basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MLIT.1

MATHEMATICAL LITERACY P1

NOVEMBER 2014

MARKS: 150

TIME: 3 hours

This question paper consists of 13 pages, 2 annexures and 4 answer sheets.

MORNING SESSION

WESTERN CAPE

INSTRUCTIONS AND INFORMATION

1.   This question paper consists of FIVE questions. Answer ALL the questions.

2.   Answer QUESTION 3.2.4, QUESTION 4.1.7, QUESTION 5.1.2 and QUESTION 5.2.1 on the attached ANSWER SHEETS. Write your centre number and examination number in the spaces on the ANSWER SHEETS. Hand in the ANSWER SHEETS with your ANSWER BOOK.

3.   Number the answers correctly according to the numbering system used in this question paper.

4.   Start EACH question on a NEW page.

5.   You may use an approved calculator (non-programmable and non-graphical), unless otherwise stated.

6.   Show ALL the calculations clearly.

7.   Round off ALL final answers appropriately according to the given context, unless stated otherwise.

8.   Indicate units of measurement, where applicable.

9.   Maps and diagrams are NOT necessarily drawn to scale, unless stated otherwise.

10.   Write neatly and legibly.

QUESTION 1

1.1   Valley High School needs a new stove for their Consumer Studies kitchen. The Consumer Studies teacher, Miss Van Dyk, obtained the following information from two stores for the school to consider. (Some of the details have been omitted.)

ASDA KITCHEN APPLIANCES   **KITCHEN PRO**

4-plate compact electric stove   4-plate gas/electric stove
No installation needed – plug in and use   Electric oven with convection function

New selling price
R1 989
SAVE R210

Selling price
R2 100
**Get 5% discount
for cash**

Hire-purchase Option
Deposit R199
R88 × 30 months
Total cost R...
at 19% interest per annum

Hire-purchase Option
15% deposit
R... × 24 months
Total cost R2 443,49 (excluding deposit) at 17% interest per annum

1.1.1   Write down the annual interest rate charged by Kitchen Pro.   (2)

1.1.2   Calculate:

(a)   The monthly instalment for the stove from Kitchen Pro   (2)

(b)   The original selling price of the stove from ASDA Kitchen Appliances before the price was reduced   (2)

(c)   The deposit amount if they purchase the stove from Kitchen Pro   (2)

(d)   The total cost of the stove from ASDA Kitchen Appliances if the hire-purchase option is chosen.   (4)

1.2 | Miss Van Dyk bought supplies for a practical lesson for her Grade 10 learners. The till slip is shown on ANNEXURE 1. (Some of the amounts on the till slip have been omitted.)

Use the till slip on ANNEXURE 1 to answer the following questions:

1.2.1   Name the non-vegetable item that is exempted from VAT.   (2)

1.2.2   Determine the number of tins of Value condensed milk bought.   (3)

1.2.3   Calculate the missing value **A**.   (2)

1.2.4   Determine the approximate period the supermarket allows for refunding.   (2)

1.2.5   Calculate the price per kilogram of sweetcorn.   (3)

1.2.6   Calculate the total cost of the items that are exempted from VAT.   (2)

1.2.7   Frank's Supermarket rounded off the total amount due to the nearest 5 cents.

(a)   Calculate the missing value **B**.   (2)

(b)   Miss Van Dyk paid for the items with one R200 note and two R100 notes. Determine the missing values **C** and **D**.   (3)

1.2.8   Frank buys tomatoes from his supplier at a cost of R12,00 per bag. He then sells them at R14,99 per bag.

(a)   Calculate his profit on tomato sales if he sells one dozen bags of tomatoes.   (4)

(b)   Determine the percentage mark-up, rounded to the nearest whole percentage, that Frank uses to determine the selling price of the tomatoes.

You may use the following formula:

$$\text{Percentage mark-up} = \frac{\text{selling price} - \text{cost price}}{\text{cost price}} \times 100\%$$ (3)
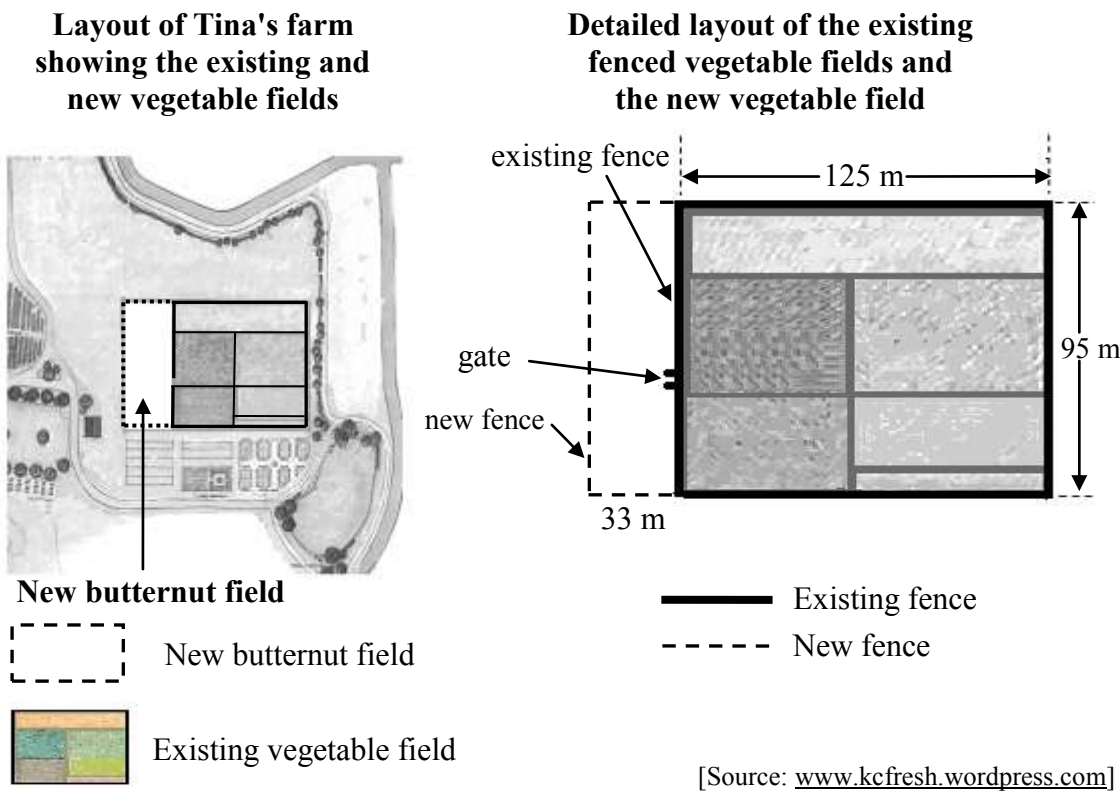
[38]

QUESTION 2

2.1   Tina is a livestock and vegetable farmer. She added a new rectangular butternut field to her existing rectangular vegetable fields by extending the length of her existing field by 33 m. The existing vegetable fields are enclosed with a fence with a gate. The fence is necessary to keep out livestock and to provide security.

The farm and vegetable field layout plans are shown below.

Layout of Tina's farm showing the existing and new vegetable fields

Detailed layout of the existing fenced vegetable fields and the new vegetable field

existing fence

gate

new fence

125 m

95 m

33 m

New butternut field

⌐ ¬ New butternut field
└ ┘

Existing vegetable field

——— Existing fence
- - - - - New fence

[Source: www.kcfresh.wordpress.com]

2.1.1   Use the layout plans to determine the number of vegetable fields Tina will now have on her farm.   (2)

2.1.2   Tina has to fence in the new field. She will have to buy additional poles and wire for the fencing. To save on costs she will also use her existing wire fence and gate to erect the new fence.

Calculate:

(a)   The length of wire fencing (sold in 5 m rolls only) she needs to buy so that the new butternut field is also enclosed   (3)

(b)   The number of additional poles she needs to buy if the poles are planted 1,5 m apart   (3)

2.1.3   Write down the ratio of the total length of the existing vegetable fields to the total length of the new extended vegetable fields.   (2)

2.1.4   Calculate the total area of Tina's new extended vegetable fields.

You may use the following formula:

Area of a rectangle = length × width   (3)

2.2   Tina investigates the possibility of installing a cylindrical water storage tank on her farm. This will allow her to store rainwater for use during the dry seasons. She found the following data about water tanks on the Internet.

Cylindrical water storage tank

WATER STORAGE TANKS		
Volume* ℓ	Diameter mm	Height mm
1 000	1 100	1 300
1 500	1 150	1 700
2 000	1 200	1 900
2 500	1 450	1 700
5 000	1 840	2 000
5 500	1 800	2 300
10 000	2 200	3 000
* Approximate values		

1 m³ = 1 000 ℓ

NOTE: The actual volume of the tanks is generally greater than the listed volume.

[Source: www.capewatersolutions.co.za]

2.2.1   Convert the diameter of a 10 000 ℓ tank to metres.   (2)

2.2.2   If the height of the cylindrical section of the 10 000 ℓ tank is 3 m, calculate the actual volume (in litres) of the tank.

You may use the following formula:

Volume of a cylinder = $\pi \times$ (radius)$^2 \times$ height, where $\pi = 3{,}142$ (5)

2.3 | Tina has a greenhouse in which she grows strawberries. The sprinkler system in the greenhouse sprays a fine mist to ensure the strawberries get enough water. The strawberries are watered for a total of 2 hours and 45 minutes every day and the temperature in the greenhouse is kept constant at 25 °C.

The clock below shows the time each morning when the sprinkler system is switched off.

2.3.1 Determine the time the sprinkler system is switched on. (3)

2.3.2 The thermometer Tina uses is calibrated in degrees Fahrenheit.

Determine the temperature reading on her thermometer if the required constant temperature of 25 °C has to be maintained.
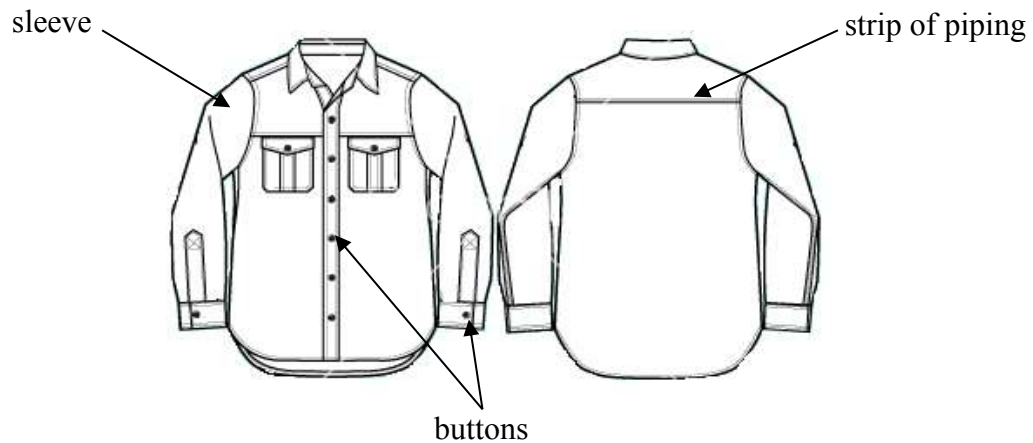
You may use the following formula:

Temperature in °F = (1,8 × °C) + 32° (3)

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QUESTION 3

3.1   Thulabone is a clothing designer. Below is a scale diagram of a shirt he designed.

Scale diagram of the designed shirt

sleeve   strip of piping

buttons

Scale 1 : 18

3.1.1   Explain the meaning of the given scale.   (2)

3.1.2   Calculate the scaled length (in mm) of the sleeve if its actual length
         is 486 mm.   (2)

3.1.3   Determine the actual number of buttons required for this shirt.   (2)

3.1.4   Thulabone wants to sew a single strip of piping on the back of the shirt as
         shown in the diagram.

         Calculate the actual length (in mm) of the strip of piping required.   (3)

3.1.5   State on which side the buttons must be sewn on the front of the shirt.   (2)

3.2 | Jabu is a Hospitality Studies teacher at Yo-yo High School. She has to convert one of the classrooms into a cafeteria for the school. The classroom desks will be replaced by 4-seater tables as shown in the photograph alongside.

The side length of each square table is 90 cm. When not occupied each chair occupies a square area of 60 cm by 60 cm measured from the edge of the table.

Cafeteria of Yo-yo High School showing a 4-seater table and chairs

ANSWER SHEET A shows a top view of the layout of the tables and chairs in the cafeteria of Yo-yo High School when it is not occupied.

The sets of tables with chairs must be 50 cm apart when not occupied (as shown on the layout plan).

The side length of the square classroom is 900 cm.

Use the layout plan on ANSWER SHEET A to answer the following questions.

3.2.1   Calculate the missing length **K**.   (2)

3.2.2   Determine the maximum number of persons that can be seated in the cafeteria.   (2)

3.2.3   Calculate the missing length **T**, the shortest distance between the southern wall and the furthest point of the chair at Table 3.   (4)

3.2.4   During a practical examination a learner waiter is standing at position **X** on the layout plan, facing north. He has to move from position **X** to position **Y** to serve a customer seated at Table 8.

He takes the following route:
- He walk northwards between two pairs of tables.
- He then turns left and walks between Tables 5 and 6 until he reaches the customer at Table 8.

Indicate the route described above on ANSWER SHEET A.   (2)

3.2.5   Write down the compass direction of Table 9 relative to the door.   (2)

3.2.6   Jabu is also looking at another possible layout for the cafeteria where two tables are joined with six chairs around the tables.

If Jabu only uses 24 chairs, how many tables will she need for the new layout plan?   (2)

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WESTERN CAPE

QUESTION 4

4.1

In October 2013 the South African National Roads Agency Limited (Sanral) published e-toll tariffs. These tariffs apply to different classes of vehicles and different types of users relating to the Gauteng Freeway Improvement Project (GFIP).	**Billboard with e-tag tariffs for registered users**

Drivers who use Gauteng freeways have a choice to register as a user and receive an e-tag or to be a non-registered user.

TABLE 1 on ANNEXURE 2 shows the tariffs for both registered and non-registered users for some e-toll gantries.

[Source: *Government Gazette No. 36912*]

Use TABLE 1 on ANNEXURE 2 to answer the following questions.

4.1.1   Write down the e-toll tariff for a non-registered user who passes through the Ukhozi gantry and drives a Class B vehicle.   (2)

4.1.2   Write down the names of the gantries that show the highest tariffs for registered e-tag users driving Class B vehicles.   (2)

4.1.3   Refer to the tariffs for registered e-tag users driving Class B vehicles to answer the following questions.

         (a)   Calculate the mean e-toll tariff.   (4)

         (b)   Determine the median e-toll tariff.   (3)

         (c)   Hence state, giving a reason, whether the mean e-toll tariff or the median e-toll tariff best represents these tariffs.   (3)

4.1.4   Calculate the difference in e-toll tariffs between the Sunbird and Fiscal gantries for non-registered users driving Class A2 vehicles.   (3)

4.1.5   Write down the ratio of the e-toll tariffs for registered e-tag users driving Class A2 vehicles to registered e-tag users driving Class B vehicles if both pass through the Owl gantry.   (2)

4.1.6   Calculate the amount that a non-registered user of a Class A2 vehicle passing through the Pikoko gantry could have saved if he had been registered.   (2)

4.1.7   ANSWER SHEET B shows a bar graph representing the e-toll tariffs of five selected e-toll gantries for registered e-tag users driving Class B vehicles.

         Draw, on the same grid on ANSWER SHEET B, a bar graph representing the e-toll tariffs for non-registered users driving Class B vehicles for the same five e-toll gantries. (Use the unshaded columns.)   (5)

4.2   The Mangaung Metropolitan Municipality receives funding for its capital projects from various sources. The pie charts below show the various sources of funding and the capital expenditure for projects during 2011/2012.
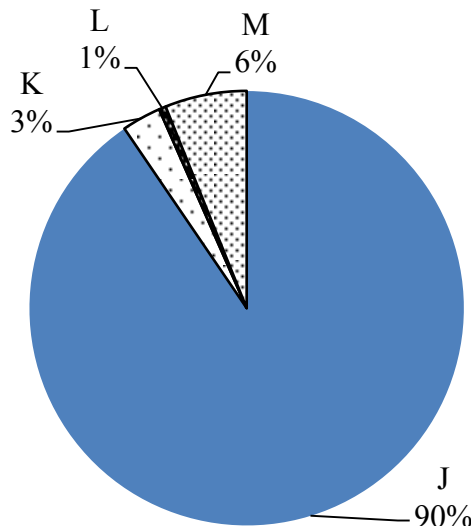
PIE CHART X:
FUNDING SOURCES
FOR 2011/2012

A 11%
B 2%
C 12%
D 3%
E 14%
F

PIE CHART Y:
CAPITAL EXPENDITURE
FOR PROJECTS FOR
2011/2012

L 1%
M 6%
K 3%
J 90%
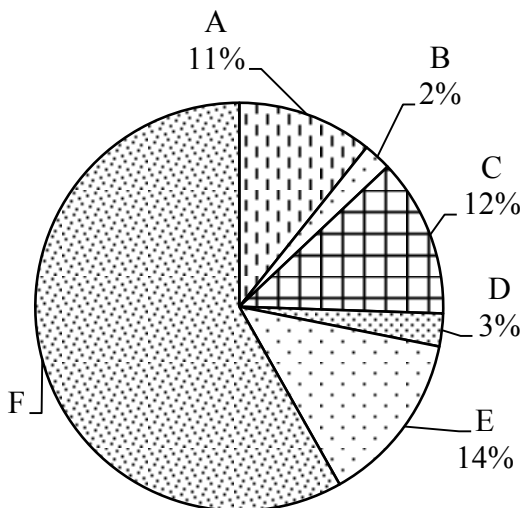
Key: FUNDING SOURCES

A	Municipal infrastructure grant
B	Department of Minerals and Energy grant
C	Capital replacement reserves
D	Public contributions and donations
E	External loans
F	Other grants and subsidies

Key: PROJECTS

J	Infrastructure
K	Sports fields
L	Recreation facilities
M	Other

[Adapted from www.mangaung.co.za]

4.2.1   Identify the second biggest funding source that contributes to the municipality's budget for capital projects.   (2)

4.2.2   Calculate the percentage contribution of other grants and subsidies to the municipality's budget for capital projects.   (2)

4.2.3   Calculate the value of the external loans if the total amount obtained from the funding sources was R587 646 376,00.   (3)

4.2.4   On which project did the municipality spend the least?   (2)

4.2.5   The municipality has a contract to spend R28 401 736,00 of their funds on infrastructure. Write down this contract amount in words.   (2)

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QUESTION 5

5.1

> Rafique is the driver of a metered taxi. The company he works for charges the following fare for a single trip:
>
> - A minimum call-out fee of R50 per trip with the first three kilometres free
> - Thereafter, R12,00 for each additional kilometre or part thereof
>
> [Source: www.taxiautofare.com]

5.1.1   Write down an equation that Rafique can use to calculate the total cost (in rand) per single trip, in the form:

Total cost (in rand) per single trip = ...   (3)

5.1.2   TABLE 2 below shows the total cost per single trip for different distances travelled.

TABLE 2: Total cost per single trip for different distances travelled

Distance (in km)	0	1	3	5	10	20	30
Total cost per single trip (in rand)	0	50	50	74	134	254	374

Use TABLE 2 to draw a line graph on ANSWER SHEET C showing the total cost per single trip.   (5)

5.1.3   A client pays Rafique R1 214 for a single trip.

Determine the distance travelled during this trip.   (4)

5.1.4   Mrs Mkhize hires a taxi from this company to take her to a meeting venue 5 km from her home. The meeting is scheduled to take exactly ONE hour and she requests that the taxi wait for her to take her back home.

The company charges an extra R100,00 per hour if the taxi has to wait for a client and the trip will be charged as a single trip.

Calculate the total taxi fare Mrs Mkhize will pay for this trip.   (5)

5.2 | Rafique is a soccer fan and he wants to use his knowledge of Mathematical Literacy to understand the possible outcomes of a game.

The possible outcomes of a soccer game are WIN (W), DRAW (D) or LOSE (L).

The team that Rafique supports still has to play two games.

5.2.1   An incomplete tree diagram on ANSWER SHEET D shows the possible outcomes of the two games that still have to be played.

Write down the missing information in the spaces provided on ANSWER SHEET D.   (3)

5.2.2   The probability of Rafique's team losing both games is $\dfrac{1}{9}$.

Which ONE of the following statements (A, B or C) best describes this probability?

A   There is **no chance** of the team losing both games.

B   There is a **certainty** of the team losing both games.

C   There is a **possibility** of the team losing both games.   (2)

5.2.3   The tree diagram on ANSWER SHEET D shows the possible outcomes of the last two games.

Use this tree diagram to determine the probability that the team will win at least one of the two games that still have to be played.   (2)

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TOTAL: 150

ANNEXURE 1

QUESTION 1.2

FRANK'S SUPERMARKET	
Welcome to our store!	
A9 Daven Avenue	
Beacon Bay, East London	
Tel No.: 043 711 11**	
VAT Reg. No.: ****2216	
Customer Helpline: 0860 00* 00*	
Last day for full refund is	
12/12/2013 except for SALE items	
# Organic Carrots 1 kg	R 14,99
White Huletts Sugar	
2,5 kg @ R23,95	
Less promotion R2,00	R 21,95
Value Condensed Milk	
@ R16,95	
Less promotion R1,00	R 159,50
# 1 ℓ Clover Milk	R 9,95
# Sweetcorn 135 g	R 19,95
# Rosa Tomatoes 400 g	R 14,99
# Red Salad Onions 10 g	R 14,99
Sliced Cooked Ham 250 g	R 46,99
Dove Fresh Touch Soap	R 8,29
# Cabbage	R 6,99
TOTAL (including VAT)	**A**
TOTAL (excluding VAT)	**R289,52**
VAT	**R29,07**
TOTAL DUE (rounded off)	**B**
AMOUNT TENDERED	**C**
CHANGE	**D**
# Non-VAT Items	
12-10-2013 16:45 Nondumiso	

WESTERN CAPE

ANNEXURE 2

QUESTION 4.1

An e-toll gantry is a framework built over a road which electronically bills a user each time a vehicle passes through the gantry as shown in the photograph alongside.

Photograph of an e-toll gantry

TABLE 1 below shows the tariffs for some e-toll gantries on the N1.

NAME OF GANTRY	TARIFFS INCLUDING VAT (IN RAND)			
	*Registered e-tag users		Non-registered users	
	**Class A2 vehicle	***Class B vehicle	Class A2 vehicle	Class B vehicle
Barbet	3,00	7,50	5,80	14,50
Mossie	3,00	7,50	5,80	14,50
Indlanzi	2,91	7,28	5,63	14,07
Pikoko	2,91	7,28	5,63	14,07
Ivusi	2,76	6,90	5,34	13,34
Flamingo	2,76	6,90	5,34	13,50
Ihobhe	3,36	8,40	6,50	16,24
Sunbird	3,36	8,40	6,50	16,20
Tarentaal	2,58	6,45	4,99	12,50
Blouvalk	2,58	6,45	4,99	12,47
Owl	3,21	8,03	6,21	15,52
Pelican	3,21	8,03	6,21	15,52
King Fisher	2,85	7,13	5,51	13,78
Ukhozi	2,85	7,13	5,51	13,78
Fiscal	2,52	6,30	4,87	12,00
Stork	2,52	6,30	4,87	12,18
Ilowe	0,60	1,50	1,16	2,90

[Adapted from *Government Gazette No. 36912*]

*Registered e-tag user – An individual or business whose make and model of vehicle, and personal and banking details have been registered with Sanral for e-toll payment.
**Class A2 vehicle – Light motor vehicle
***Class B vehicle – Small heavy motor vehicle
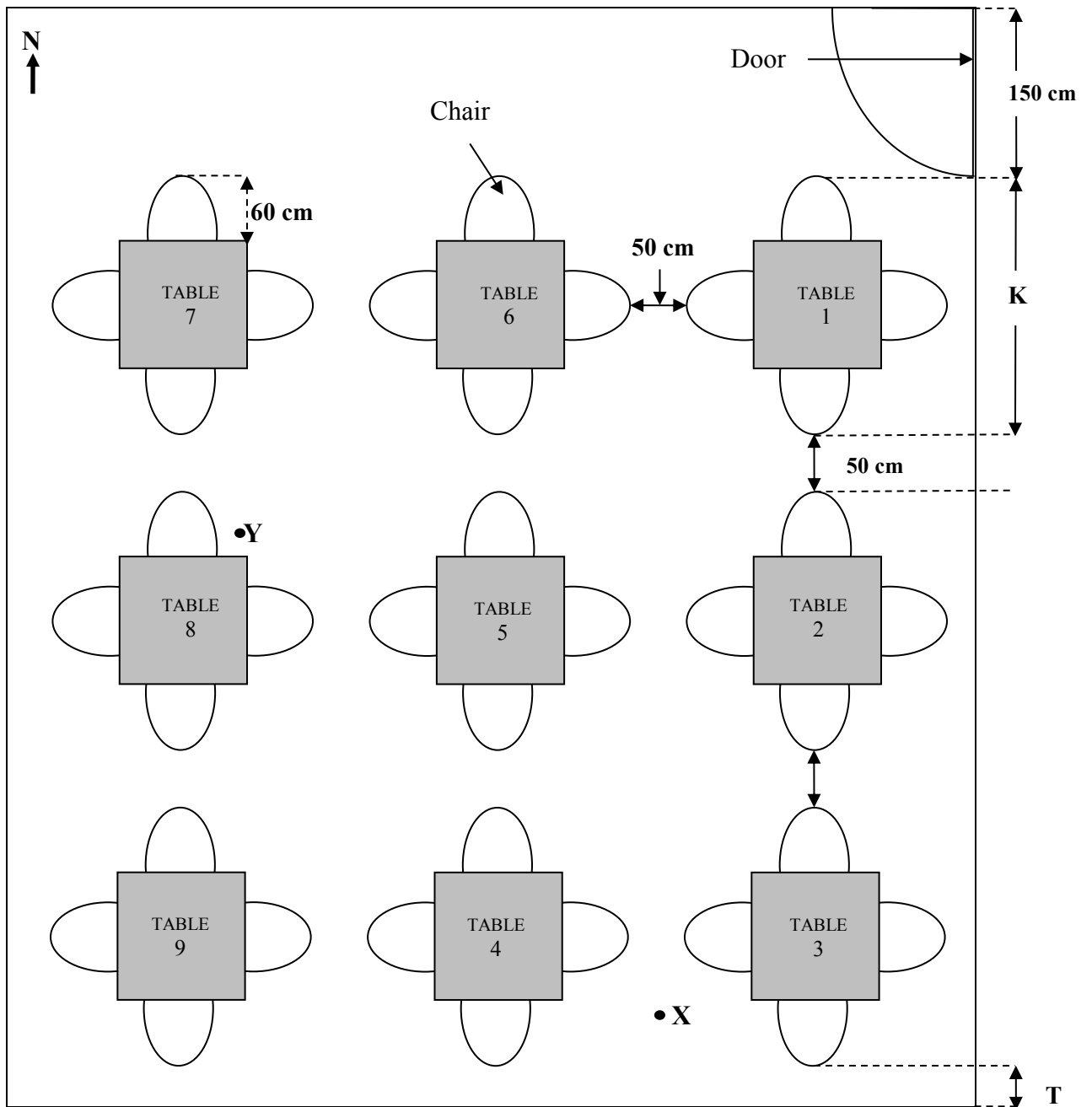
ANSWER SHEET A

CENTRE NUMBER:

EXAMINATION NUMBER:

QUESTION 3.2.4

Top view of the layout of the cafeteria when not occupied

ANSWER SHEET B

CENTRE NUMBER:

EXAMINATION NUMBER:

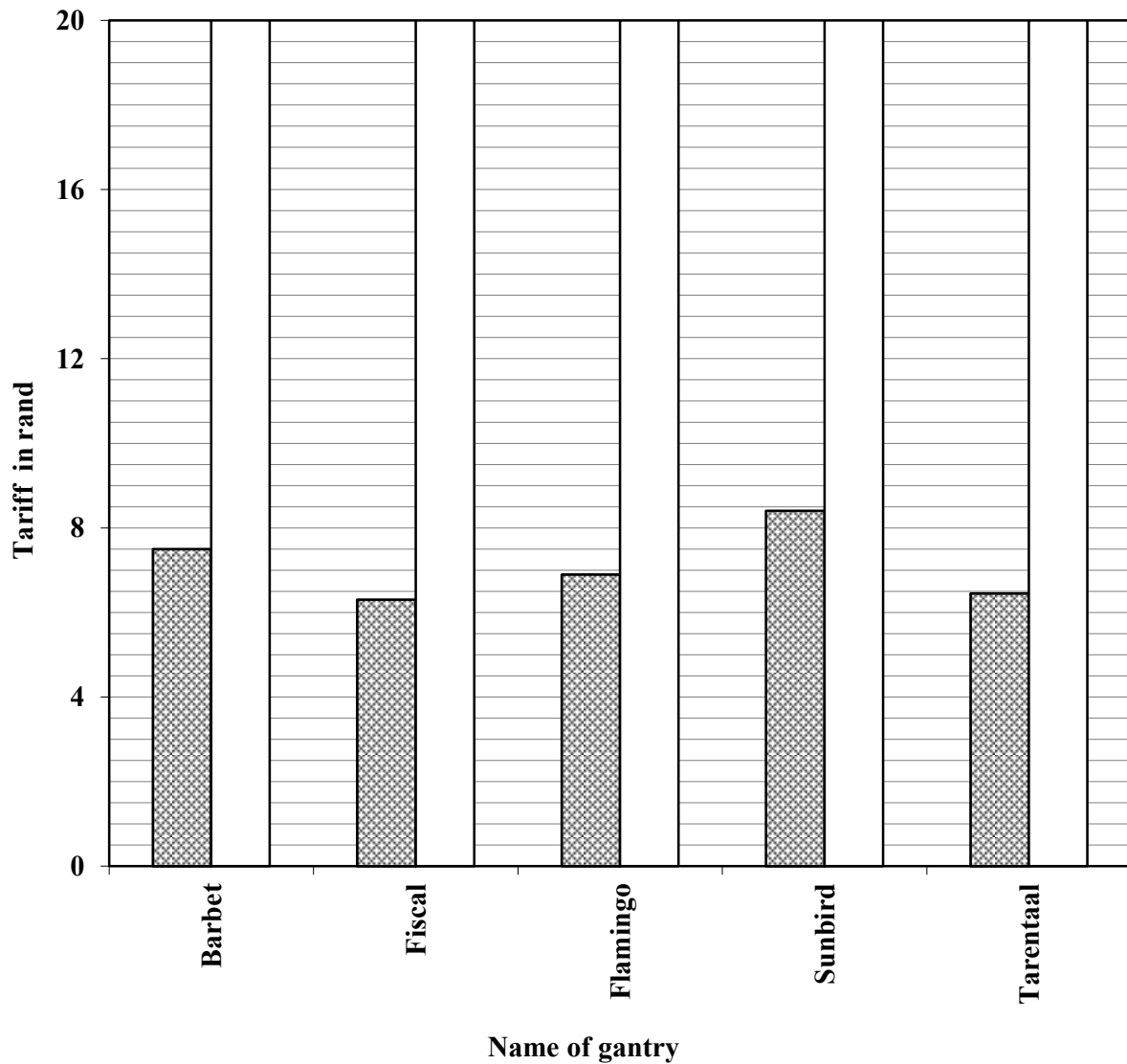**QUESTION 4.1.7**

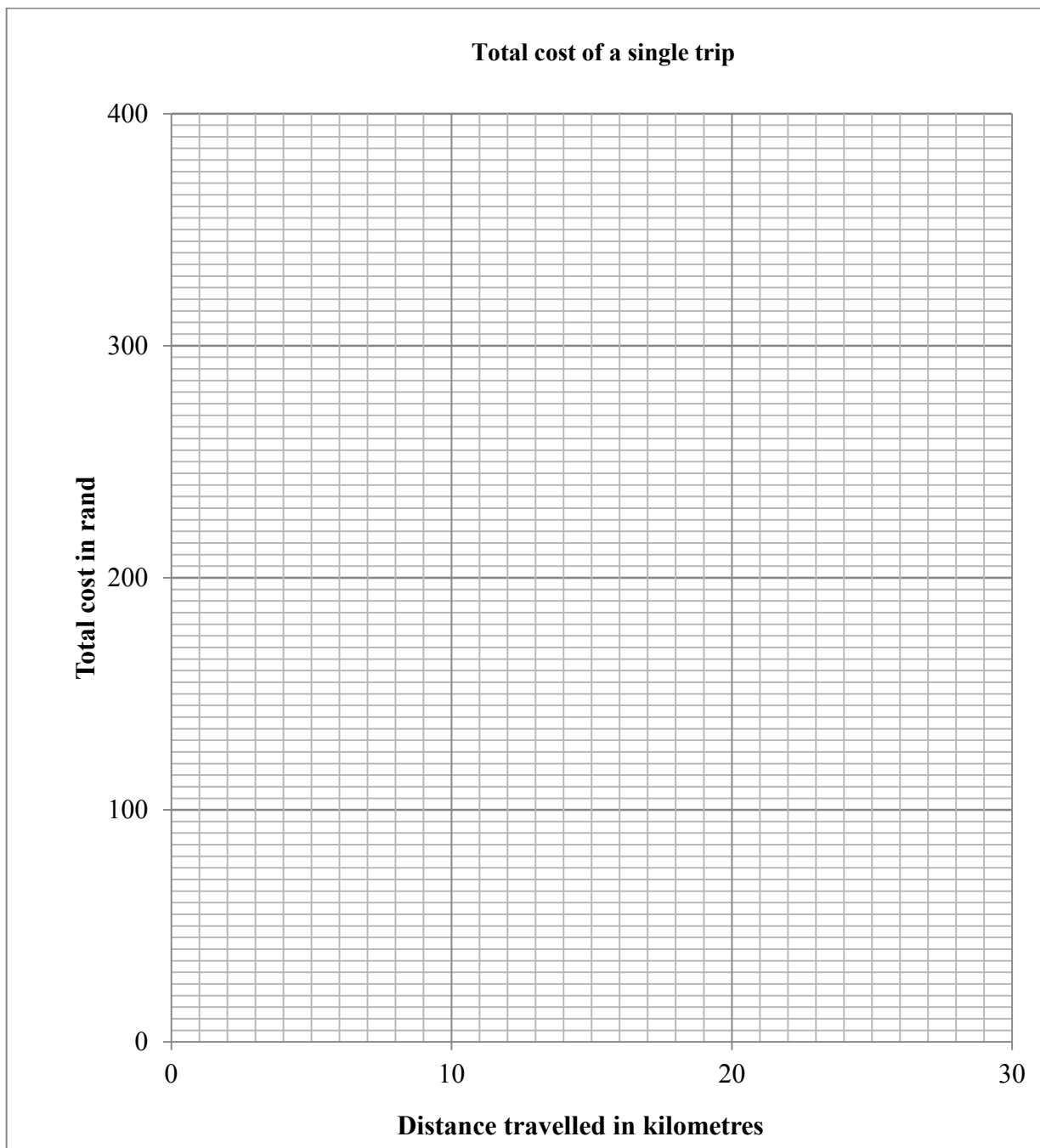**E-toll tariffs of five selected gantries for registered e-tag users of Class B vehicles**

Name of gantry

WESTERN CAPE

ANSWER SHEET C

CENTRE NUMBER:

EXAMINATION NUMBER:

QUESTION 5.1.2

Distance (in km)	0	1	3	5	10	20	30
Total cost per single trip (in rand)	0	50	50	74	134	254	374

Total cost of a single trip

Total cost in rand (y-axis)

Distance travelled in kilometres (x-axis)

ANSWER SHEET D

CENTRE NUMBER:

EXAMINATION NUMBER:

QUESTION 5.2.1

Outcome of first game	Outcome of second game	Outcome of both games
	W	W W
WIN (W)	…	W D
	L	W L
	W	D W
DRAW (D)	D	D D
	L	D L
	W	L W
…	D	…
	L	L L