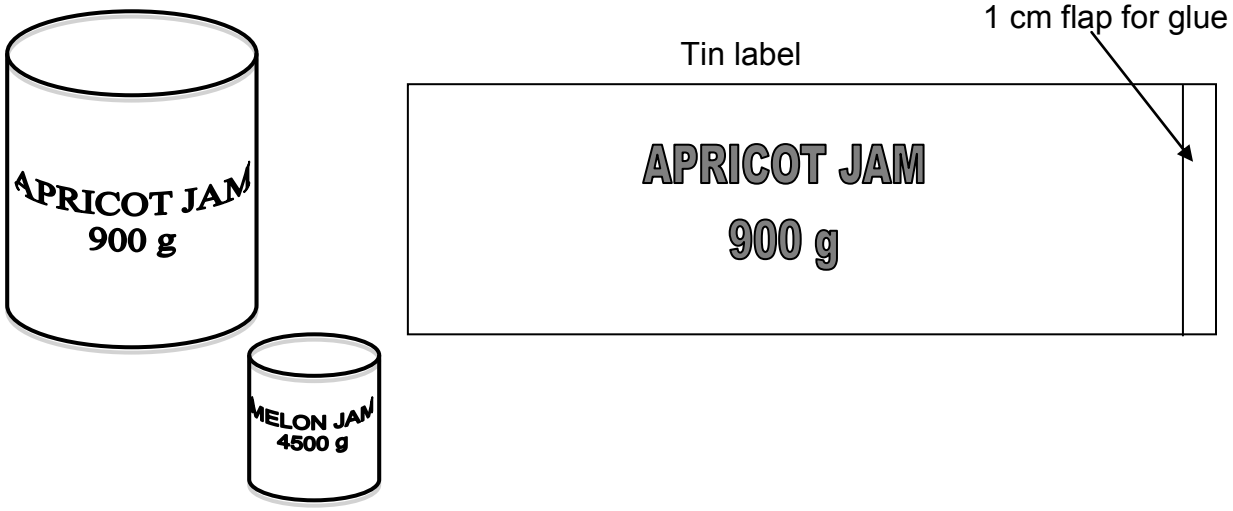
4.3. Area = πr^2 ✓
Area = 3,14 × $(31 \text{ m})^2$ ✓✓
Area = 3 017,54 m^2 ✓✓ (5)

4.4. Maximum height = height of tower + length of blade
Maximum height = 50 m ✓ + 31 m ✓
Maximum height = 81 m ✓ (3)
[11]

SECTION C: HOMEWORK

QUESTION 1: 10 minutes

A group of 250 learners stay in a school hostel. The matron buys apricot jam in 900 g tins and melon jam in 450 g tins, as shown below:



1.9. The circumference of the large tin is 31,4 cm and the height is 10,5 cm. Calculate the volume of jam in this tin.
$V = \pi r^2 h$ and $\pi = 3,14$ (7)

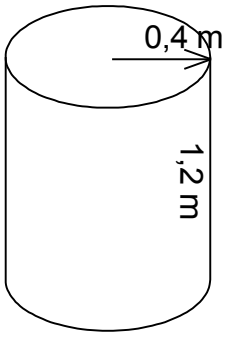
1.10. Determine the dimensions (i.e. the length and breadth) of the label. (4)
[11]

QUESTION 2: 12 minutes *(Taken from DoE/Preparatory Exam 2008 Paper 1)*

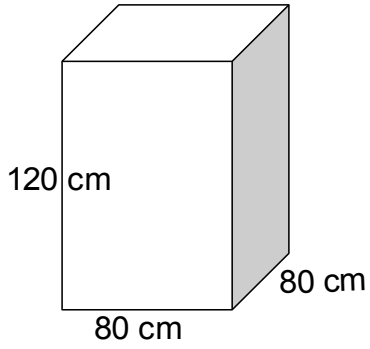
A company manufactures electrical geysers out of steel in the following two shapes:

- Geyser 1: radius = 0,4 metres, height = 1,2 metres
- Geyser 2: length = 80 centimetres
  breadth = 80 centimetres
  height = 120 centimetres

GEYSER 1 (cylindrical)



GEYSER 2 (rectangular)



2.1. Calculate the volume of Geyser 1 in m^3.
Volume of cylinder = π × (radius)^2 × height, using π = 3,14 (3)

2.2. The volume of Geyser 2 is 768 000 cm3. If 1 000 cm^3 = 1 litre, convert the volume of Geyser 2 to litres. (1)

2.3. If 1 000 cm^3 = 0, 22 gallon, how many gallons can Geyser 2 hold? (2)

2.4. To prevent loss of heat, geysers are covered with an insulation material pasted on all the outside surfaces. How many square metres of insulation material will be needed to cover Geyser 1?
Surface area of cylinder = 2πrh + 2πr^2, using π = 3,14 (4)

2.5. A 1 litre tin of glue used to paste the insulation material can cover a surface area of 1,25 m^2. Calculate the surface area that a 5 litre tin of glue can cover. (2)

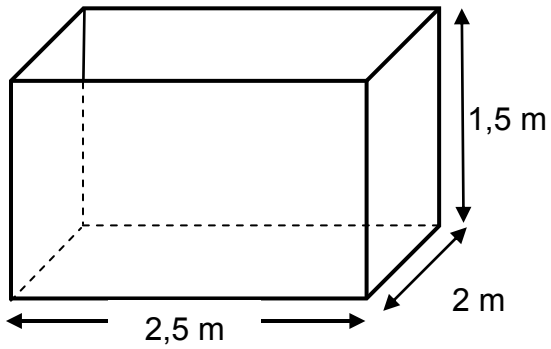
[12]

QUESTION 3: 8 minutes *(Taken from DoE/November Exam 2008 Paper 1)*

An aquarium is a place where collections of fish and other aquatic animals are displayed. The fish are kept in open rectangular glass tanks. A water pump is used to circulate and refresh the water in the tanks.

An open-top fish tank has the following dimensions:
length = 2,5 m; breadth = 2 m; height = 1,5 m

Sketch of a fish tank



Fish in an aquarium

3.1. Determine the volume of the fish tank in kilolitres if 1 m^3 = 1 kℓ, where **volume = length × breadth × height**. (4)

3.2. Determine the total surface area (in m^2) of glass used for the open-top fish tank, where **surface area = (*l* × *b*) + 2 × (*l* × *h*) + 2 × (*h* × *b*)** and ***l*** = length, ***b*** = breadth and ***h*** = height. (5)

[9]

SECTION D: SOLUTIONS TO HOMEWORK

QUESTION 1: 10 minutes

1.1. $V = \pi r^2 h$

Circumference = π D
31,4 cm ✓ = 3,14D ✓

$\frac{31,4}{3,14}$ = D

10 cm = D ✓

V = 3,14 × (5 cm ✓)^2 × 10,5 cm ✓
V = 824,25 ✓ cm^3 ✓ (7)

1.2. Dimensions of the label:
Length = circumference + 1 cm
Length = 31,4 cm ✓ + 1 cm ✓
Length = 32,4 ✓

Breadth = 10,5 cm ✓ (4)
[11]

QUESTION 2: 12 minutes *(Taken from DoE/Preparatory Exam 2008 Paper 1)*

2.1 Volume of cylinder = π × (radius)^2 × height
= 3,14 × (0,4)^2 × 1,2 ✓
= 0,60288m^3 ✓
≈ 0,6m^3 ✓ (3)

2.2 The volume of Geyser 2 is 768 000 cm^3
1 000 cm^3 = 1 litre
768 000 cm^3 = 768 cm^3 ✓ (1)

2.3 1 litre = 0,22 gallon
1 litre : 0,22 gallon = 768 litre : x gallons

$$\frac{1}{0,22} = \frac{768}{x}$$

x = 0,22 × 768 ✓
= 168,96 gallons ✓ (2)

2.4 Surface area of cylinder = 2πrh + 2πr^2
Surface area of cylinder = 2 × 3,14 × 0,4 m ✓ × 1,2 m ✓ + 2 × 3,14 × (0,4 m)^2
= 4,0192 m^2 ✓
= 4,02 m^2 ✓ (4)

2.5 1 litre tin of glue : 1,25 m^2 = 5 litre tin : x m^2

$$\frac{1}{1,25} = \frac{5}{x}$$

x = 5 × 1,25 m^2 ✓
x = 6,25 m^2 ✓ (2)
[12]

QUESTION 3: 8 minutes *(Taken from DoE/November Exam 2008 Paper 1)*

3.1. V = $\boldsymbol{l \times b \times h}$
V = 2,5 m ✓ × 2 m ✓ × 1,5 m ✓
V = 7,5 m^3 ✓ (4)

3.2. S.A. = $(l \times b) + 2(l \times h) + 2(b \times h)$ ✓
S.A. = [(2,5 ✓ × 2 ✓) + 2(2,5 × 1,5 ✓) + 2(2 × 1,5)] m^2
S.A. = (5 + 7,5 + 6) m^2
S.A. = 18,5 m^2 ✓ (5)
[9]

SESSION 4: TOPIC 1: PREPARATION 1: EXAMINATION PAPER 1

Teacher Note: When attempting the examination questions below, learners must determine to which specific section the question pertains. They must remember to check the number of places to round off to. They must also remember to write down the units when dealing with money, space, shape and measurement.

LESSON OVERVIEW

1. Introduce session: 5 minutes
2. Typical exam questions: 55 minutes
3. Review/solutions/memo: 30 minutes

SECTION A: TYPICAL EXAM QUESTIONS

QUESTION 1: 8 minutes *(Taken from DoE/Preparatory Examination 2008 Paper1)*

1.1. Write $\frac{11}{20}$ as a percentage. (2)

1.2. Convert 2,5km to metres. (1)

1.3. Decrease R128 by 5%. (3)

1.4. Write the ratio 2kg: 0,4kg in its simplest form. (2)

[8]

QUESTION 2: 6 minutes *(Taken from DoE/November 2009 Paper1)*

315 guests and 1 050 learners attended a function. The guests were served tea, while the learners received fruit juice

2.1. Write down the ratio of the number of guests who attended the function to the number of learners. Give the ratio in its simplest form. (2)

2.2. The school found that for every 2 guests who drank rooibos tea, there were 5 guests who drank regular tea. Calculate the number of guests at the function who drank rooibos tea. (3)

2.3. The concentrated fruit juice that was bought for the function comes in 5-litre bottles, and is diluted in the ratio of 1 part juice to 4 parts water. How many litres of diluted fruit juice can be made from one 5-litre bottle of concentrated fruit juice? (3)

[8]

QUESTION 3: 11 minutes *(Taken from DoE/November 2009 Paper 1)*

Ms James, an educator at Achiever's High, is responsible for preparing the prize-giving certificates for the annual academic awards' assembly.

The certificate is rectangular in shape with a uniform 2,5 cm shaded border, as shown in the diagram on the right. The outside measurement of the certificate is 21 cm by 29,5 cm.

A gold or silver circle with a radius of 5 cm indicating the performance level of the learner is placed on the certificate.

3.1. Write down the length of the diameter of the circle. (1)

3.2. Write down the length of the unshaded part of the certificate. (2)

3.3. Calculate the area of the circle. Use the formula:

Area = πr^2, where π = 3,14 and r = radius (3)

3.4. Calculate the perimeter of the outside of the certificate. Use the formula:

Perimeter = 2 (*l* + *b*), where *l* = length and *b* = breadth (2)

3.5. Determine the area of the certificate. Use the formula: Area = length × breadth. (2)

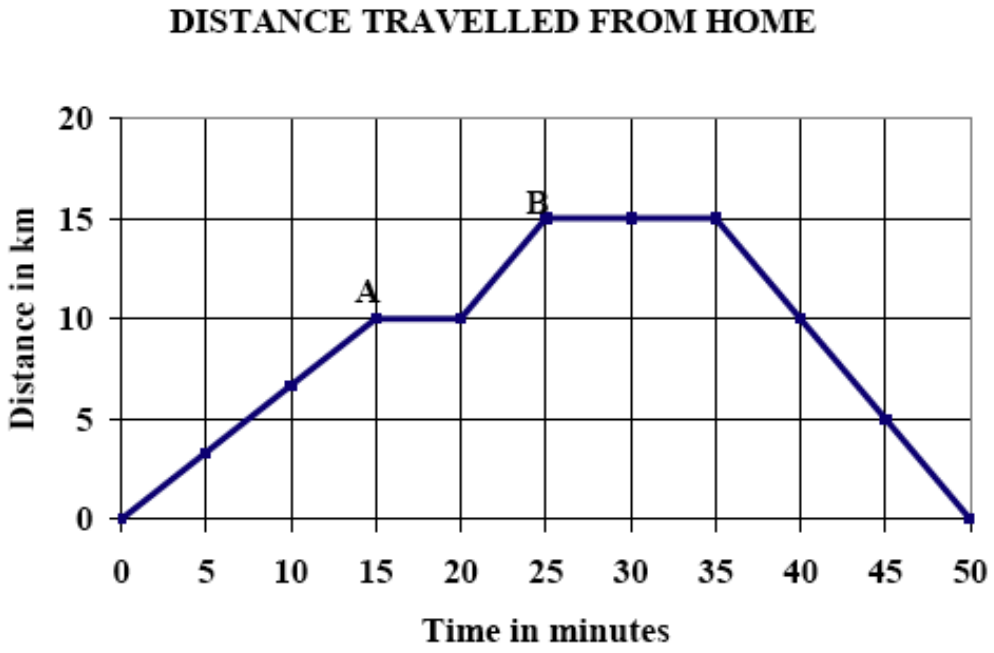
[10]

QUESTION 4: 11 minutes *(Taken from DoE/Preparatory Exam 2008 Paper1)*

Mrs Khumalo has two children, Mpho and Tumi, who attend two different schools. The following information describes Mrs Khumalo's routine on a particular morning:

- She drives Mpho (7 years old) and Tumi (17 years old) to their respective schools.
- First she drops Mpho at point A.
- Then she takes Tumi to her school at point B.
- Then she returns home.

Use the graph on the next page to answer the questions that follow.



4.1. How long was Mrs Khumalo away from home? (1)

4.2. How far, in km, is it from the Khumalo home to Mpho's school at point A? (1)

4.3. How long did it take Mrs Khumalo to reach Mpho's school? (1)

4.4. How far, in km, is Tumi's school at point B from home? (1)

4.5. How much time did Mrs Khumalo spend at Tumi's school? (2)

4.6. It took Mrs Khumalo 15 minutes to drive the 10 km from home to Mpho's school.

a) Express 15 minutes as a fraction of an hour in decimal form. (2)

b) Calculate Mrs Khumalo's average speed in km per hour during the trip from home to Mpho's school using the formula below.

$$\text{Average Speed} = \frac{\text{distance}}{\text{time}}$$ (3)

[11]

QUESTION 5: 19 minutes *(Taken from DoE/November 2008 Paper1)*

Sipho and Sandile are twin boys who are both good middle-distance athletes.

Their athletics coach gave them the following 40 minute training programme:

- Jog for 5 minutes at a pace of 80 m per minute.
- Run for 10 minutes at a pace of 100 m per minute.
- Take a 5 minute rest.
- Walk for 5 minutes at a pace of 50 m per minute.
- Run for 15 minutes at a pace of 100 m per minute.

TABLE 5: Total distance covered by each twin during the daily training programme

Time elapsed (in min.)	0	5	15	20	25	40
Total distance (in m)	0	400	1 400	1 400	1 650	3 150

5.1. Use the data in TABLE 5 and the grid provided on the next page to draw a line graph representing the time elapsed and the total distance covered. (5)

5.2. Sipho and Sandile recorded their times in minutes for a number of 7 km trial runs as shown below.

Times taken for a 7 km trial run

Sandile (in minutes)	35	32	31	32	32	31	30	29	32	30	
Sipho (in minutes)	30	31	32	33	33	34	34	35	35	35	37

5.2.1. Write down Sipho's **median** time. (1)

5.2.2. Calculate Sandile's **median** time. (3)

5.2.3. Determine the **range** of Sipho's time. (2)

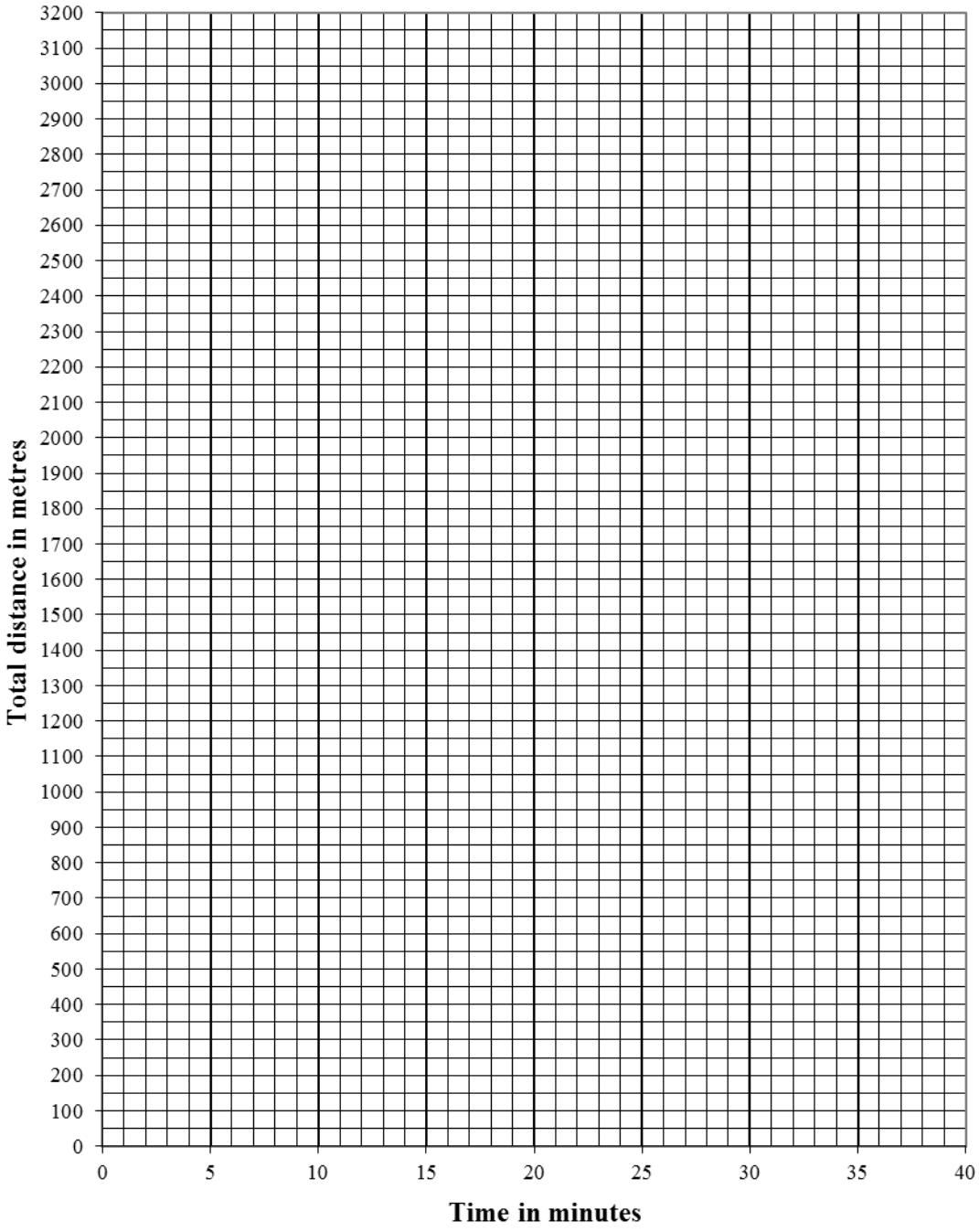
5.2.4. Calculate Sandile's **mean** time, rounded off to TWO decimal places. (3)

5.2.5. Determine the **mode** of Sandile's times. (2)

5.2.6. Use Sipho's times for his eleven trial runs to determine the probability that his next trial run will be less than 35 minutes. (2)

[18]

DISTANCE COVERED DURING TRAINING



SECTION B: SOLUTIONS AND HINTS TO SECTION A

QUESTION 1: 8 minutes *(Taken from DoE/Preparatory Examination 2008 Paper1)*

1.1. $\frac{11}{20}$ × 100% ✓ = 55% ✓ (2)

1.2. 2,5 km = 2 500 m ✓ (1)

1.3. R128 – (5% of R128) = R128 – (5% × R128)
= R128 – ($\frac{5}{100}$ × R128) ✓
= R128 – R6,40 ✓
= R121,60 ✓

OR

R128 x 0,95 ✓✓ = R121,60 ✓ (3)

1.4. 2kg : 0,04kg = 2 000 g : 400 g ✓
= 5 : 1 ✓ (2)

[8]

QUESTION 2: 6 minutes *(Taken from DoE/November 2009 Paper1)*

2.1. 315 : 1050 ✓
= 3 : 10 ✓ (2)

2.2. $\frac{2}{7}$ ✓ × 315 guests✓
= 90 guests ✓ (3)

2.3. 1 litre concentrate makes 5 litres of juice ✓
5 litres concentrate makes 5 × 5 litres ✓
= 25 litres ✓

OR

Number of litres of juice – 4 x 5 litres + 1 x 5 litres ✓
= 20 litres + 5 litres ✓ = 25 litres ✓ (3)

[8]

QUESTION 3: 11 minutes *(Taken from DoE/November 2009 Paper 1)*

3.1. D = 10cm ✓ (1)

3.2. L = 29,5cm – 2,5cm – 2,5cm ✓
= 24,5cm ✓ (2)

3.3. A = π r^2
= 3,14 × $(5cm)^2$ ✓
= 78,5 ✓cm^2 ✓ (3)

3.4. P = 2(29,5 + 21) ✓
= 101 cm ✓ (2)

3.5. A = 29,5cm × 21 cm ✓
= 619,5cm^2 ✓ (2)
[10]

QUESTION 4: 11 minutes *(Taken from DoE/Preparatory Examination 2008 Paper1)*

4.1. 50 minutes ✓ (1)
4.2. 10km ✓ (1)
4.3. 15 minutes ✓ (1)
4.4. 15km ✓ (1)
4.5. 35 min – 25 min ✓
= 10min ✓ (2)
4.6. a) $\frac{15}{60}$ ✓ = 0,25 ✓ (2)

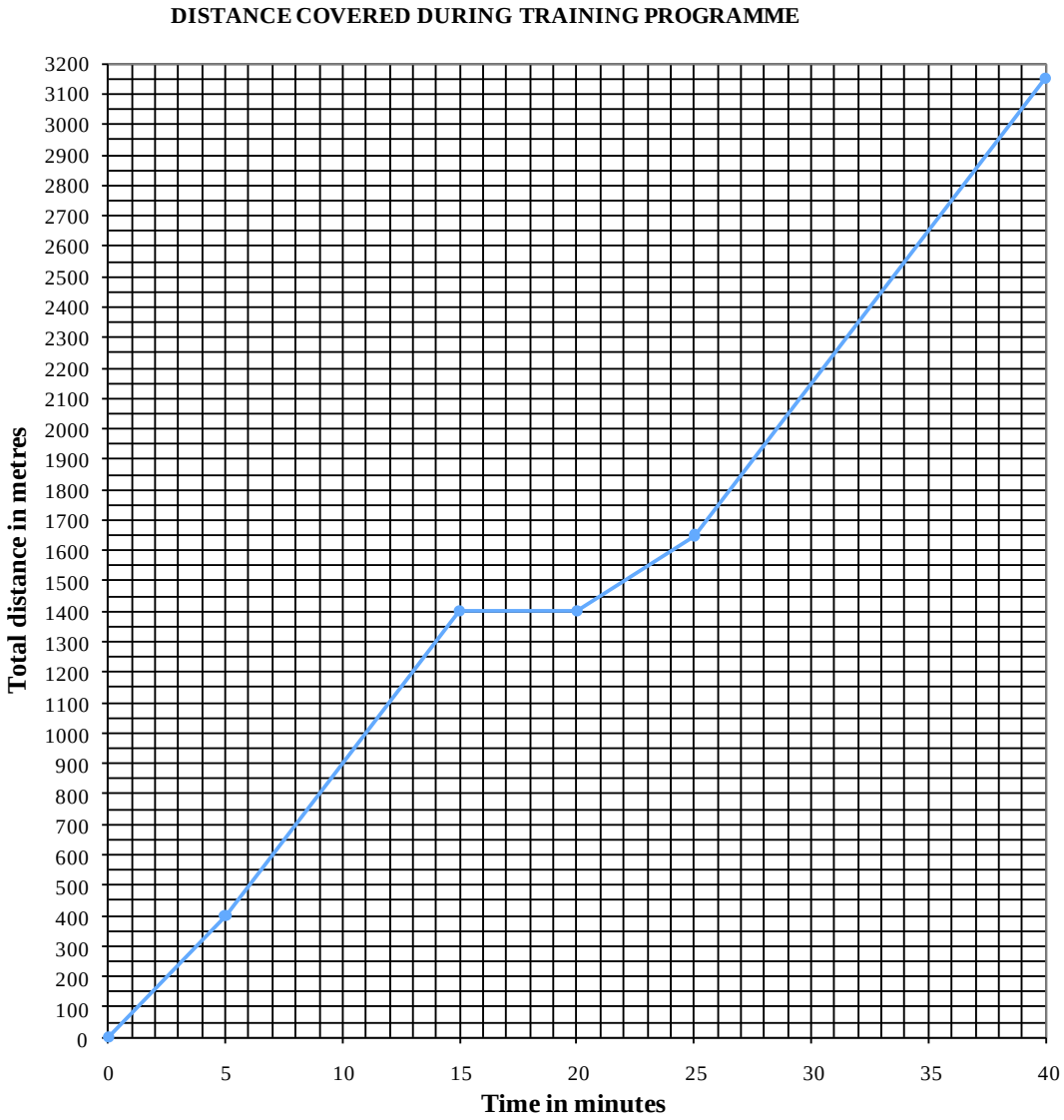
b) $\text{Average Speed} = \frac{\text{distance}}{\text{time}}$

Average speed = $\frac{15\text{ km}}{0{,}25\text{ h}}$ ✓✓

Average speed = 60 km/h ✓ (3)
[11]

QUESTION 5: 19 minutes *(Taken from DoE/November 2008 Paper1)*

5.1.



Maximum 2 marks if Bar Graph drawn

✓✓ Any two points plotted correctly ✓ Joining the points with straight lines
✓ resting (horizontal line 15 – 20 minutes) ✓ totally correct shape (5)

5.2. Measures of Central Tendency

5.2.1. Median time = 34 minutes ✓ (1)

5.2.2. Sandile's times : 29; 30; 30; 31; 31; 32; 32; 32; 32; 35 ✓

Median time = $\frac{32+31}{2}$ minutes ✓

= 31,5 minutes or 31 minutes 30 seconds ✓ (3)

5.2.3. Range = (37-30) minutes✓

= 7 minutes✓ (2)

5.2.4. Sandile's mean time

$= \frac{\text{Sum of Sandile's times}}{\text{no of trials}}$ ✓

$= \frac{29+30+30+31+31+32+32+32+32+35}{10}$ minutes ✓

$= \frac{314}{10}$ minutes

= 31,40 minutes **OR** 31 minutes 24 seconds ✓ (3)

5.2.5. Mode = 32 minutes. ✓✓ (2)

5.2.6. P(less than 35 minutes) = $\frac{7}{11}$ ✓✓

OR 63,64% ✓✓ **OR** 0,64 ✓✓ (2)

[18]

SECTION C: HOMEWORK

QUESTION 1: 7 minutes *(Taken from DoE/November 2008 Paper 1)*

A survey of 1 000 households was undertaken during 2001 to determine how many households used various electronic appliances. A survey of the same number of households was repeated during 2007.

The graph below shows the results of the two surveys.

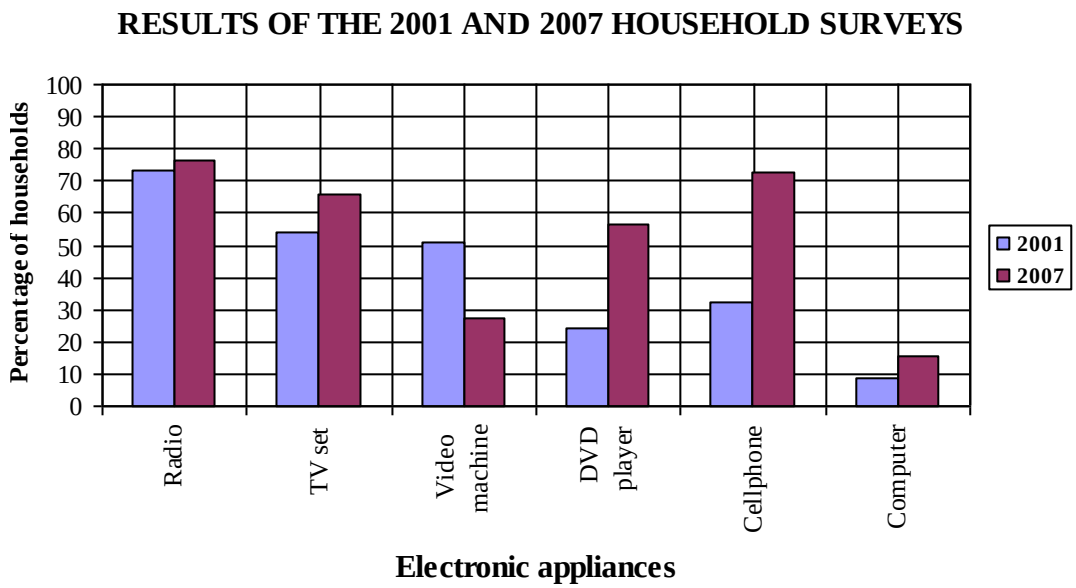


TABLE 2: Percentage of households using the various electronic appliances

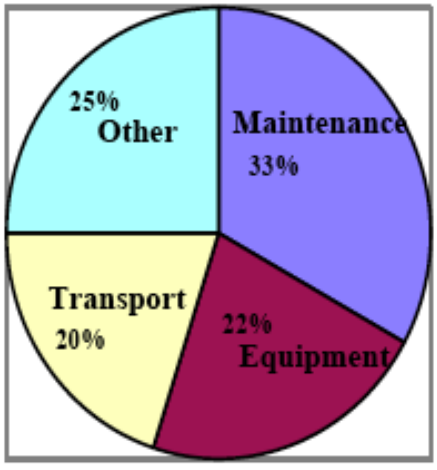
Year	Radio	TV set	Video machine	DVD player	Cellphone	Computer
2001	73,0	53,8	51,2	24,4	32,3	8,8
2007	76,6	65,6	27,6	56,4	72,9	15,7

1.1. What was the percentage increase in usage of TV sets between 2001 and 2007? (1)
1.2. Which appliance was used in most households during both 2001 and 2007? (1)
1.3. Which appliance showed a decrease in usage in 2007 compared to 2001? (1)
1.4. How many of the 1 000 households surveyed used cellphones during 2007? (2)
1.5. Calculate the difference in usage during 2001 between TV sets and DVD players. (3)
[8]

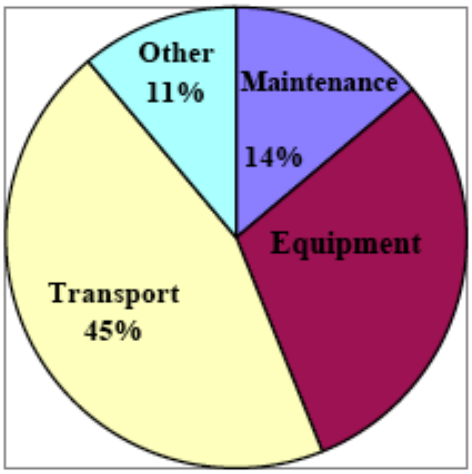
QUESTION 2: 11 minutes *(Taken from DoE/Preparatory Examination 2008 P1)*

The pie charts below show the yearly expenditure of the Pythons Soccer Club and the Mamba Soccer Club for 2007.

Pythons Soccer Club
Total Expenditure: R54 000



Mamba Soccer Club
Total Expenditure: R35 000



2.1. What was the total expenditure of Pythons Soccer Club for 2007? (1)
2.2. What percentage was spent by the Mamba Club on transport? (1)
2.3. What percentage was spent by the Mamba Club on equipment? (2)

2.4. Calculate the actual amount spent by the Pythons Club on maintenance. (2)

2.5. The Pythons Club receives its income from membership fees. The club had 100 members in 2007, each paying R450 membership fee for the year. All the members paid in full for 2007. What was the club's income from membership fees in 2007? (2)

2.6. The Pythons Club increased its membership fees by 6% for 2008. Calculate the new membership fee for ONE member. (3)

2.7. The total income of the Mamba Club for 2007 was R42 000. Calculate the club's surplus (profit) for 2007.

Profit = Income – Expenditure (2)

[13]

QUESTION 3: 12 minutes *(Taken from DoE/November 2008 Paper 1)*

The Lighthouse Foundation provides food parcels, uniforms and clothing to needy children in Limpopo.

Each year the Lighthouse Foundation presents a financial report to all its stakeholders (see TABLE 3).

TABLE 3:
Lighthouse Foundation Financial Report for 1 Mar 2006 to 28 Feb 2007

INCOME		EXPENSES	
Item	**Amount (in rand)**	**Item**	**Amount (in rand)**
Private donations		**Administration costs**	
Local	78 240	Salaries for part-time employees	128 833
Overseas	57 120	Telephone	15 571
Subsidy		Stationery/Postage	2 379
Local municipality	308 160	Bank charges	2 899
		Services rendered to children	
		Food parcels	178 200
		Vegetable gardens (seedlings, fertiliser, etc.)	5 812
		School uniforms	10 047
		Clothing	30 456
		Transport costs	22 822
TOTAL INCOME	**443 520**	**TOTAL EXPENSES**	**397 019**

Use the information in TABLE 3 to answer the following questions:

3.1. Write down the period of time covered by the financial report. (1)

3.2. Name the Lighthouse Foundation's main source of income. (1)

3.3. Express the subsidy from the local municipality as a percentage of the total income. (Round off the answer to ONE decimal place.) (4)

3.4. Calculate the average cost of ONE school uniform if 48 children received school uniforms. (3)

3.5. The overseas donations are from Japanese businessmen. Determine the amount in yen that the Foundation received from overseas donations.

1 Japanese yen (¥) = 0,08 South African rand (R). (3)

[12]

SECTION D: SOLUTIONS TO HOMEWORK

QUESTION 1: 7 minutes *(Taken from DoE/November 2008 Paper 1)*

1.1 65,6% - 53,8% = 11,8% ✓ (1)

1.2 Radio ✓ (1)

1.3 Video machine ✓ (1)

1.4 72,9% × 1000 households
= 0,729 x 1000 ✓
= 729 households ✓ (2)

1.5 Difference in percentage = 53,8 % ✓ – 24,4% ✓
= 29,4% ✓

OR
Difference in usage
= (53.8% of 1 000) ✓ – (24,4% of 1 000) ✓
= 538 – 244
= 294 ✓

OR
(53,8% ✓- 24,4% ✓) × 1 000
= 29,4% × 1 000
= 294 ✓ (3)

[8]

QUESTION 2: 11 minutes *(Taken from DoE/Preparatory Examination 2008 P1)*

2.1. Pythons: R54 000 ✓ (1)

2.2. 45%✓ (1)

2.3. 100% - (45% + 11% + 14%) ✓
= 30% ✓ (2)

2.4. 33% of R54 000
= 0,33 × 54000 ✓
= R17 820 ✓ (2)

2.5. 100 × R450 ✓
= R45 000 ✓ (2)

2.6. R450 + (6% of R450)
= R450 ✓ + ($\frac{6}{100}$ × R450)
= R450 + R27 ✓ = R477 ✓

OR
1,06 × R450 ✓✓
= R477 ✓ (3)

2.7. R42 000 – R35 000 ✓
= R7 000 ✓ (2)
[13]

QUESTION 3: 12 minutes *(Taken from DoE/November 2008 Paper 1)*

3.1. 1 March 2006 – 28 February 2007
OR
12 months
OR
One year
OR
March to February ✓ (1)

3.2. Local municipality **OR** Subsidy ✓ (1)

3.3. $\frac{R308\ 160}{R443\ 520}$ × 100% ✓
= 69, 48051948 % ✓
≈ 69,5% ✓✓ (4)

3.4. Average cost of one school uniform
= R10 047 ÷ 48 ✓
= R209,3125 ✓
= R209,31 **OR** R209,30 ✓ (3)

3.5. R0,08 : 1 yen = R57 120 : x

$$\frac{0,08}{1} = \frac{57\ 120}{x}$$ ✓

$$0,08x = 57\ 120$$

$$\frac{0,08x}{0,08} = \frac{57\ 120}{0,08}$$ ✓

x = 714 000 yen ✓ (3)
[12]

SESSION 4: TOPIC 2: PREPARATION 2: EXAMINATION PAPER 1

Teacher Note: When attempting the examination questions below, learners must determine to which specific section the question pertains . They must remember to check the number of places to round off to. They must also remember to write down the units when dealing with money, space, shape and measurement. Learners must remember which operations to do first. Remember BODMAS!

LESSON OVERVIEW

1. Introduce session: 5 minutes
2. Typical exam questions: 55 minutes
3. Review/solutions/memo: 30 minutes

SECTION A: TYPICAL EXAM QUESTIONS

QUESTION 1: 19 minutes *(Taken from DoE/Preparatory Examination 2008 Paper 1)*

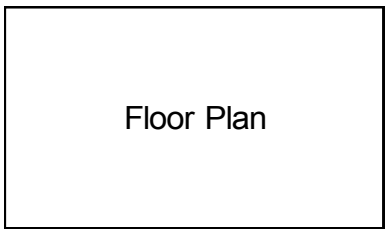
1.1 Calculate:

1.1.1 $325 - 36{,}3 \div 0{,}3$. (2)

1.1.2 7,5% of R499. (2)

1.1.3 $\frac{4}{5}$ of 250 learners. (1)

1.2 The diagram below shows the floor plan of the living room of a house.



1.2.1 Calculate the perimeter of the living room.

Perimeter of rectangle = 2 x (length + breadth) (2)

1.2.2 Calculate the area of the floor.

Area of rectangle = length x breadth (2)

1.2.3 If a concrete floor, which is 5 cm thick, is to be laid, how many cubic metres of concrete will be needed? Give your answer rounded off to the nearest whole number.

Volume of rectangular prism = length x breadth x height (3)

1.3 A circular flower bed has a radius of 1,5 metres.

1.3.1 Write down the diameter of the flowerbed. (1)

1.3.2 Calculate the area of the flowerbed.

Area of circle = $\pi \times r^2$. Use $\pi = 3{,}14$. (3)

1.3.3 Calculate the circumference of the flowerbed.

Circumference of circle = $2 \times \pi \times r$. Use $\pi = 3{,}14$. (3)

[19]

QUESTION 2: 15 minutes

Mrs Phumzile is starting a transport business. She owns one taxi, and she employs Pieter as a taxi driver. The table below shows a list of the income and expenses of Mrs Phumzile's business for the month of February 2007.

	Income	Expenses
Maintenance costs:		
a) Fuel		R1065.40
b) Service and repairs		R546.09
c) Cleaning		R60.00
Insurance for taxi		R305.45
Taxi licence fee		R400.00
Taxi driver's salary		R3 500.00
Taxi association fee		R200.00
Fares collected	R7 842.00	
TOTAL	**R7 842.00**	**R6 076.94**

2.1. Determine the following:

2.1.1. The total cost of maintenance. (2)

2.1.2. How many litres of fuel were used if fuel costs R7,00 a litre. (2)

2.1.3. What percentage of the total expenses is allocated to salary. (3)

2.2. On Monday 18 February, Pieter worked from 06:00 to 15:30. How many hours did he work on that day? (2)

2.3. Pieter's basic salary is R17,50 per hour. If Pieter wants to earn R200,00 per day, how many hours does he have to work? Give your answer to the nearest hour. (3)

2.4. Mrs Phumzile asks Pieter to go on a trip of 120 km. Pieter drives the taxi at an average speed of 90 km/h. How long will the trip take? Write your answer correct to one decimal place. Given the formulae:

$$\text{Distance} = \text{Speed} \times \text{Time}$$

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

(3)

[15]

QUESTION 3: 12 minutes *(Taken from DoE/November 2009 Paper 1)*

One of the key functions of the Department of Social Development is to provide social assistance to people in need. The following table shows both the number and the percentage of beneficiaries allocated to each type of grant during 2005 and 2007:

TABLE 3: Allocation of grants during 2005 and 2007

TYPE OF GRANT	2005		2007	
	Number of beneficiaries	%	Number of beneficiaries	%
Old-age pensioners	2 097 723	22,3	2 190 686	18,2
Child support	5 662 911	60,2	7 908 138	65,7
Disability	1 307 549	A	1 420 335	11,8
Other	338 646	3,6	517 580	4,3
TOTAL	9 406 829	100	B	100

3.1. What percentage of the grants allocated during 2007 were for old-age pensioners? (1)

3.2. Calculate the difference between the number of beneficiaries receiving child support grants during 2005 and 2007. (3)

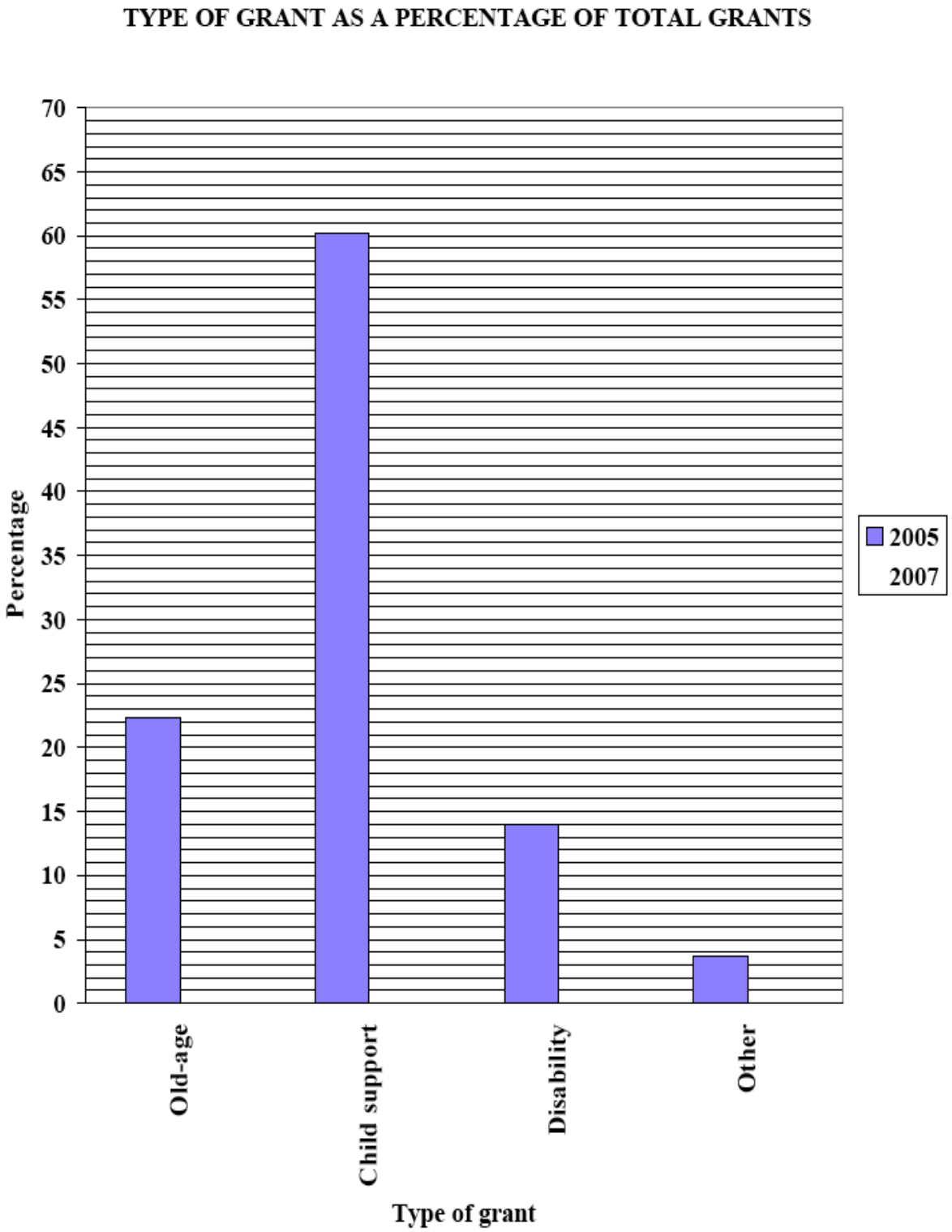
3.3. Calculate the following missing values from the table:

3.3.1. A (2)

3.3.2. B (2)

3.4. The percentage of the total number of beneficiaries for each type of grant during 2005 is represented as a bar graph on the next page. Complete the graph by adding in bars to represent the percentage of allocations for the different types of grants during 2007. (4)

[12]



QUESTION 4: 9 minutes *(Taken from DoE/November 2008 Paper 1)*

The ages (in years) of patients treated for malaria at two different clinics during a certain month were recorded as follows:

Clinic A (Set 1): 5 7 18 24 24 32 46 52 63

Clinic B (Set 2): 37 28 17 56 43 55 39 40 26 35

4.1. What is the median of Set 1? (1)

4.2. What is the mode of Set 1? (1)

4.3. Arrange the ages of Set 2 in ascending order. (2)

4.4. Calculate the range of Set 2. (2)

4.5. Calculate the mean age of Set 2. (3)

[9]

SECTION B: SOLUTIONS AND HINTS TO SECTION A

QUESTION 1: 19 minutes *(Taken from DoE/Preparatory Examination 2008 Paper 1)*

1.1. Calculate:

1.1.1. $325 - 36,3 \div 0,3$
$= 325 - 121$ ✓
$= 204$ ✓ (2)

1.1.2. 7,5% of R499
$= 0,075$ ✓ × R499
$= R37,43$ ✓ (2)

1.1.3. $\frac{4}{5}$ × 250 learners
$= 200$ learners ✓ (1)

1.2. Floor Plan

1.2.1. Perimeter $= 2 \times (l + b)$
$= 2(5,2 + 3,8)$ ✓
$= 18m$ ✓ (2)

1.2.2. Area $= l \times b$
$= 5,2 \times 3,8$ ✓
$= 19,76m^2$ ✓ (2)

1.2.3. Volume of concrete $= l \times b \times h$
$= 5,2 \times 3,8 \times 0,05$ ✓
$= 0,988m^3$ ✓
$\approx 1m^3$ ✓ (3)

1.3. Circular flowerbed

1.3.1. 3m ✓ (1)

1.3.2. Area of circle = $\pi \times r^2$
$= 3,14 \times (1,5\ m)^2$ ✓
$= 7,065\ m^2$ ✓
$\approx 7,07m^2$ ✓ (3)

1.3.3. Circumference = $2 \times 3,14 \times r$
$= 2 \times 3,14 \times 1,5$ ✓
$= 9,42m^2$ ✓✓ (3)

[19]

QUESTION 2: 15 minutes

2.1.1. Maintenance costs:

= R1065,40 + R546,09 + R60 ✓
= R1 671,49 ✓ (2)

2.1.1. No. of litres of fuel
= R1065,40 ÷ 7 ✓
= 152,2l ✓ (2)

2.1.2. $\frac{R3\ 500}{R6\ 076,94} \times 100\%$ ✓✓
= 57,59%✓ (3)

2.2. Hours worked = 15:30 – 6:00 ✓
= 9h30 min ✓ (2)

2.3. No. of hours = R200 ÷ R17,50 ✓✓
= 11,4287
≈ 12 hrs ✓ (3)

2.4. $\text{Time} = \frac{\text{Distance}}{\text{Speed}}$ ✓

$\text{Time} = \frac{120\ \text{km}}{90\ \text{km/h}}$ ✓

Time = 1h 20 min ✓ (3)

[15]

QUESTION 3: 12 minutes *(Taken from DoE/November 2009 Paper 1)*

3.1. 18,2% ✓ (1)

3.2. Difference = 7 908 138 ✓ – 5 662 911 ✓
= 2 245 227 ✓ (3)

3.3. Missing values

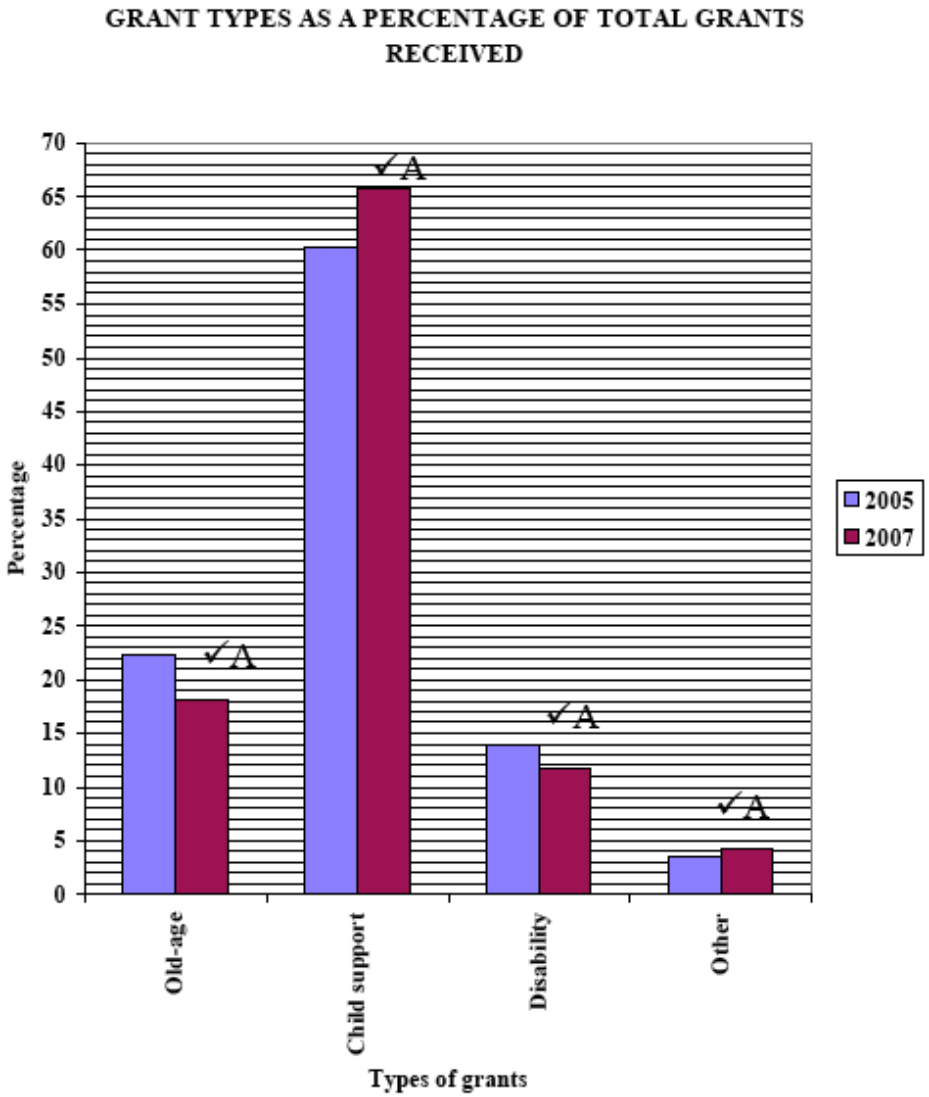
3.3.1. A = 100% - 22,3% - 60,2% - 3,6% ✓
A = 13,9% ✓

OR

$\frac{1\,307\,549}{9\,406\,829} \times 100\%$ ✓
= 13,9% ✓ (2)

3.3.2. B = 2 194 066 + 7 908 138 + 1 420 335 + 517 580 ✓
B = 12 036 739 ✓ (2)

3.4. The graph (4)



✓ Old-age 2007 (accept 18%)
✓ Child support in 2007 (accept 66%)
✓ Disability in 2007 (accept 12%)
✓ Other in 2007 (accept 4%)

[12]

QUESTION 4: 9 minutes *(Taken from DoE/November 2008 Paper 1)*

4.1. 24 ✓ (1)

4.2. 24 ✓ (1)

4.3. 17 26 28 35 37 39 40 43 55 56 ✓✓ (2)

4.4. 56 – 17 ✓ = 39 ✓ (2)

4.5. $$\frac{17 + 26 + 28 + 35 + 37 + 39 + 40 + 43 + 55 + 56}{10}$$

$$= \frac{376}{10} \checkmark\checkmark$$

= 37,6 ✓ (3)

[9]

SECTION C: HOMEWORK

QUESTION 1: 17 minutes *(Taken from DoE/Nov Exam 2009 Paper 1)*

1.1. Calculate the price of one 500g brick of margarine if a box containing thirty 500g bricks of margarine costs R399,00. (2)

1.2. If 18 May 2009 is on Monday, what is the probability that 19 May 2009 is on Tuesday? (2)

1.3. Convert 225°C to °F using the following formula:

Temperature in °F = $\frac{9}{5}$ × (Temperature in °C) + 32°

Round the answer off to the nearest 5° (3)

1.4.

Naledi intends selling oranges at her school market day. She buys one dozen oranges for R9,00. She decides to sell the oranges in packets of six at R6,00 per packet.

Calculate:

1.4.1. The cost price of ONE orange. (2)

1.4.2. The profit she will make per dozen oranges sold. (2)

1.4.3. How much it would cost Naledi to buy 108 oranges. (2)

1.5.

Examination rules specify that each learner is to be given a seating area in the examination venue of at least 1,6 m^2

1.5.1. What is the minimum total area that is required for 52 learners sitting for an examination? (2)

1.5.2. Calculate the maximum number of learners that can be accommodated in an examination venue having an area of 96m^2 if the examination rules are adhered to. (2)

[17]

QUESTION 2: 13 minutes *(Taken from DoE/Nov Exam 2009 Paper 1)*

2.1. Simplify the ratio of 464 : 128. (1)

2.2. Write $\frac{379}{250}$ as a decimal fraction. (2)

2.3. Simplify (show ALL calculations): $\sqrt{49} + \frac{1}{3}(71-14)$. (4)

2.4. Convert 1,25 litres to ml if 1litre = 1000ml (2)

2.5. Increase 1 255 kg by 16% (3)

2.6. Convert \$1 215,00 to rand. Use the exchange rate \$1 = R10,52 (2)

[14]

SECTION D: SOLUTIONS TO HOMEWORK

QUESTION 1: 17 minutes *(Taken from DoE/Nov Exam 2009 Paper 1)*

1.1. $\frac{R399}{30}$ ✓

= R13,30 ✓

OR

Total number of grams in a box = 500g x 30

= 15 000g ✓

Cost of 500g = $\frac{R399}{15\,000} \times 500$ ✓

= R13,30 ✓ (2)

1.2. 1 or 100% or certain ✓✓ (2)

1.3. Temperature in °F = $\frac{9}{5} \times 225\,°C + 32°$ ✓

= 405° + 32°

= 437 °F ✓

≈ 435 °F ✓ (3)

1.4

1.4.1. Cost of 1 orange = $\frac{R\,9{,}00}{12}$ ✓

= R0,75 ✓

OR

Cost of 1 orange = $\frac{R\,9{,}00 \times 100}{12}$ ✓

= 75 cents ✓ (2)

1.4.2. 1 dozen oranges sell for R12,00 ✓

Profit = E12,00 – R9,00

= R3,00 ✓ (2)

1.4.3. Cost = 108 × R0,75 ✓
= R81,00 ✓

OR

108 oranges = $\frac{108 \times R\,9{,}00}{12}$ ✓
= R81,00 ✓ (2)

1.5

1.5.1. 52 learners × 1,6m^2/learner ✓
= 83,2m^2 ✓ (2)

1.5.2. Number of learners = $\frac{96}{1{,}6}$ ✓
= 60 learners ✓ (2)
[17]

QUESTION 2: 13 minutes *(Taken from DoE/Nov Exam 2009 Paper 1)*

2.1. 464 : 128
29 : 8 ✓ (1)

2.2. $\frac{379}{250}$ = 1,516 ✓
≈1,52 ✓ (2)

2.3. $\sqrt{49} + \frac{1}{3}(71-14)$
$= 7 + \frac{1}{3}(57)$ ✓✓
= 7 + 19 ✓
= 26 ✓ (4)

2.4. 1,25 × 1000 ml ✓= 1 250 ml ✓ (2)

2.5. 16% of 1255kg = $\frac{16}{100}$ × 1 255 kg
= 200,8 kg ✓
New amount = 1 255 kg + 200,8 kg ✓
= 1 455,8 kg ✓

OR

16 % increase = 1,16 ✓
New amount = 1,16 × 1255kg ✓
= 1 455,8kg ✓ (3)

2.6. $1 = R10,52
$1 215,00 = R10,52 x 1215,00 ✓
= R12 781,80 ✓ (2)
[14]

SESSION 4: TOPIC 3 : PREPARATION 3: EXAMINATION PAPER 2

Teacher Note: When attempting the examination questions below, learners must determine to which specific section the question pertains . They must remember to check the number of places to round off to. They must also remember to write down the units when dealing with money, space, shape and measurement. Learners must remember which operations to do first. Remember BODMAS!

LESSON OVERVIEW

1. Introduce session: 5 minutes
2. Typical exam questions: 55 minutes
3. Review/solutions/memo: 30 minutes

SECTION A: TYPICAL EXAM QUESTIONS

QUESTION 1: 15 minutes (*Taken from DoE Nov Exam 2009 Paper 2)*

The Royal Bafokeng Stadium is one of the stadiums that will be used during the 2010 Soccer World Cup. It has a seating capacity of 42 000.

The stadium will be used for five first-round matches and one second-round match.

Seating categories are based on the position of the seat in the stadium. Category 1 seats have the best view of the soccer field, as indicated in the diagram alongside.

Layout of the different categories of seating

The table below gives the ticket prices for South African residents for the various types of matches and categories of seating.

TABLE 4: Ticket prices in South African rand (ZAR)

TYPE OF MATCH	CATEGORIES OF SEATING			
	1	2	3	4**
Opening	3 150	2 100	1 400	490
First round	1 120	840	560	140
Second round	1 400	1 050	700	350
Quarter-final	2 100	1 400	1 050	525
Semi-finals	4 200	2 800	1 750	700
3rd/4th place	2 100	1 400	1 050	525
Final	6 300	4 200	2 800	1 050

** Wheelchair-bound spectators pay Category 4 prices.

Write down a formula in the form:

'Total income = ……'

that can be used to calculate the total income from ticket sales for a second-round match. (3)

1.1. The following table shows the expected number of tickets to be sold in each category for the second-round match at the Royal Bafokeng Stadium:

TABLE: Expected number of tickets to be sold for the second-round match

Category 1	Category 2	Category 3	Category 4
12 425	**8 672**	**4 546**	**14 424**

1.1.1. Calculate the Royal Bafokeng Stadium's expected income from the sale of these tickets. (3)

1.1.2. To ensure that the stadium (which has seating for 42 000 spectators) is filled to capacity for the second-round match, the organisers decide to offer all the unsold tickets at a reduced price to a mining company who will distribute the tickets to schools in the area.

The organisers and the mining company agree that the reduced ticket price should be 48% of the average (mean) ticket price of a Category 3 and Category 4 seat for the second round.

Calculate the additional income that could be obtained from the sale of the tickets. (7)

[13]

QUESTION 2: 20 minutes *(Taken from DoE/Feb-Mar Exam 2009 Paper 2)*

The Hospitality Studies department of Ses'fikile High School bakes brown bread in order to raise funds for the shortfall incurred in their day-to-day expenses.

The school charges the Hospitality Studies department a fixed weekly cost of R400,00 for water and electricity.

The cost of producing one loaf of brown bread, including labour and ingredients, is R3,50. The brow bread is sold at R6,00 a loaf.

If one loaf of brown bread requires 450g of flour, determine the maximum number of loaves of brown bread that can be baked from a 12,5kg bag of flour. (4)

2.1. The table below shows the weekly cost of making the bread.

TABLE: Weekly cost of making brown bread

Number of loaves	0	40	80	120	160	**B**	300
Total income (in rand)	400	540	680	**A**	960	1 240	1 450

The formula used to calculate the total cost per week is:
Total cost per week = Fixed weekly cost + (number of loaves of bread × cost per loaf)
Use the given formula to determine the values of **A** and **B** in the table. (4)

2.2. The table below shows the weekly income from selling the bread.

TABLE: Weekly income received from selling bread.

Number of loaves	0	40	120	150	**D**	250	300
Total income (in rand)	0	240	**C**	900	960	1 500	1 800

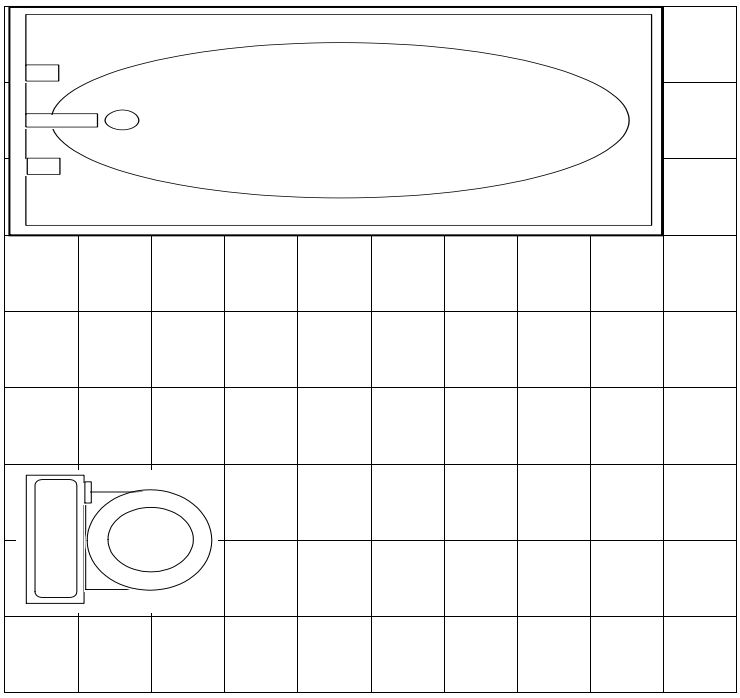
Determine the values of **C** and **D** in the table. (4)

2.3. Use the values from the Tables in question 2.1 and 2.2 to draw TWO straight-line graphs on the same grid, showing the total **COST** per week of making bread and the **INCOME** per week from selling bread. Clearly label the graphs „**COSTS'** and **'INCOME'.** (8)
[20]

QUESTION 3: 16 minutes *(Taken from DoE/Feb-Mar Exam 2009 Paper 2)*

Mrs Naudé decides to hire Bathwizz to re-tile her bathroom floor.

The scale drawing of the bathroom is illustrated alongside.



Scale: The length of one small square is 20 cm.

The fitted toilet and fitted bath are illustrated in the photographs below. The area under the toilet and the area under the bath will NOT be tiled.

3.1. What area, in m^2, of the bathroom floor does the bath cover? (6)

3.2. Calculate the area, in m^2, of bathroom floor that needs to be tiled. (5)

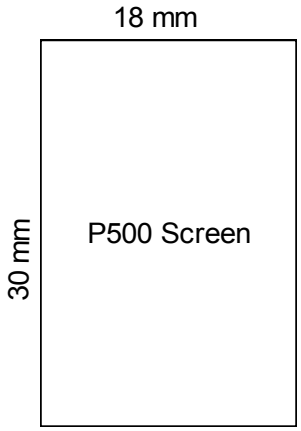
3.3. Determine how many full boxes of tiles Mrs Naudé must buy to tile her bathroom. The following information will help you with your calculations:

- One box of tiles covers 1,5 m^2.
- Mrs Naudé is advised to buy 10% more tiles than she needs in order to allow for the cutting of the tiles and for breakages. (5)

[16]

QUESTION 4: 4 minutes *(Taken from DoE/Nov Exam 2009 Paper 2)*

A diagram of the rectangular screen of cellphone P500 is given alongside. Use the measurements and the scale 2 : 5 to determine the actual measurements of the screen of cellphone P500 in millimetres. (4)



[4]

SECTION B: SOLUTIONS AND HINTS TO SECTION A

QUESTION 1: 15 minutes *(Taken from DoE Nov Exam 2009 Paper 2)*

1.1. Total income
= (number of Category 1 tickets) × R1 400 (✓ naming categories)
+ (number of Category 2 tickets) × R1 050
+ (number of Category 3 tickets) × R700 (✓ pricing of tickets)
+ (number of Category 4 tickets) × R350 (✓ summing all 4 categories)

OR

Total income ✓ = (×1) ✓ x R1 400 ✓ + (×2) x R1 050 + (×3) × R700 + (×4) x R350 (3)

1.2. Second round matches

1.2.1. Total income
= (12 425 × R1 400) + (8 672 × R1 050) + (4 546 × R700) + (14 424 × R350)
= R34 731 200 ✓
(✓ correct number of tickets with corresponding price)
(✓ summing the products) (3)

1.2.2. Total expected number of tickets sold = 40 067 ✓
Number of expected unsold tickets
42 000 – 40 067 = 1 933✓

Average price
$= \frac{R700 + R350}{2}$ = R525 ✓
48% of average price ✓
$= \frac{48}{100}$ × R525 = R252 ✓
Additional income = R252 × 1 933 ✓
= R487 116 ✓ (7)

[13]

QUESTION 2: 20 minutes *(Taken from DoE/Feb-Mar Exam 2009 Paper 2)*

2.1. Number of loaves $= \frac{12{,}5\text{ kg}}{450\text{ g}}$ ✓

$= \frac{12\,500\text{ g}}{450\text{ g}}$ ✓

$= 27{,}78$ ✓ ∴ 27 loaves ✓ (4)

2.2. Total cost = fixed cost + (number of loaves × cost per loaf)

A = 400 + (120 x R3,50) ✓

A = R820 ✓

AND

1 240 = 400 + (**B** × R3,50) ✓

840 = (B × R3,50)

$\frac{840}{3{,}50} = \frac{3{,}50\,B}{3{,}50}$

240 loaves = B ✓ (4)

2.3. Income = number of loaves × price of loaf

C = 120 x R6,00 ✓

C = R720,00 ✓

AND

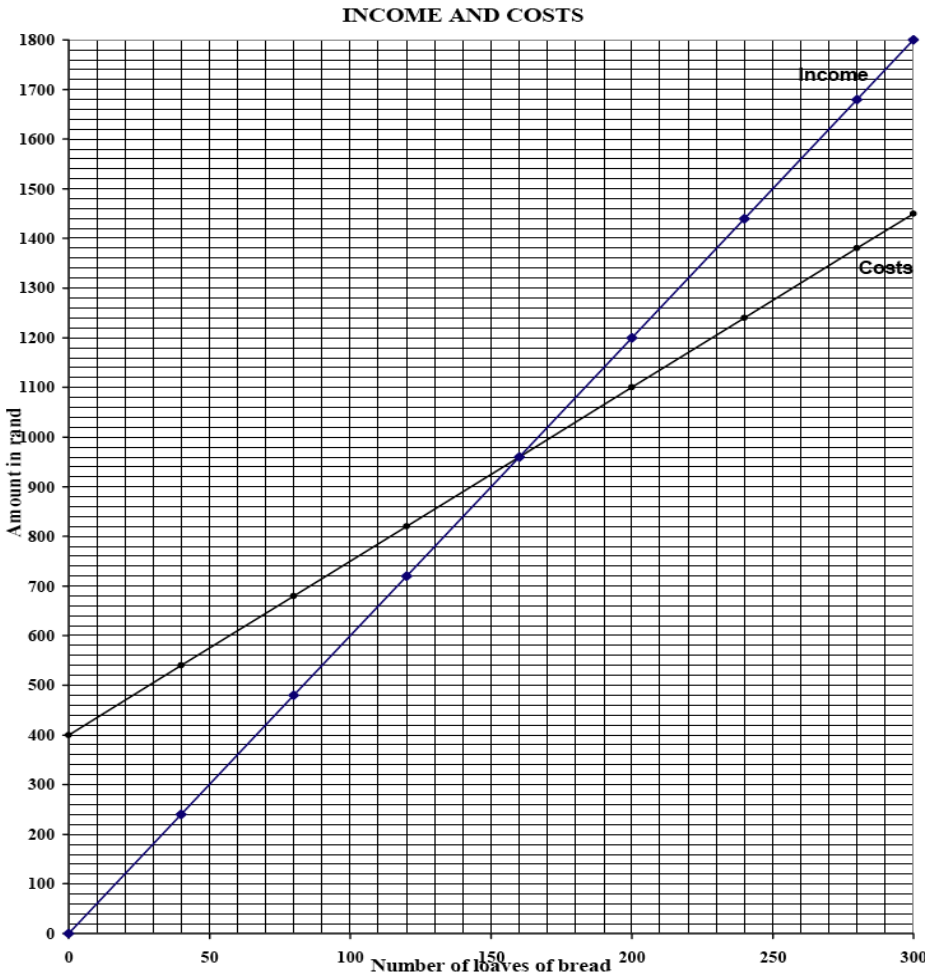
960 = D x R6,00 ✓

960 = 6D

$\frac{960}{6} = \frac{6D}{6}$

D = 160 loaves ✓ (4)

2.4. Graph



✓ „Cost' cutting vertical axis at 400 ✓ „Income' starting at the origin
✓ Point of intersection ✓ Labelling graphs correctly
✓✓ Each graph is a straight line (broken) ✓✓ Any 2 points plotted correctly (8)

[20]

QUESTION 3: 16 minutes *(Taken from DoE/Feb-Mar Exam 2009 Paper 2)*

3.1. The bath covers 27 squares. ✓✓
One block is 20 cm by 20 cm

$20\text{ cm} = \frac{20}{100}\text{ m}$

$= 0{,}2\text{ m}$ ✓

1 block = 0,2 m ×0,2 m = 0,04 m^2 ✓

The area under the bath = 27 × 0,04 m^2 ✓

= 1,08 m^2 ✓

OR

The length of the bath is 9 blocks $= 9 \times 20$ cm ✓
$= 180$ cm ✓
$= \frac{180}{100}$ m
$= 1{,}8$ m ✓

The width of the bath $= 3 \times 20$ cm
$= 60$ cm
$= 0{,}6$ m ✓

Area under the bath $= 1{,}8$ m $\times 0{,}6$ m ✓
$= 1{,}08$ m^2 ✓ (6)

3.2. Number of squares to be tiled = 54 ✓✓
1 square $= 0{,}2$ m $\times 0{,}2$ m $= 0{,}04$ m^2 ✓
54 squares $= 54 \times 0{,}04$ m^2 ✓
$= 2{,}16$ m^2 ✓

OR

Length of bathroom = 10 × 20 cm = 200 cm = 2 m ✓
Breadth of the bathroom = 9× 20 cm = 180 cm = 1,8 m

Area of bathroom $= 2$ m $\times 1{,}8$ m ✓
$= 3{,}6$ m^2 ✓

Length of basin = 60 cm = 0,6 m
Width of the basin $= 3 \times 20$ cm
$= 60$ cm
$= 0{,}6$ m ✓

Area under the basin = 0,6 m × 0,6 m
Area to be tiled $= 3{,}6$ m^2 $- (1{,}08$ m$^2 + 0{,}36$ m$^2)$
$= 2{,}16$ m^2 ✓

OR

Size of bathroom = 9 × 10 squares = 90 squares ✓✓
Size of the bath = 3 × 9 squares = 27 squares ✓
Size of wash basin = 3 × 3 squares = 9 squares ✓
Area to be tiled = 90 – 27 – 9 = 54 squares
Area = 54× 0,2 m ×0,2 m
= 2,16 m^2 ✓ (5)

3.3. Number of square metres of tiles needed
$= (2{,}16 + 10\%$ of $2{,}16)$ m^2 ✓
$= (2{,}16 + \frac{10}{100}$ ✓ $\times 2{,}16)$ m^2
$= (2{,}16 + 0{,}216)$ m^2
$= 2{,}376$ m^2 ✓

Number of boxes of tiles $= \frac{2{,}376}{1{,}5}$ ✓
$= 1{,}574$ boxes
$= 2$ boxes ✓

OR

Number of boxes of tiles $= \frac{2,16}{1,5}$ ✓

$= 1,44$ boxes ✓

10% extra $= \frac{10}{100} \times 1,44$ ✓ $= 0,144$ ✓

Number of boxes $= 1,44 + 0,144 = 1,584$

$= 2$ boxes ✓

OR

Number of boxes of tiles $= \frac{2,16}{1,5}$ ✓

$= 1,44$ boxes ✓

$110\% \times 1,44 = \frac{110}{100}$ ✓ $\times 1,44 = 1,584$ ✓

$= 2$ boxes ✓ (5)

[16]

QUESTION 4: 4 minutes *(Taken from DoE/Nov Exam 2009 Paper 2)*

Width of screen on diagram = 18 mm
Length of screen on the diagram = 30 mm

$2 : 5 = 18 : x$

$\frac{2}{5} = \frac{18}{x}$ ✓

$2x = 90$

$\frac{2x}{2} = \frac{90}{2}$

$x = 45$ mm ✓

$2 : 5 = 30 : x$

$\frac{2}{5} = \frac{30}{x}$ ✓

$2x = 150$

$\frac{2x}{2} = \frac{150}{2}$

$x = 75$ mm ✓ (4)

[4]

SECTION C: HOMEWORK

QUESTION 1: 30 minutes *(Taken from DoE/Preparatory Examination 2008 Paper2)*

Sello is a public servant and received a gross salary of R14 125,25 per month during the 2007/2008 tax year. Every month PAYE (pay-as-you-earn), contributions to the pension fund and medical aid are deducted from his salary.

The table below shows his September 2007 payslip for the tax year 2007/2008.

TABLE 4: Sello's payslip for September 2007

Pay date/Betaaldatum			Notch/Kerf		
20070915			xxxxxxxx		
EARNINGS/VERDIENSTE			**DEDUCTIONS/AFTREKKINGS**		
Item			Item		
0001	Basic salary	13 625,25	0001	Pay-as-you-earn (PAYE)	2 350,00
0543	Housing maximum	500,00	0002	Pension (7,5% of monthly salary)	1 021,87
			0005	Medical aid contribution	1 562,20
	Gross salary	14 125,25		Total deductions	xxxx
				Net pay due	xxxx

1.1. Answer the following questions and complete the pay slip below:

1.1.1. If the notch is your basic salary multiplied by twelve, calculate Sello's notch. (A) (2)

1.1.2. What will his net salary per month be after all the deductions have been made? (B and C) (4)

SELLO'S PAYSLIP

Pay date/Betaaldatum			Notch/Kerf		
20070915			(A)		
EARNINGS/VERDIENSTE			**DEDUCTIONS/AFTREKKINGS**		
Item			Item		
0001	Basic salary	13 625,25	0001	Pay-as-you-earn (PAYE)	2 350,00
0543	Housing maximum	500,00	0002	Pension (7,5% of monthly salary)	1 021,87
			0005	Medical aid contribution	1 562,20
	Gross salary	14 125,25		Total deductions	(B)
				Net pay due	(C)

1.2.

SARS published the table below for the tax year ending on 29 February 2008. Use it to answer the questions that follow.

RATES APPLICABLE TO INDIVIDUALS (TAX YEAR 2007/2008)

TABLE INCOME R		R	RATES OF TAX R				R
0	—	112 500			18%	of each R1	
112 501	—	180 000	20 250	+	25%	of the amount above	112 500
180 001	—	250 000	37 125	+	30%	of the amount above	180 000
250 001	—	350 000	58 125	+	35%	of the amount above	250 000
350 001	—	450 000	93 125	+	38%	of the amount above	350 000
450 001		and above	131 125	+	40%	of the amount above	450 000

Tax rebates

- Primary rebate R7 740
- Additional rebate (for persons 65 years and older) R4 680

Tax threshold

- Persons under 65 years R43 000
- Persons 65 years or older R69 000

Example provided by SARS: A 30-year-old person earning R125 000 per year.

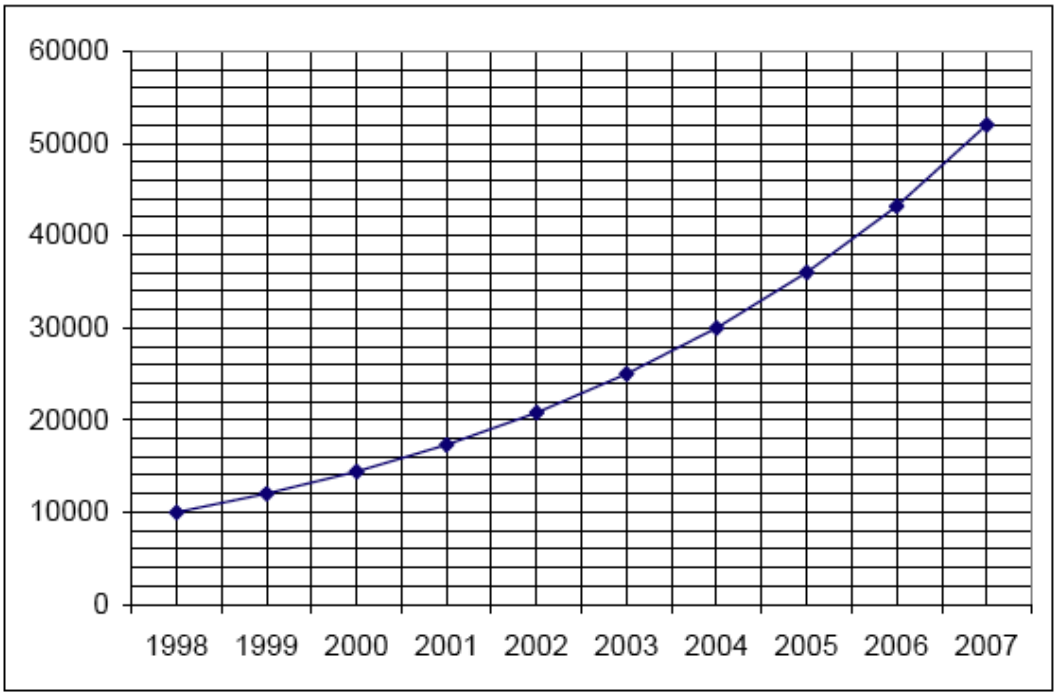
Tax payable per year = R20 250 + 25% of (R125 000 – R112 500) – R7 740
= R15 635

Mr Sello, 34 years old, used the above table to calculate whether the PAYE tax that was deducted from his September salary was sufficient.

1.2.1. Sello calculated that his taxable income for the year will be R169 503,00. Calculate the monthly income tax (RSA tax) Sello has to pay on his salary. (5)

1.2.2. Was sufficient PAYE tax deducted from Sello's September 2007 salary? Give a reason for your answer. (3)

1.3. Sello has had an investment policy since 1998. The value of the investment at the end of each year is shown in the graph below.



1.3.1. If the value of the investment at the end of 1999 is R12 000, calculate the rate of growth between the end of 1998 and 1999. (3)

1.3.2. During which year did the investment earn the most interest? Explain how you can see this from the graph. (3)

1.4.

A daily newspaper called *Universe* is sold from Monday to Friday in Sello's hometown. The price of the newspaper is R4,00 (VAT included). To have it delivered to your door, you must pay the subscription fee in advance. The table below shows the subscription rates for the newspaper.

PERIOD	AMOUNT
One month	R72,00

1.4.1. How many newspapers would Sello get in the month of February which has 4 weeks? (2)

1.4.2. Sello considers buying the newspapers at full price. How much would 20 newspapers cost if he had paid the full price for each newspaper? (2)

1.4.3. What percentage discount does the newspaper effectively give a person who subscribes for one month? (3)

1.4.4. Give TWO reasons why Sello may consider the option of subscribing to the newspaper. Explain. (4)

[31]

SECTION D: SOLUTIONS TO HOMEWORK

QUESTION 1: 30 minutes *(Taken from DoE/Preparatory Examination 2008 Paper2)*

1.1. The annual gross salary

1.1.1. Mr Sello's notch (A) = 14 125,25 × 12 ✓
= R169 503,00 ✓ (2)

1.1.2. Monthly deductions (B) = R2350 + R1021,87 + R1562,20 ✓
= R4934,37 ✓

His take home salary per month after all deductions (C):
= R14125,25 – R4934,37 ✓
= R9191,16 ✓ (4)

1.2.1. The annual gross salary = R169 503,00
Annual income tax
= R20250 + [25% × (R169503 – R112500)] – R7740✓
= R20250 + [25% × (R57003 ✓)] – R7740
= R20250 + R14250,75 ✓ = R7740 ✓
= R26 760,75 ✓

The monthly income tax $= \frac{R26\ 760,75}{12}$
= R2230,06 ✓ (5)

1.2.2. Too much PAYE tax was deducted from Sello's September salary. ✓ They deducted R2350,00 instead of deducting 2230,06. They have to pay R119,94 back to Mr Sello ✓✓ (3)

1.3.1. The increased rate: $\frac{(12\,000 - 10\,000)}{10\,000}$ ✓ × 100% ✓= 20% ✓ (3)

1.3.2. 2007. ✓ The increase ✓ in the value from 2006 to 2007 is greater than for any other pairs of points. The graph is steeper. ✓ (3)

1.4.1. 4 weeks × 5 days = 20 newspapers ✓✓ (2)

1.4.2. R4 × 20 ✓ = R80,00 ✓ (2)

1.4.3. R80 – R76 = R4 ✓
$\frac{R4}{80}$ × 100 ✓ = 5% ✓ (3)

1.4.4. Sello can save a little bit of money in cost of daily newspapers by subscribing at a reduced price. ✓✓
Sello does not have to worry about getting to the shop on a daily basis in order to buy a newspaper. ✓✓
Not only will Sello save money but transport costs and time. ✓✓
He is supporting the building of a reading nation. ✓✓
(Any two valid reasons.) (4)

[31]

SESSION 4: TOPIC 4: PREPARATION 4: EXAMINATION PAPER 2

Teacher Note: When attempting the examination questions below, learners must determine to which specific section the question pertains. They must remember to check the number of places to round off to. They must also remember to write down the units when dealing with money, space, shape and measurement. Learners must remember which operations to do first. Remember BODMAS!

LESSON OVERVIEW

1. Introduce session: 5 minutes
2. Typical exam questions: 55 minutes
3. Review/solutions/memo: 30 minutes

SECTION A: TYPICAL EXAM QUESTIONS

QUESTION 1: 16 minutes *(Taken from DoE/Preparatory Exam 2008 Paper 2)*

Deborah was born at the end of January and she had a mass of 3,00 kg at birth. She is taken to the clinic at the end of each month and her mass is recorded in TABLE 1

Use the table to answer the questions below.

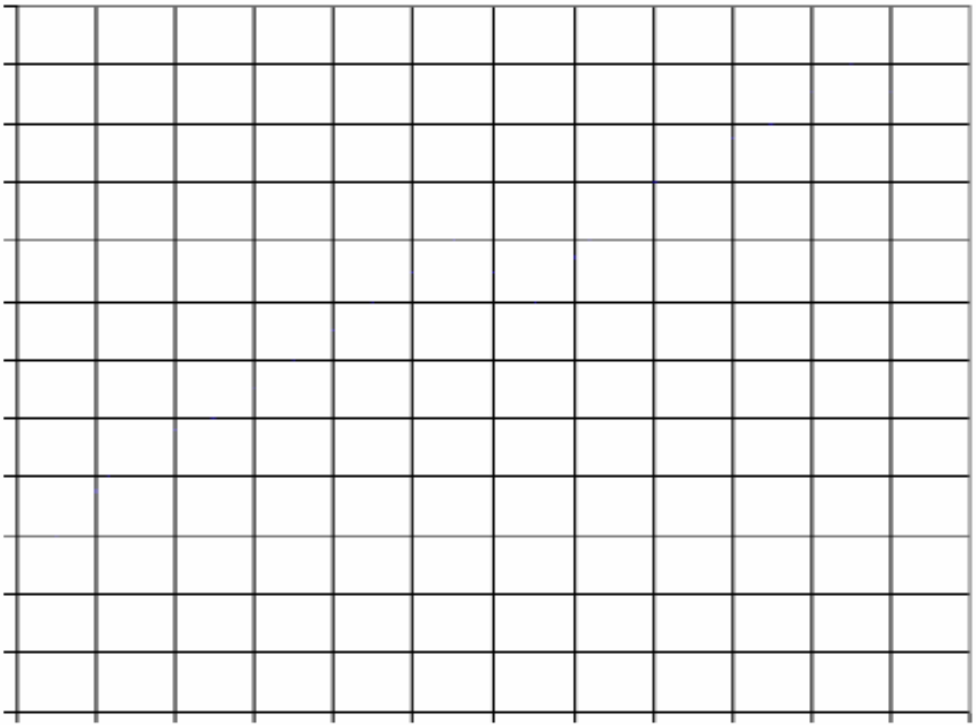
TABLE 1: Deborah's mass

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Mass kg	3,0	4,5	5,0	6,0	7,0	8,0	7,0	8,5	9,5	10,0	11,0	10,0

1.1. Use the grid provided on the next page to draw a line graph of the data in the table above. (8)

1.2. Describe the trend of the graph from January to June and give a reason for this trend. (4)

1.3. During which months did Deborah's mass decrease? Give TWO possible reasons for the decrease in her mass. (4)



[16]

QUESTION 2: 18 minutes

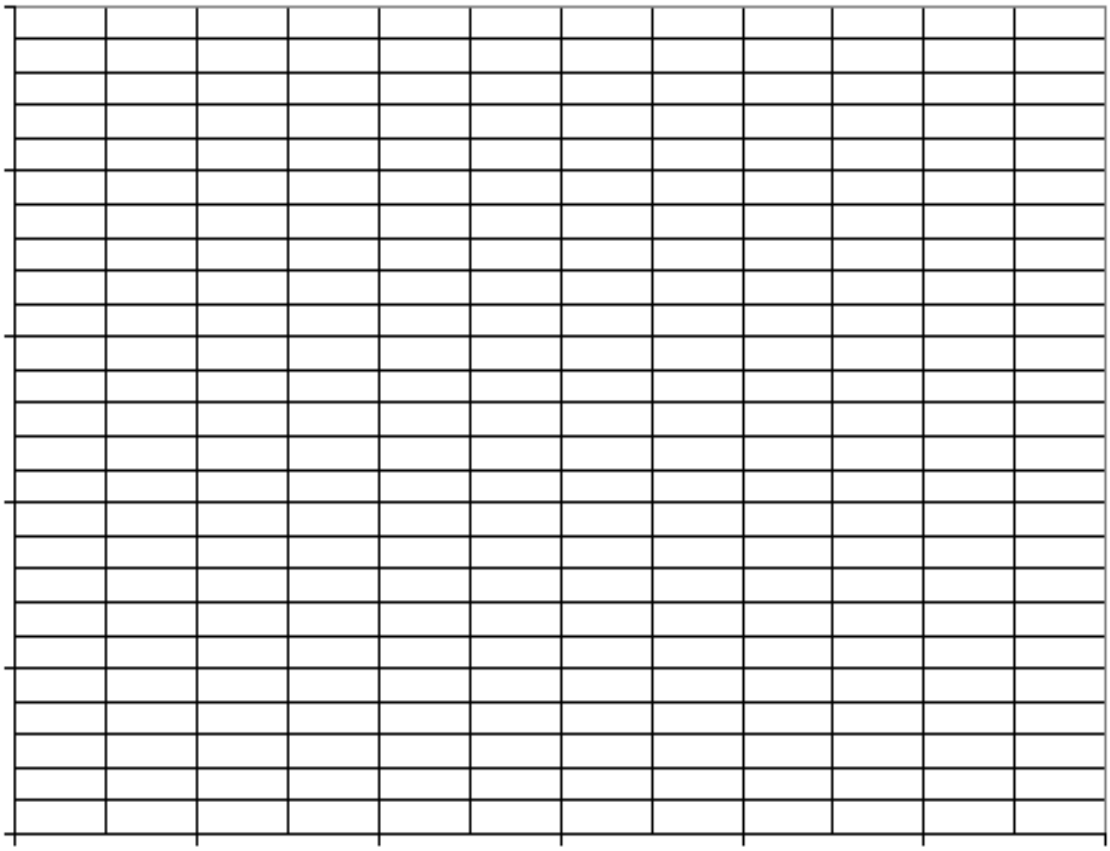
A survey was done at a clinic to determine the number of babies and the type of milk feeding they receive. The data was summarised as follows:

TABLE 2: Type of milk feeding

TYPE OF MILK FEEDING	FREQUENCY
Milk A (Breast-feeding)	240
Milk B	110
Milk C	90
Milk D	160

2.1. Determine the most popular type of milk feeding and its frequency. (2)
2.2. Give TWO reasons for your answer in QUESTION 2.1. (4)
2.3. How many babies were involved in this survey? (2)

2.4. Use the grid provided below to draw a bar graph to represent the summarised data from TABLE 2.



(8)

2.5. How can you identify the mode on the bar graph? (2)
[18]

QUESTION 3: 21 minutes *(Taken from DoE/Preparatory Exam 2008 Paper 2)*

Mukala is busy building his new house. The length of the house is 11 m and the width is 6,10 m. The building is a double storey. The details below are found in his notebook

TABLE 3

STAGE OF WORK	LABOUR COST
1. Foundations	R5 500,00
2. Building of walls below the top floor	R7 000,00
3. Plastering of walls inside and outside below the top floor	R6 000,00
4. Preparing for throwing the concrete on the top floor	R4 500,00
5. Throwing the concrete on the top floor	R18 000,00
6. Building of support columns	R4 500,00
7. Roofing	R14 000,00
8. Electrical installation	R3 600,00
9. Building of walls on the top floor up to the roof	R9 000,00
10. Plastering of walls inside and outside on the top floor	R11 000,00

3.1. Express the cost of the most expensive stage of the work as a percentage of the total labour cost. (3)

3.2. The length of the top floor is 11 m; the width, including the balcony, is 7,60 m and the thickness is 17 cm. Calculate the volume of the concrete used for the top floor.

Volume of a rectangular prism = length × width × height (4)

3.3. A cubic metre of concrete costs R850,00. How much did Mukala pay for the concrete for the top floor? (3)

3.4. If the maximum load of concrete that the lorry can carry is 6 m^3, how many loads of concrete were delivered to pour the top floor? Explain your answer. (4)

3.5. The distance on the plan between two walls is 27,5 cm and the actual distance between the two walls is 11 m. What is the scale used on the plan? (4)

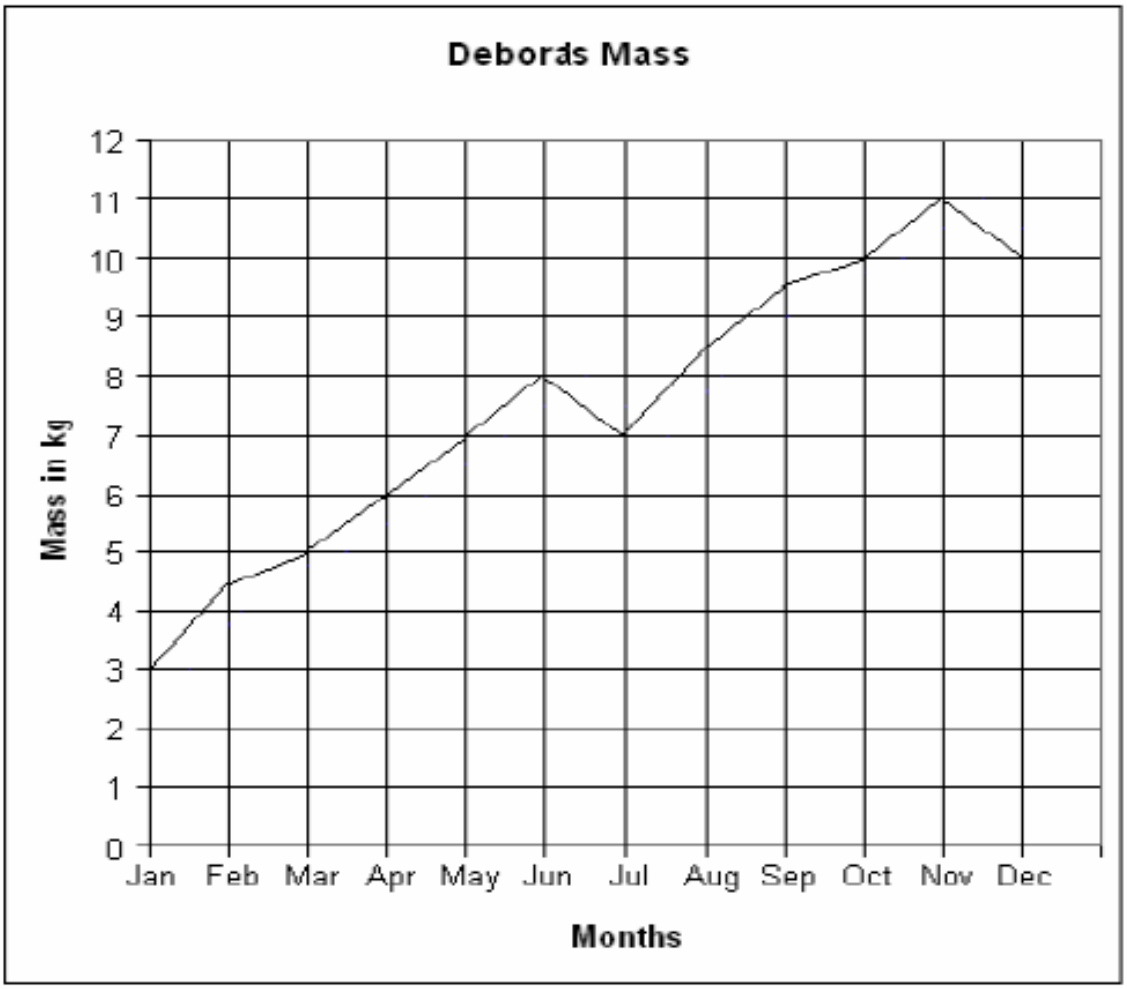
3.6. Mukala measures the height of the steps in his new house and finds that the height between two consecutive steps is the same. The first step is 15 cm above the floor, the second step is 30 cm above the floor, the third step is 45 cm above the floor, and the fifth step is 75 cm above the floor. What is the height of the 17^{th} step above the floor? (3)

[21]

SECTION B: SOLUTIONS AND HINTS TO SECTION A

QUESTION 1: 16 minutes *(Taken from DoE/Preparatory Exam 2008 Paper 2)*

1.1



✓✓ Heading ✓ Horizontal axis scale ✓label
✓✓ Two points plotted accurately ✓ Vertical axis scale ✓label (8)

1.2 From January to June Deborah's mass has increased ✓ steadily ✓because she was healthy✓ and well nourished. ✓ (4)

1.3 Deborah's mass decreased in June ✓ and November. ✓ because she was either ill ✓ or she was undernourished. ✓ (4)

[16]

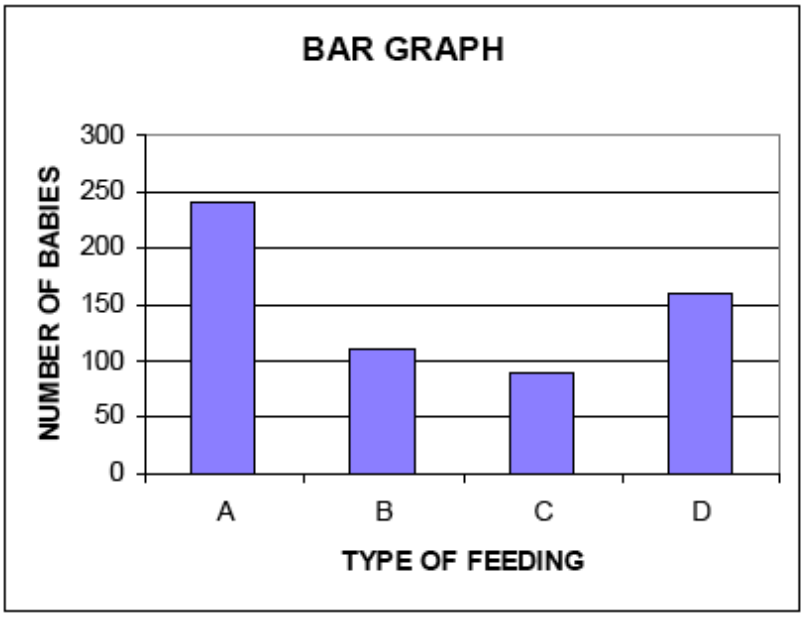
QUESTION 2: 18 minutes

2.1. The most popular type of milk feeding is Milk A (Breast feeding). ✓ The frequency is 245. ✓ (2)

2.2. Mothers are breast feeding because:
It is not expensive to feed babies. ✓✓
You do not really spend to get the milk. ✓✓
It is good for the baby's health according to advice received by mothers at the clinic.✓✓
Babies can have milk A at anytime and anywhere. ✓✓
(Any two valid reasons.) (4)

2.3. The number of babies involved in this survey:
240 + 110 + 90 + 160 ✓ = 600 ✓ (2)

2.4



✓✓ Heading ✓ Horizontal axis scale ✓label
✓✓ Four bars plotted accurately ✓ Vertical axis scale ✓label (8)

2.5 You can identify the mode in any bar diagram by searching for the highest bar or the highest frequency. ✓✓ (2)

[18]

QUESTION 3: 21 minutes *(Taken from DoE/Preparatory Exam 2008 Paper 2)*

3.1. R5 5000 + R7 000 + R6 000 + R4 500 + 18 000 + R4 500 + R14 000 + R3 6000 + R9 000 + R11 000 = R83 100,00 ✓

$$\text{Percentage} = \frac{\text{R18 000}}{\text{R83 100}} \times 100\% \checkmark$$
$$= 21{,}6606\ldots\%$$
$$= 21{,}7\% \checkmark$$ (3)

3.2. Length = 11 m Wide = 7,60m Thickness = 17cm = 0,17m ✓
Volume of the slab = l × w × h
= 11 x 7,60 x 0,17 ✓
= 14,212m^3 ✓✓ (4)

3.3. A cubic meter cost R850 including the delivery.
Volume of the slab = 14,212 m^3 ✓
Mukala will pay: 14,212 m3 × R850 = R12 089,20 ✓✓ (3)

3.4. The lorry can carry 6m^3

The number of loads: $\frac{14,212\ m^3}{6\ m^3}$ ✓= 2,37 ✓
The lorry will take 3 loads✓
The lorry will take 2 full loads, i.e. 12m^3 and one load of 2,212m^3 ✓ (4)

OR
Three equal loads of 2,37 each ✓

3.5. Paper : Reality = 27,5cm : 11 m
= 27,5cm : 1 100 cm ✓
= $\frac{27,5\ cm}{27,5\ cm} : \frac{1\ 100\ cm}{27,5\ cm}$ ✓
= 1 cm : 40 cm ✓
= 1 : 40 ✓ (4)

3.6. The distance between two consecutive steps is always 15 cm ✓
The 17th step measures: 17 × 15 cm ✓ = 255cm ✓ (3)
[21]

SECTION C: HOMEWORK

QUESTION 1: 30 minutes *(Taken from DoE/November Exam 2008 Paper 2)*

Mrs Maharaj makes duvet sets, which she sells at the local street market at R150,00 per set (including VAT).

- If she makes 50 or less duvet sets per month, her production costs are R100,00 per set.
- If she makes more than 50 duvet sets per month, her production costs are reduced by 15% per set.

Mrs Maharaj has to pay R8 400 annually for the rental of her stall and she has weekly transport costs of R75.

1.1. Mrs Maharaj prepares a monthly budget.

1.1.1. Show that her fixed cost for the month of February is R1 000,00. (2)

1.1.2. How does her fixed cost for February compare to her average monthly fixed costs? Show ALL calculations. (5)

1.2. Calculate the production cost per duvet set if 90 sets are made per month. (2)

1.3. The table below shows Mrs Maharaj's production cost for different quantities of duvet sets made in February.

TABLE 1: Cost of duvet sets made in February

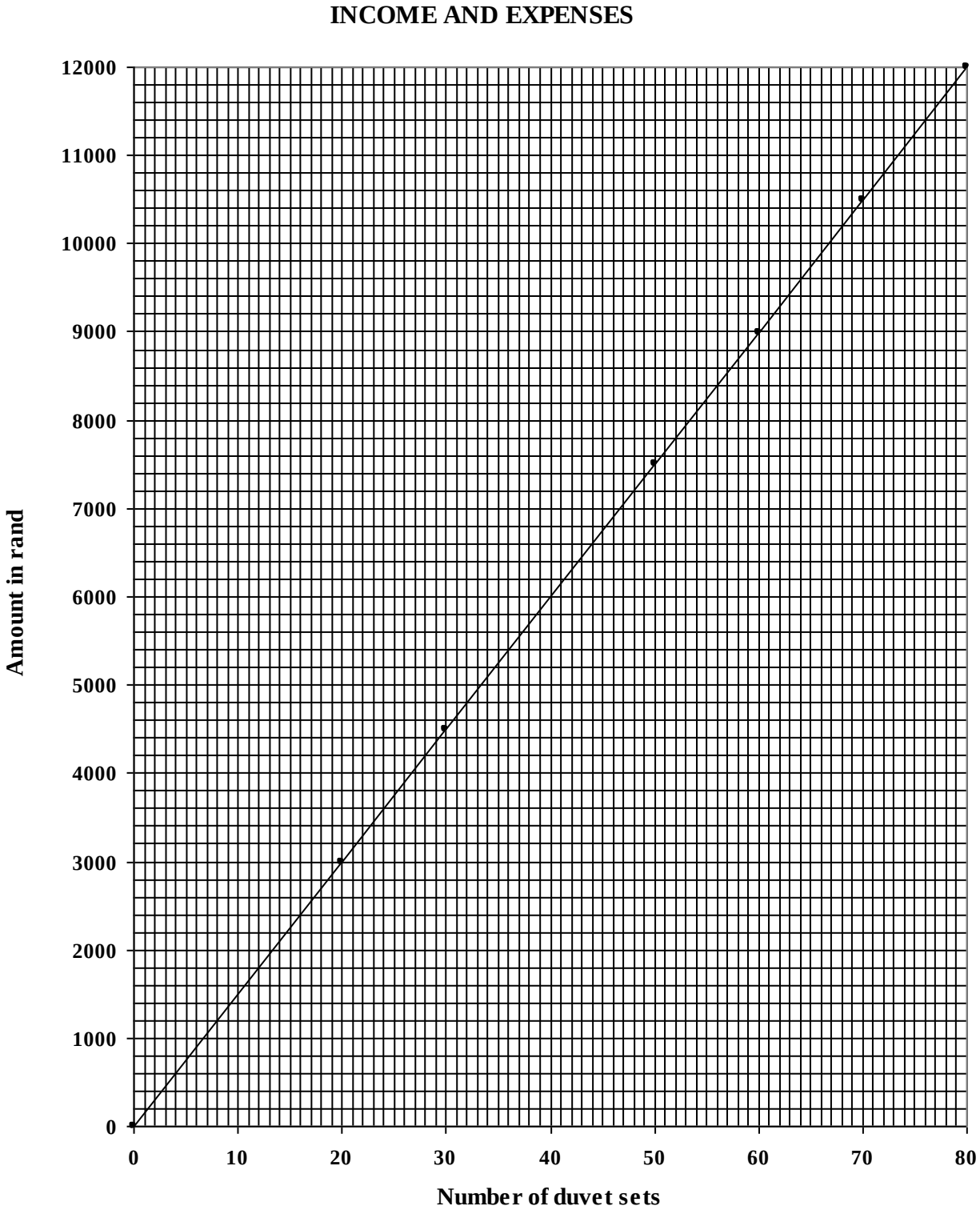
Number of duvet sets	0	30	50	51	56	60	70	**D**
Total cost per month (in rand)	1 000	4 000	6 000	5 335	5 760	6 100	**C**	7 800

The formula used to calculate the total cost is:

Total cost = fixed monthly cost + (number of duvet sets × cost per set)

Use the formula and the given information to determine the missing values **C** and **D**. (5)

1.4. Mrs Maharaj draws two graphs to represent her income and expenses for different quantities of duvet sets. The graph showing her INCOME for different quantities of duvet sets has already been drawn on the next page.



Use the values from TABLE 1 to draw a second graph on this grid showing the total EXPENSES for February for making different quantities of duvet sets. Label the graph as 'EXPENSES'. (7)

1.5. Use the two graphs to answer the following questions:

1.5.1. How many duvet sets must Mrs Maharaj sell to break even? (2)

1.5.2. What profit will she make if all 80 duvet sets are sold? (3)

1.5.3. Suppose Mrs Maharaj makes 80 duvet sets, but only sells 70 of them. Calculate her profit for February. (3)

[29]

SECTION D: SOLUTIONS TO HOMEWORK

QUESTION 1: 30 minutes *(Taken from DoE/November Exam 2008 Paper 2)*

1.1.1. Fixed monthly cost $= \frac{R8\ 400}{12}$ ✓+ 4 × R 75 ✓

= R700 + R300

= R 1 000 (2)

1.1.2. Annual transport costs = R75 × 52 ✓

= R3 900,00 ✓

Total annual costs = R8 400,00 + R3 900,00

= R12 300 ✓

Average monthly costs $= \frac{R12\ 300}{12}$

= R1 025,00 ✓

The fixed costs for February is R25,00 less than the average monthly fixed costs.✓.

OR

Annual transport costs = R75 × 52 ✓

= R3 900,00 ✓

Average annual transport costs $= \frac{R3\ 900}{12}$ ✓

= R325 ✓

February's monthly transport cost = R300

The monthly travel costs for February is R25,00 less than the average monthly travel costs. ✓ (5)

1.2. 15% reduction means the cost = 85% of R100
New production cost = 0,85 × R100 ✓ = R85,00 ✓

OR

15% reduction = $\frac{15}{100} \times$ R100 = R15 ✓
New production cost: R100 – R15 = R85 ✓ (2)

1.3. 80 is more than 50, so the cost is R85 per duvet set.

Total cost = fixed cost + (no. of duvet sets × cost per set)
So C = R1 000 + 70 × R85 ✓
= R1 000 + R5 950
= R 6 950 ✓

R 1 000 + D × R 85 = R 7 800 ✓
D × R 85 = R 6 800

$$D = \frac{R\,6\,800}{R\,85} \checkmark$$

D = 80 ✓

OR

Production costs for D: R7 800 ✓ – R1 000 ✓ = R6 800

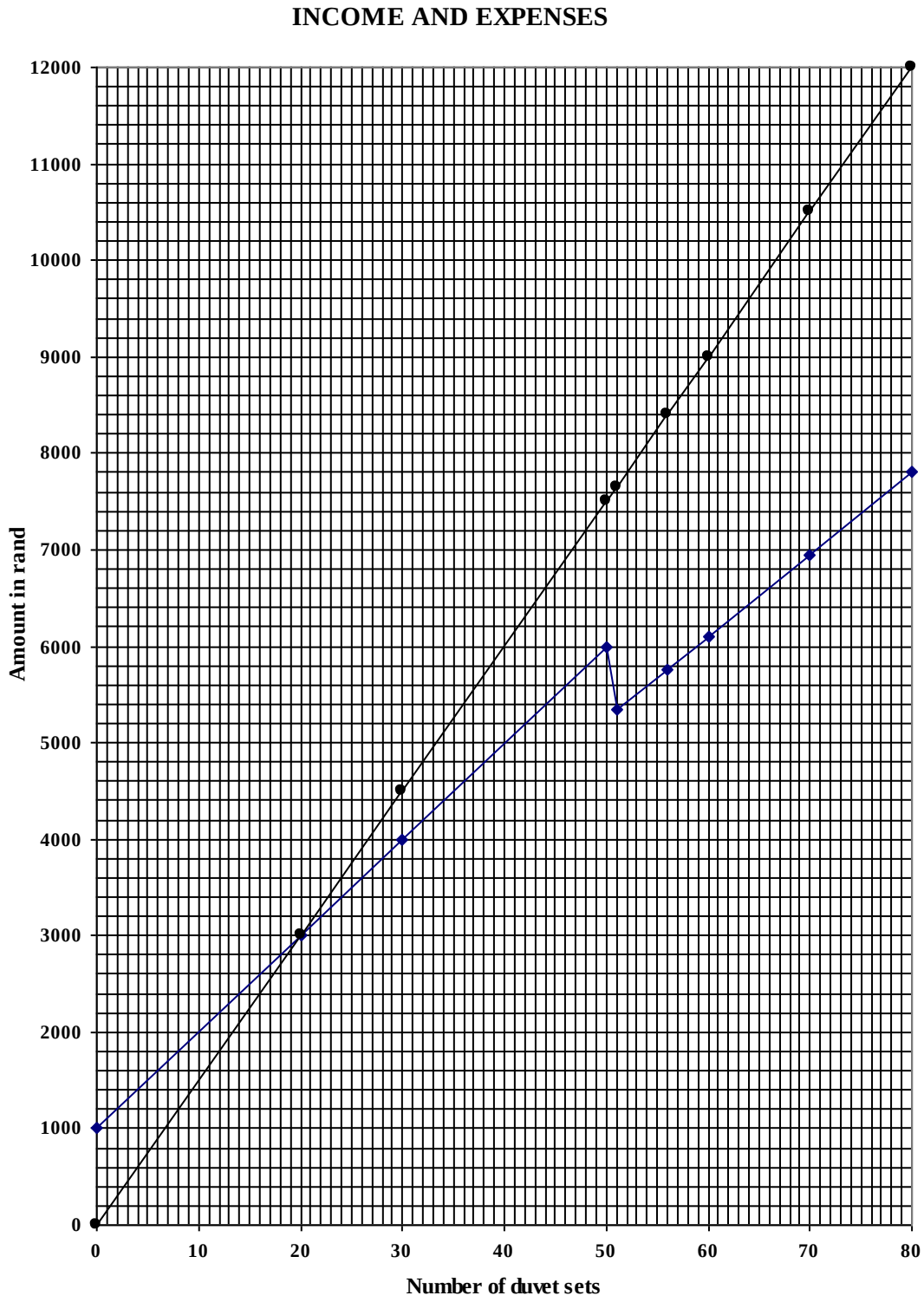
$$\therefore D = \frac{R6800}{R85} \checkmark\checkmark$$

D = 80 ✓

OR

R 1 000 ✓ + 80 ✓ × R85 ✓ = R7 800 ✓
D = 80 ✓ (5)

1.4.



✓✓ Plotting given points from table ✓✓ Plotting calculated points (C; D)
✓ Joining points up to (50 ; 6000) with straight lines
✓ Plotting (51 ; 5335) ✓ Joining points up to (80 ; 7800) (7)

1.5. Using the graphs:

1.5.1. 20 Duvet sets ✓✓ (2)

1.5.2. Profit = Income – expenses
= R12 000 ✓ – R7 800 ✓
= R4 200 ✓ (3)

1.5.3. Profit = Income from 70 sets – Expenses from 80 sets
= R10 500 ✓ – R7 800 ✓
= R2 700 ✓ (3)

[8]