basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

FEBRUARY/MARCH 2012

MARKS: 150

TIME: 3 hours

DEAF LEARNERS

This question paper has 14 pages.
This question paper has 3 annexures.

* M L I T E 2 *

EASTERN CAPE

INSTRUCTIONS AND INFORMATION

1. This question paper has FIVE questions. You must answer ALL the questions.

2.
- There are ANNEXURES at the end of this exam question paper.
- You must write your centre number in the blocks at the top of the page.
- You must write your exam number in the blocks at the top of the page.
- Answer QUESTION 5.1.3 on ANNEXURE C.
- You must hand in the ANSWER SHEET with your answers when you have finished your exam.

3. Your answers must have the same numbers as the questions.

4. You must start EACH question on a NEW page.

5. You can use an approved scientific calculator (it must be non-programmable and non-graphical). The question will tell you if you must not use a calculator.

6. Show ALL calculations that you used in finding the answers.

7. You must round off your answers to TWO decimal places. The question will tell you if it must be different.

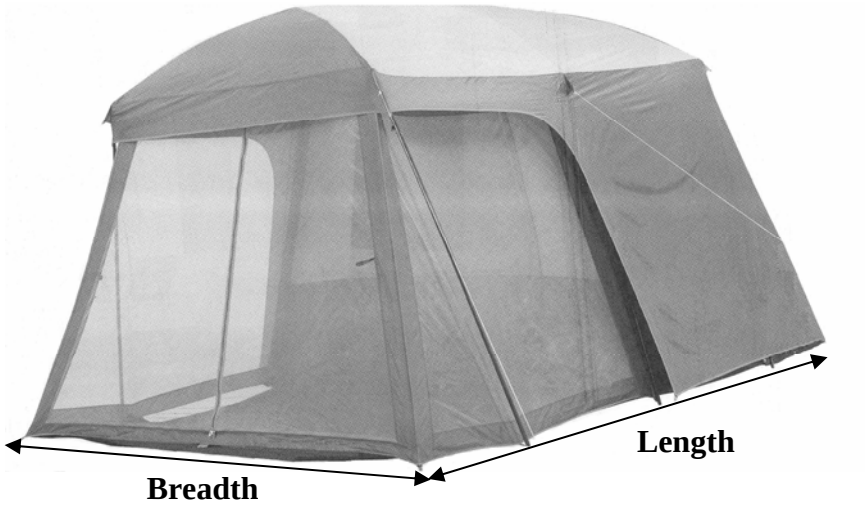
8. You must show the units of measurement. The question will tell you if you must show the units of measurement.

9. Write neatly.

QUESTION 1

1.1 Mr Gys and his friends want to go camping.
Look at the picture of their tent.
The base of the tent is rectangular.
The length is 380 cm.
The width is 265 cm.

They must buy a groundsheet to place underneath the tent.
(A groundsheet is a piece of thick plastic. They put it under the base of the tent.)



1.1.1 Determine the scale used if the width of the tent in the picture is 45 mm.
Give the scale in the form:

1 : ... (3)

1.1.2 They sell rolls of thick plastic.

- They sell 2 m wide plastic. It costs R20,99 per metre, including VAT.
- They sell 6 m wide plastic. It costs R44,99 per metre, including VAT.

They sell the rolls of plastic in metre lengths only.

You can also order the plastic. They cut the sheets of plastic.
The sheets then cost R12,24 per square metre, excluding VAT.
VAT is value-added tax calculated at 14%.

You must use the formula:

Area of rectangle = length × breadth

You must choose the most economical option.
Calculate the cost of the groundsheet for the tent. (9)

1.2 They want to see what the weather conditions would be like.
They use 24-hour meteograms.

(A meteogram is a graph of the predicted weather conditions for a certain period of time. It shows the temperature fluctuations (going up or down), the cloud conditions and the possibilities of rain.)

ANNEXURE A has the meteograms. It shows the predicted weather for two days.

Use the meteograms on ANNEXURE A. Answer the questions:

1.2.1 Look at Day 1.

They show that the predicted temperature will fall below 0 °C.
How long will it take? Give an estimation (more or less, guess) of the period of time.

(*predict: forecast, expect) (2)

1.2.2 Look at Day 2.

The temperature on Day 2 was at its maximum.
What was the maximum temperature? You must estimate.
What was the time? You must estimate. (2)

1.2.3 Look at the predicted temperature on Day 1.
Look at the predicted temperature on Day 2.

The predicted temperature on Day 1 was lower than the predicted temperature on Day 2. During which time interval? (2)

1.2.4 You want to go camping.

Look at the temperatures for the two days.

Use the range of the temperatures for the two days.
You must determine on which of the two days you must go camping.
Show ALL calculations to explain your answer. (6)

1.3 Look at the table.

They went fishing on their camping trip.
They caught 11 fish.
They recorded the mass (in grams) of the 11 fish.

1 513	875	3 025	912	1 809	1 513
1 003	1 794	1 628	958	1 052	

Look at the statistical measures relating to the above data:

Lower quartile = 958 g
Upper quartile = 1 794 g
Median = 1 513 g
Mean = 1 462 g

1.3.1 They caught 11 fish.

You must determine the number of fish with a mass between the lower quartile and the upper quartile. (2)

1.3.2 ONE of the following measures of central tendency (median, mean or mode) will change.

Which ONE of the measures of central tendency (median, mean or mode) will change, if a twelfth fish with a mass of 1 462 g was also caught? (2)
[28]

QUESTION 2

2.1 The principal of the local school wants Lihle to take over the school tuck shop.
Lihle must show that the annual profit from the tuck shop increases each year. TABLE 1 shows the profit of the tuck shop.
The profit is for the last five years.

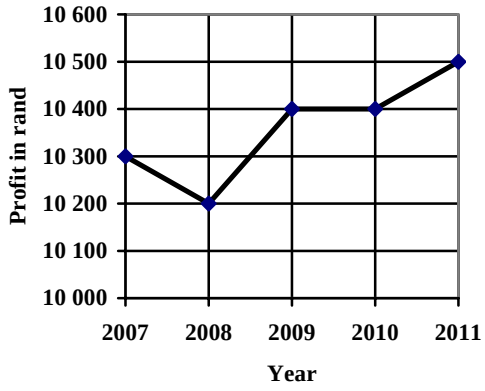
TABLE 1: Profit from the school tuck shop over the last five years

YEAR	2007	2008	2009	2010	2011
PROFIT IN RAND	10 300	10 200	10 400	10 400	10 500

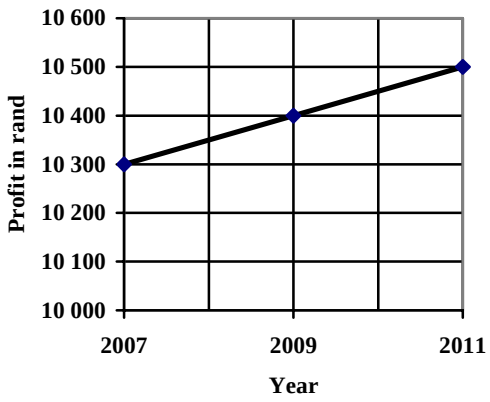
Look at the graphs.

They put the data of TABLE 1 in the graphs.

GRAPH A:
ANNUAL PROFIT OF THE TUCK SHOP



GRAPH B:
ANNUAL PROFIT OF THE TUCK SHOP



2.1.1 The two graphs have different shapes. Explain why. (2)

2.1.2 The principal used one graph.
He wanted to show Lihle that the annual profits have increased.

Which graph did he show Lihle?
If he used Graph A you must explain why.
If he used Graph B you must explain why. (3)

2.2

It is the day the tuck shop opens.
Lihle wants to give free diluted juice to the first few customers.
The free juice will be either 200 mℓ or 140 mℓ.

For this free offer, she uses 1 200 mℓ of concentrated (undiluted) juice.
She mixes it with water.
The ratio is 1 **:** 8 to make the diluted juice.

(*diluted: To add some water to a concentrate to make it thinner.)

2.2.1 Lihle has a cylindrical container.
The diameter of the container is 20 cm.
The height of the container is 35 cm.

Do you think this container is big enough for mixing the juice?

You must use the formula:

Volume = $\pi \times$ **(radius)**$^2 \times$ **height**, using $\pi = 3{,}14$ and 1 mℓ = 1 cm^3 (6)

2.2.2 The first 40 customers will each get 200 mℓ of free juice.
The rest of the customers will get 140 mℓ of free juice.
How many customers will receive 140 mℓ of free juice? Calculate. (5)

2.2.3 You must write a formula.
The formula must help you to calculate how many learners will receive 140 mℓ of free juice, if ***x*** number of learners received 200 mℓ of free juice. (2)
[18]

QUESTION 3

3.1 Discipline is a serious (big) problem in many South African schools.

Mr Khan is the principal of ABC High School.
Mr Khan keeps a record of the transgressions (breaking of school rules) done by the Grade 10 to 12 learners at his school.
The record is for the first term of 2011.

TABLE 2: Record of transgressions (breaking of school rules) done during the first term of 2011 at ABC High School

CATEGORY	GRADE 10	GRADE 11	GRADE 12	TOTAL
A	405	328	287	1 020
B	173	201	86	460
C	156	187	216	559
D	18	17	14	49
E	288	167	98	553
F	189	128	98	415
TOTAL	**1 229**	**1 028**	**799**	**3 056**

Look at the key to different categories of transgressions:
A: Arriving late
B: Smoking
C: Copying assessment tasks
D: Possession of illegal substances (that is alcohol, drugs, et cetera)
E: Absent without a valid reason
F: Other

3.1.1 Look at Category F.

Write any TWO transgressions (breaking school rules) under Category F. (2)

3.1.2 Mr Khan said: 'The percentage of the total number of learners that copied during the first term of 2011 increased by more than 5% from Grade 10 to Grade 11 to Grade 12.' (More people are copying.)

Do you think his statement (what he said) is correct?
First say YES or NO.
Then give TWO possible reasons for this increase in copying. (9)

3.1.3 Name a possible trend relating to (that has to do with) the number of transgressions (breaking of school rules) from Grade 10 to Grade 12.
Write reasons for this possible trend. (3)

3.1.4 You must show the information in TABLE 2 graphically.
What type of representation (image, graph) will best show the information?
Give a reason for your answer. (2)

3.2 Mr Abel and Mrs Botha are the class teachers (register teachers) of Grade 12 A and Grade 12 B.

Look at TABLE 3.
Mr Abel and Mrs Botha gave information about the number of learners who arrived (came) late during the first term of 2011.

TABLE 3: Number of learners who arrived late during the first term of 2011

	NUMBER OF LEARNERS IN EACH CLASS	TOTAL NUMBER OF LEARNERS ARRIVING LATE	TOTAL NUMBER OF SCHOOL DAYS
Grade 12 A	28	115	50
Grade 12 B	42	172	

Mr Abel says a greater percentage of learners from Grade 12B arrive later than learners from Grade 12A.

Is what Mr Abel says true?
You must show a calculation to determine if Mr Abel's claim is true.
Write possible reasons for what Mr Abel says.

You must use the formula:

Percentage of learners arriving late daily

$$= \frac{\textbf{Total number of learners arriving late}}{\textbf{Total number of school days} \times \textbf{number of learners in a class}} \times \textbf{100}\% \quad (4)$$

3.3 Tom and Zara are in Mr Abel's class.
They always arrive late.
The school day at ABC High School starts at 07:35.
Then they have a five-minute assembly.
Each period is 45 minutes long.

Look at TABLE 4.
Mr Abel carefully recorded the arrival times of Tom and Zara.
He recorded the times for 10 days.

TABLE 4: Times for ten days that Tom and Zara arrived at school

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10
Tom	07:39	07:33	07:42	07:59	07:28	08:28	07:30		07:45	No time
Zara	08:08	07:51	07:39	07:32	07:56	07:42	08:02	07:15	07:46	07:34

3.3.1 Look at Day 8 (previous page).

Tom arrived at school at the start of period 2.
Calculate his arrival time at the school. (2)

3.3.2 Look at Day 10.

There is no arrival time for Tom.
Why not?
Give a possible explanation (reason). (2)

3.3.3 You must determine the average number of minutes Zara arrived late at school. (6)
[30]

QUESTION 4

4.1

Mrs Nkosi lives in the centre of Pretoria.
She works in Sandton.
She travels to work by car.
She travels approximately 65 km each way.
She works a five-day week.
A colleague travels with her to work.

Mrs Nkosi pays an average of R650,00 per week for petrol.
The general maintenance of her car is 35 cents per kilometre.
Her colleague pays her R330,00 per week to travel with her.

Mrs Nkosi has to be at work by 08:15 daily.
There is a lot of traffic.
It takes her between $1\frac{1}{2}$ hours and $2\frac{1}{2}$ hours to travel to work.

4.1.1 Mrs Nkosi must be at work on time.
What is the latest time that Mrs Nkosi should leave home to make sure that she is on time? Determine. (2)

4.1.2 Mrs Nkosi works a 22-day working month.
What are Mrs Nkosi's total expenses to and from work? Calculate. (6)

4.2

The Gautrain travels between Pretoria and Sandton. (The Gautrain is a rapid rail link between Pretoria and Johannesburg.)
Mrs Nkosi decides to use the Gautrain.

The trip between Pretoria station and Sandton station takes 42 minutes.
This includes three 1-minute stops at other stations along the way.

Look at ANNEXURE B.
It shows the train route and the train fares.

The Gautrain travels between Pretoria station and Sandton station at an average speed of 85,8 km/h.

Calculate the distance travelled by the Gautrain between Pretoria station and Sandton station. Write your answer in kilometres.

You must use the formula:

$$\textbf{Average speed} = \frac{\textbf{Distance}}{\textbf{Time}}$$ (4)

4.3

Mrs Nkosi has TWO options (choices).
She can use the 'Pay-As-You-Go' payment system.
She can use the '35-Day Pass'.

Look at ANNEXURE B.
It gives the Gautrain fares in rand.

It would cost her R150,00 per month for petrol to travel from her home to the station and back.
It would cost her R10,00 per day for parking at the station.
It would cost her R6,00 for the Gaubus between Sandton station and her workplace. The Gaubus is a shuttle bus service.

4.3.1 Mrs Nkosi wants to buy the '35-Day Pass'.
She does not want to buy the 'Pay-As-You-Go' system.
She will save some money.
How much money will Mrs Nkosi save? (6)

4.3.2 Mrs Nkosi's daughter travelled from Pretoria station to another destination.
She uses the Gautrain.
She paid R43,00 on the 'Pay-As-You-Go' system for the trip.

She wanted to travel to another destination (place).
She again used the Gautrain.
The total cost of travelling to these two destinations was R70,00.

Write the names of her TWO destinations. (3)

4.3.3 Look at the expenses for the '35-Day Pass' for 22 days.
Look at the expenses for travelling to work by car for 22 days.

Determine the difference in total expenses between the '35-Day Pass' and her car. (8)

4.3.4 Mrs Nkosi should use the Gautrain to travel to work.

First say YES or NO. Then give at least TWO financial reasons. (3)

[32]

QUESTION 5

5.1 Peggy is the owner of the Tasty Sandwich Company.

Her weekly expenses are:

- Rent R520,00
- Water and electricity R390,00
- Wages 25% of the total weekly expenses
- Other R140,00

The cost of the ingredients and packaging is R4,00 per sandwich.

5.1.1 (a) Calculate her total weekly expenses. (5)

(b) Peggy wants to calculate her total costs per week for producing ***x*** number of sandwiches. She wants to have the cost in rand.

Write down a formula that Peggy could use in the form:

Total costs (in rand) per week = … (2)

(c) Peggy's total costs for making sandwiches in one week are R2 400. How many sandwiches did Peggy make? (4)

5.1.2 Peggy calculates the total production cost per sandwich.
She gives the cost in rand.

Peggy uses the following formula:

$$\mathbf{P} = \frac{\mathbf{1\,400}}{\boldsymbol{x}} + \mathbf{4}$$

where **P** = total production cost (in rand) per sandwich
x = number of sandwiches produced per week

TABLE 5: Cost of producing one sandwich

Number of sandwiches (***x***) produced per week	0	100	200	400	700	**B**
Total cost (**P**) of producing one sandwich (in rand)	**A**	18	11	7,50	6	2

Look at **A** and **B**.
Calculate the missing values **A** and **B**.
What is the meaning of each of these calculated values? Explain. (5)

5.1.3 Answer this question on ANNEXURE C.

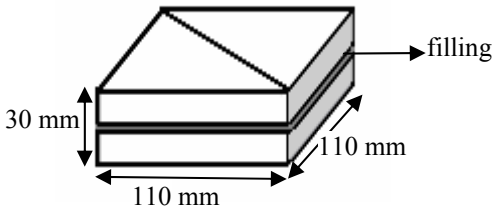
Draw a curved line on the grid.
You must show the relationship between the total cost of producing one sandwich and the number of sandwiches produced per week. (5)

5.1.4 Peggy calculated that the total cost per sandwich could vary (be) from R6,00 to R29,00.

(a) Calculate how many sandwiches she would produce (make) if the total cost per sandwich is a **minimum**. (1)

(b) Calculate how many sandwiches she would produce (make) if the total cost per sandwich is a **maximum**. (3)

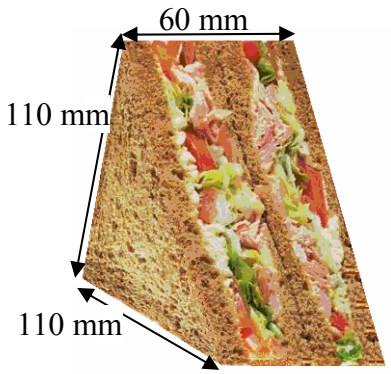
5.2 She makes the sandwiches from two square slices of bread. There is a filling between them.



Each side of the sandwich is 110 mm long.
The sandwich is 30 mm thick.

Look at the pictures.

Each square sandwich is cut diagonally. It forms two triangular pieces. The pieces are stacked next to each other. They are then packed in a box shaped like a triangular prism.



Two triangular sandwiches placed next to each other

The packed triangular sandwiches

The dimensions of the box are 5% greater than the dimensions of the sandwich.
A rectangular sticker is pasted onto the diagonal side of the sandwich box.
The words on the sticker are: Tasty Sandwich Company.

5.2.1 (a) You must determine the diagonal length of the sandwich.
Your answer must be rounded off to the nearest cm.

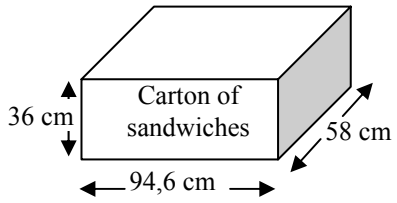
You must use the formula:

$$\mathbf{d} = \sqrt{2} \times \mathbf{s}, \text{ where}$$

d = length of the diagonal side of the sandwich
s = length of the side of the sandwich (2)

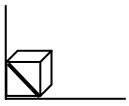
(b) The ratio of the length of the sticker to the length of the diagonal side of the box is 2 **:** 3.
Calculate the length of the sticker. (3)

5.2.2 The boxed sandwiches need to be packed into a rectangular carton.
The carton is 94,6 cm long.
The carton is 58 cm wide.
The carton is 36 cm high.



Look at the picture below.

They will pack the sandwiches upright.



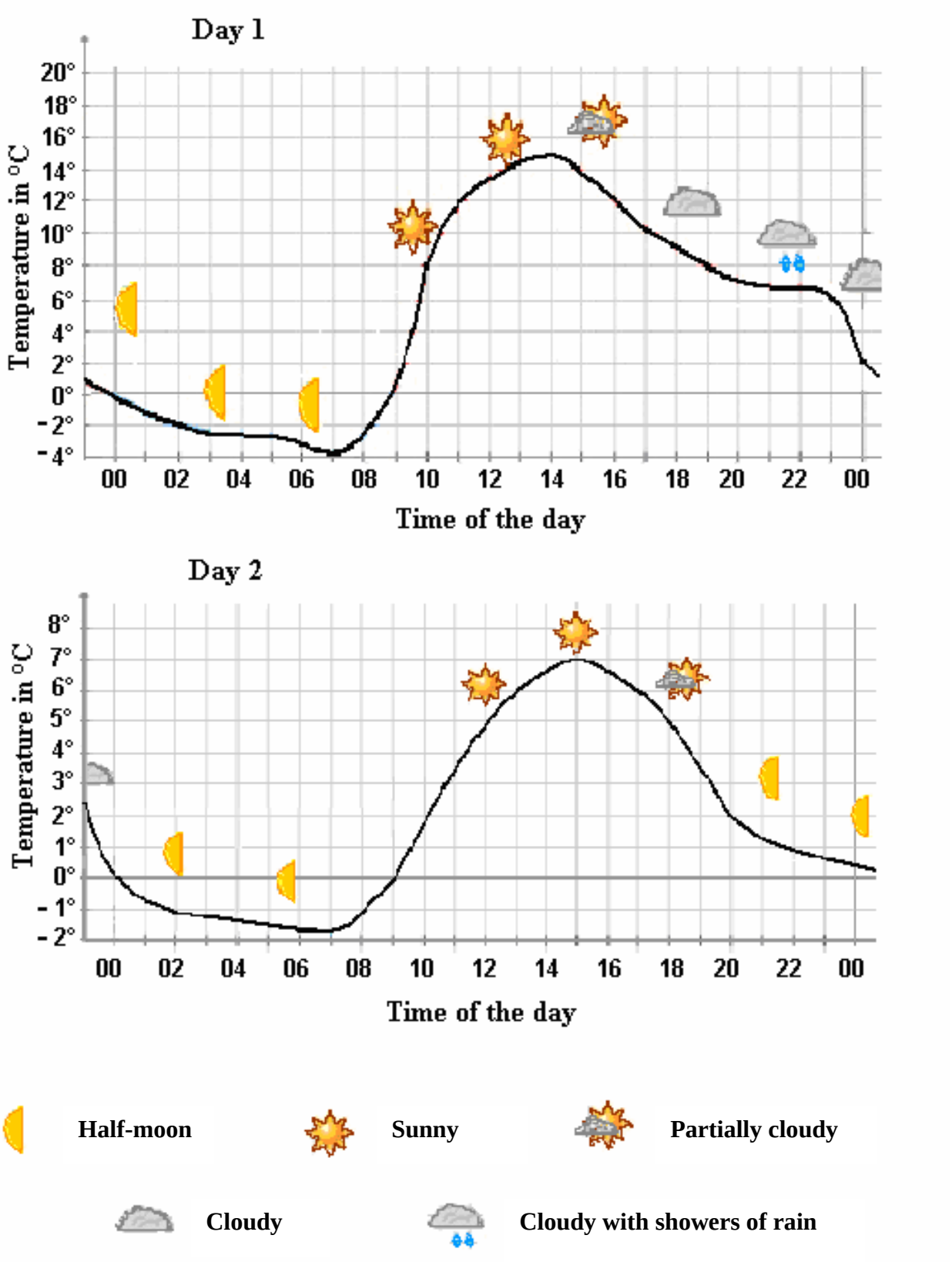
You must determine the maximum number of boxed sandwiches that they can pack into ONE carton.
You must show ALL workings (calculations). (12)
[42]

TOTAL: 150

ANNEXURE A

QUESTION 1.2

METEOGRAMS FOR DAY 1 AND DAY 2



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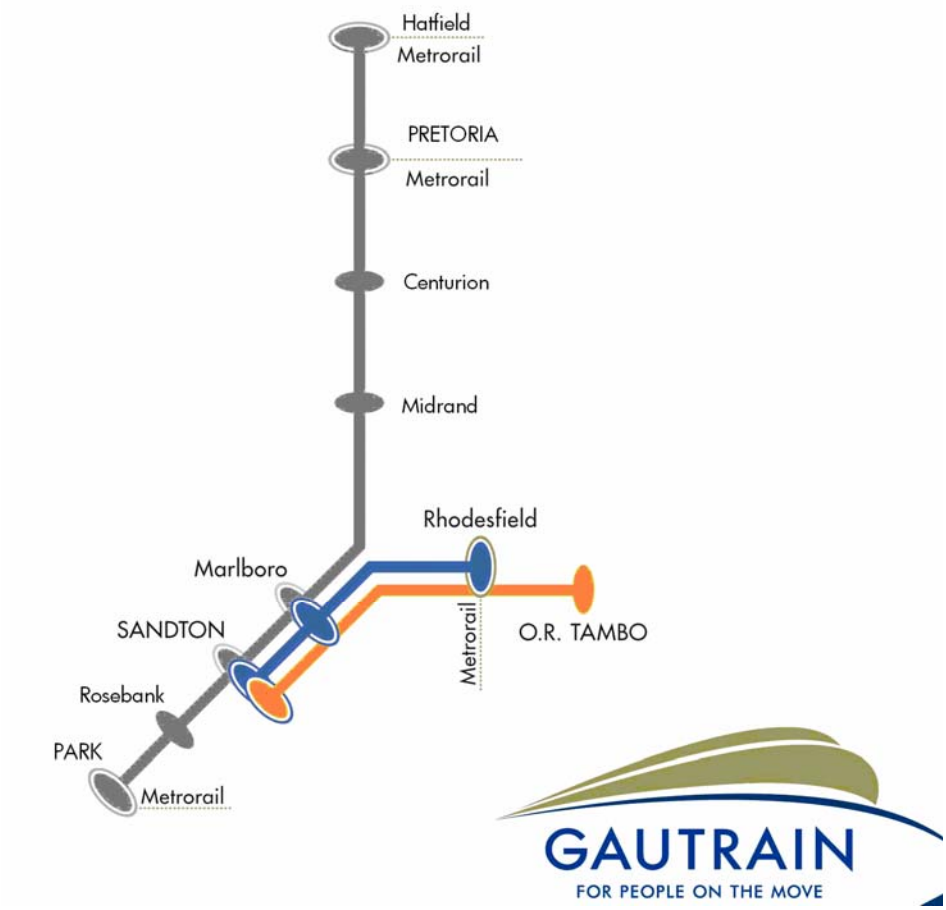
ANNEXURE B

QUESTION 4.2



QUESTION 4.3: TRAIN FARES IN RAND

Pay-As-You-Go (If you are an occasional user. Single trip fares.)

	Hatfield	Pretoria	Centurion	Midrand	Marlboro	Sandton	Rosebank	Park	Rhodesfield
Hatfield		19,00	24,00	35,00	40,00	43,00	46,00	49,00	46,00
Pretoria	19,00		22,00	29,00	38,00	41,00	43,00	46,00	44,00
Centurion	24,00	22,00		24,00	29,00	36,00	38,00	40,00	38,00
Midrand	35,00	29,00	24,00		22,00	24,00	26,00	29,00	27,00
Marlboro	40,00	38,00	29,00	22,00		19,00	21,00	24,00	22,00
Sandton	43,00	41,00	36,00	24,00	19,00		19,00	21,00	25,00
Rosebank	46,00	43,00	38,00	26,00	21,00	19,00		19,00	27,00
Park	49,00	46,00	40,00	29,00	24,00	21,00	19,00		29,00
Rhodesfield	46,00	44,00	38,00	27,00	22,00	25,00	27,00	29,00	

35-Day Pass (Means you have 35 days to make the 22 return trips.)

	Hatfield	Pretoria	Centurion	Midrand	Marlboro	Sandton	Rosebank	Park	Rhodesfield
Hatfield		674,00	836,00	1 236,00	1 423,00	1 525,00	1 612,00	1 715,00	1 633,00
Pretoria	674,00		758,00	1 019,00	1 335,00	1 435,00	1 515,00	1 618,00	1 535,00
Centurion	836,00	758,00		857,00	1 022,00	1 253,00	1 331,00	1 425,00	1 350,00
Midrand	1 236,00	1 019,00	857,00		762,00	853,00	923,00	1 006,00	939,00
Marlboro	1 423,00	1 335,00	1 022,00	762,00		686,00	756,00	839,00	772,00
Sandton	1 525,00	1 435,00	1 253,00	853,00	686,00		665,00	749,00	863,00
Rosebank	1 612,00	1 515,00	1 331,00	923,00	756,00	665,00		679,00	933,00
Park	1 715,00	1 618,00	1 425,00	1 006,00	839,00	749,00	679,00		1 016,00
Rhodesfield	1 633,00	1 535,00	1 350,00	939,00	772,00	863,00	933,00	1 016,00	

ANNEXURE C

CENTRE NUMBER: | | | | | | | | |

EXAMINATION NUMBER: | | | | | | | | | | | | | |

QUESTION 5.1.3

RELATIONSHIP BETWEEN THE TOTAL COST OF PRODUCING ONE SANDWICH AND THE NUMBER OF SANDWICHES PRODUCED PER WEEK