basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P1

FEBRUARY/MARCH 2014

MARKS: 150

TIME: 3 hours

MATHEMATICAL LITERACY: Paper 1
1060E
10601E

This question paper consists of 16 pages, 2 annexures and 1 appendix.

X05

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GAUTENG

INSTRUCTIONS AND INFORMATION

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

2. Answer QUESTION 5.2.2 on ANNEXURE A and QUESTION 6.3.3 on ANNEXURE B. Write your centre number and examination number in the spaces on the ANNEXURES and hand in the ANNEXURES with your ANSWER BOOK. Use APPENDIX A to answer QUESTION 5.1.

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 stated otherwise.

6. Show ALL calculations clearly.

7. Round off ALL the final answers to TWO decimal places, unless stated otherwise.

8. Units of measurement MUST be indicated, where applicable.

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

10. Write neatly and legibly.

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QUESTION 1

1.1 1.1.1 Simplify: 45% of 26,7 $- \sqrt{\frac{24 \times 345}{10\ 389}}$ (2)

1.1.2 Express 1,068 as a common fraction, in simplified form. (2)

1.1.3 Fred, the oldest known living goldfish, was exactly $41\frac{1}{2}$ years old on 15 March 2012. During which month and year was Fred born? (2)

1.1.4 Convert €32 527 into rands, if R1 = €0,10717. (2)

1.1.5 The distance (S), in metres, covered by an object is given by:

$S = 5t(t - 1)$, where t = time (in seconds)

Calculate the value of S if $t = 1,5$. (2)

1.1.6 A class of 18 boys and 24 girls entered a competition.

Determine the probability (in simplified form) of randomly selecting a boy as the winner of the competition. (3)

1.1.7 A Gautrain is available every 12 minutes during peak periods and every 20 minutes during off-peak periods.

During off-peak periods there are 3 trains per hour. Determine how many more trains there are per hour during peak periods compared to off-peak periods. (2)

1.2 Thokozile uses a recipe to make a fennel and pomegranate salad. The ingredients required for a salad that can serve up to 6 people are as follows:



Fennel

- 4 large fresh fennel bulbs
- 3 tbsp. (tablespoon) olive oil
- 50 g pine nuts
- 200 g feta cheese



Pomegranate

- Pomegranate pips from 1 fruit (approximately 50 g)
- 2 tbsp. fresh fennel tips
- 2 tbsp. fresh mint

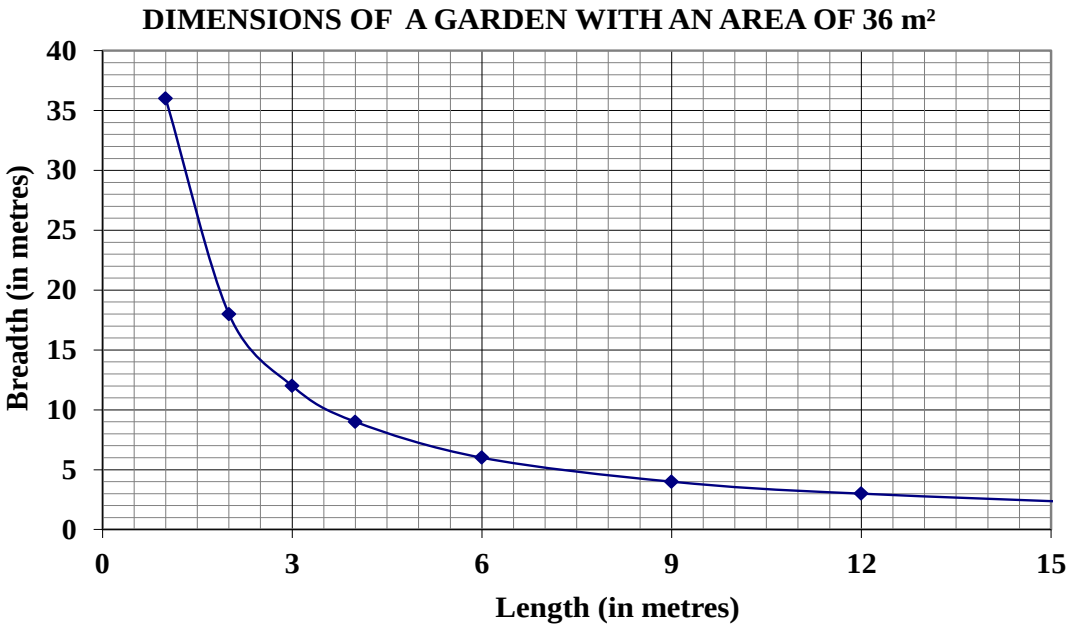
1.2.1 Express the amount of feta cheese (in pounds) required for the salad for the above recipe if 2,2 pounds = 1 000 g. (2)

1.2.2 If 10 tbsp. = 125 mℓ, determine how many millilitres of olive oil are required for the above recipe. (2)

1.2.3 Determine the amount of pine nuts that would be required for the salad if 9 people were to be served. (2)

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1.3 Sello decides to plant vegetables in a rectangular garden with an area of exactly 36 m^2. He uses the graph below to help him decide on the possible length and breadth of his garden.



1.3.1 Complete: If the length of the garden increases, then the breadth … (1)

1.3.2 Write down the breadth if the length of the garden is 9 m. (1)

1.3.3 Determine the side length of the garden if the garden is square shaped. (2)

1.3.4 Sello chooses a garden with a breadth of 400 cm. He wants to plant cabbages in straight rows, which must be exactly 16 cm apart.



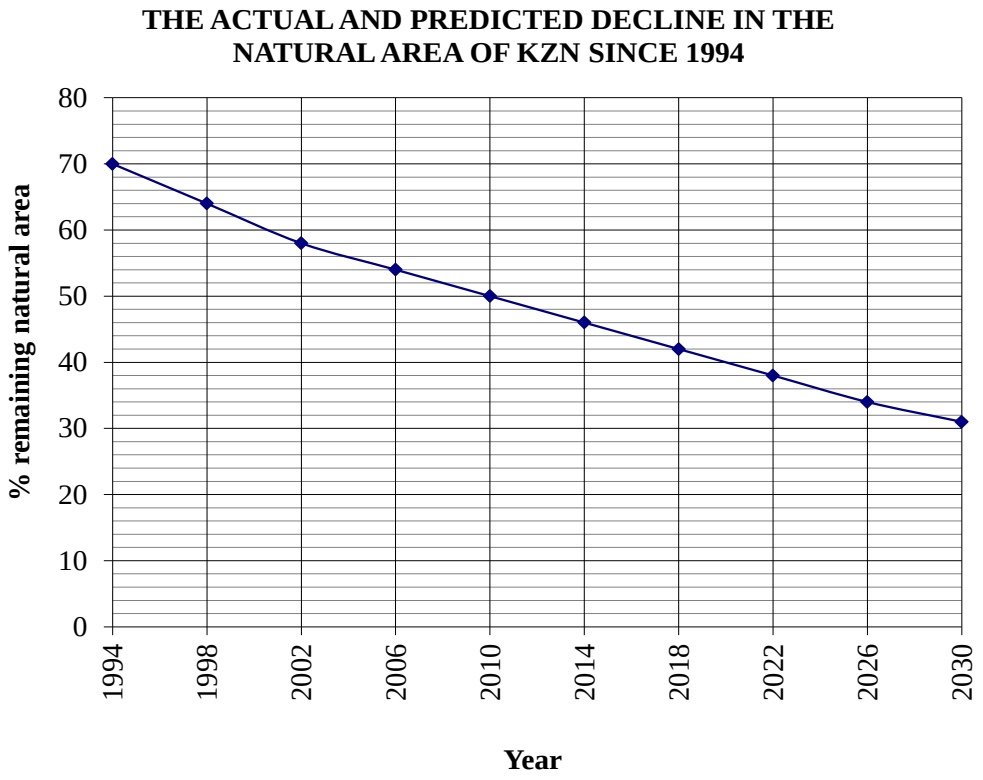
Rows of cabbages

Determine the maximum number of cabbages he can plant in a straight row along the breadth of his garden. (2)

[27]

QUESTION 2

2.1 Environmentalists are concerned that the natural area* of South Africa has been showing a rapid decrease. The graph below shows how the natural area of KwaZulu-Natal (KZN) has decreased from 1994 to 2010 and predicts what will happen in the next 20 years.
[*Natural area – an area of land that consists of natural vegetation such as forests, woodlands, grasslands and wetlands.]



[Source: *Environment, people and conservation in Africa, Autumn 2012*]

2.1.1 Write down the percentage of natural area that remained in KZN during 2006. (2)

2.1.2 The graph predicts that 34% of the natural area in KZN will remain by 2026.

Determine the percentage of natural area that will have been lost between 1994 and 2026. (2)

2.1.3 From 1994 to 2012 the average annual rate of change of the natural area in KZN was 127 909 hectares per annum. The total land area of KZN is 9 474 740 hectares.

Calculate the average annual percentage rate of change of the natural area in KZN from 1994 to 2012. (2)

2.2 Sooriya is an athletics coach for middle-distance runners. His athletes ran an 800 m time trial and he recorded the finishing times (in seconds) of all the athletes who took part as follows:

145	148	150	152	155	158
160	160	164	165	166	170

2.2.1 Calculate the median finishing time. (2)

2.2.2 The lower quartile value is 151 and the upper quartile value is 164,5. Determine how many athletes' finishing times lie between the lower and upper quartiles. (2)

2.2.3 If an athlete is chosen at random from those who ran the 800 m time trial, what is the probability that this athlete would have finished the time trial in less than 158 minutes? Express your answer as a percentage. (3)

2.3 Sooriya usually calculates the heart rate (the number of heart beats over a certain period of time) of his athletes and compares it with the recorded maximum heart rate for athletes.

He uses the formula below to calculate the maximum heart rate (MHR), in beats per minute, for each gender type.

$\mathbf{MHR_{male} = 202 - (0{,}55 \times \text{age in years})}$

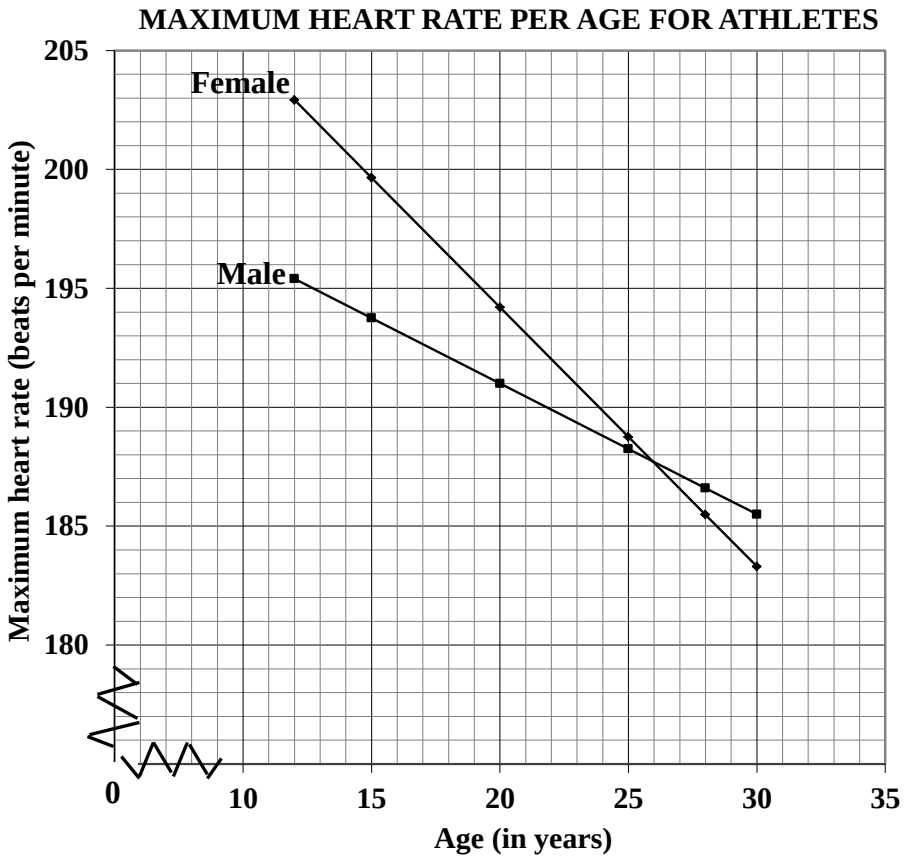
$\mathbf{MHR_{female} = 216 - (1{,}09 \times \text{age in years})}$

2.3.1 Calculate the maximum heart rate for an 18-year-old female athlete. (2)

2.3.2 Calculate the age (in years) of a male athlete who has a maximum heart rate of 189,9 beats per minute.

Use the formula: $\textbf{Age (in years)} = \dfrac{\mathbf{202 - MHR_{male}}}{\mathbf{0{,}55}}$ (2)

2.3.3 Sooriya drew a chart showing the age and the maximum heart rate of athletes according to gender, for easier reference.



(a) Between the ages of 15 and 20, which gender has the higher maximum heart rate? (1)

(b) Determine the maximum heart rate of a 29-year-old male athlete. (2)

(c) A 15-year-old athlete has a maximum heart rate of 199,65 beats per minute. Determine the gender of this athlete. (2)

(d) Estimate the age at which the maximum heart rate for both genders is the same. (2)

(e) At what age is the difference between the maximum heart rates for both genders exactly 3 beats per minute? (2)

(f) Determine the difference in age between the genders if the maximum heart rate for both genders is 192 beats per minute. (3)

[29]

QUESTION 3

3.1 One of the most important deciduous fruits grown in South Africa is peaches. The peach industry creates job opportunities in the production and processing sectors in South Africa.

Farm workers' wages are regulated by South African labour law. Farm workers generally work nine hours a day, five days a week. TABLE 1 shows the minimum wages for farm workers for the period 1 March 2009 to 1 March 2011.

TABLE 1: Wage rates for farm workers from 2009 to 2011

YEAR	HOURLY	WEEKLY	MONTHLY
2009	R6,31	**A**	R1 230,45
2010	R6,74	R303,30	**B**
2011	R7,04	R316,80	R1 372,80

[Source: www.daff.gov.za]

3.1.1 Calculate the missing value **A**. (3)

3.1.2 Calculate the missing value **B** by using the formula:

$$\textbf{Monthly rate (in rand)} = \frac{\textbf{Weekly rate (in rand)} \times \textbf{13}}{\textbf{3}}$$ (2)

3.1.3 Calculate the percentage increase in the weekly rate from 2010 to 2011.

Use the formula:

$$\textbf{Percentage increase} = \frac{\textbf{Difference in weekly rate}}{\textbf{Initial weekly rate}} \times \textbf{100}\%$$ (3)

3.2 TABLE 2 below shows the production and export of peaches by six countries in the Southern Hemisphere that were major producers during 2010.

TABLE 2: Production and export of peaches during 2010 by major producers in the Southern Hemisphere

COUNTRY	% PRODUCTION	QUANTITY EXPORTED (IN TONNES)
Argentina	27,19	10 017
Australia	7,18	5 526
Brazil	18,87	0
Chile	30,53	91 916
New Zealand	3,21	84
South Africa	13,02	9 631

[Source: www.daff.gov.za]

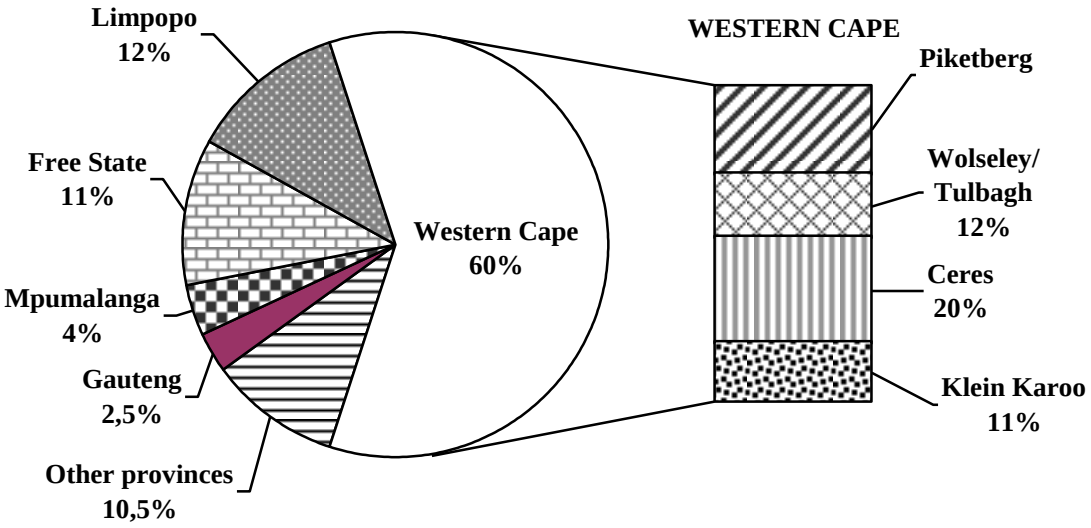
3.2.1 Identify the country that did not export peaches during 2010. (1)

3.2.2 Calculate the total quantity of peaches (in tonnes) exported by the SIX countries during 2010. (2)

3.2.3 Calculate the quantity of peaches (in tonnes) produced in Chile during 2010 if the six countries produced a total of 1,2 million tonnes of peaches. (3)

3.3 The pie chart below shows the peach production areas in 2010. The Western Cape has four production areas, as shown by the bars next to the pie chart. The bars represent only the 60% of the Western Cape's portion of the pie chart.

NATIONAL PEACH PRODUCTION AREAS IN 2010



[Source: www.daff.gov.za]

3.3.1 Express Gauteng's peach production area as a fraction of the national peach production area during 2010, in simplified form. (2)

3.3.2 Determine the percentage production area for Piketberg. (2)

3.3.3 Name the production area(s) in the Western Cape that had exactly the same percentage of land for the production of peaches as those of the other provinces. (2)

3.3.4 Which production area in the Western Cape had the largest percentage of land for the production of peaches? (2)
[22]

QUESTION 4

4.1 Xora Combined School provides each learner with an A4 exercise book for each of their learning areas/subjects.

Grades and classes are not combined.

The distribution of exercise books for each phase is planned for separately, based on the number of learners per class, the number of classes per phase and the number of learning areas/subjects per phase.

- The Foundation Phase receives 32-page exercise books.
- The Intermediate Phase receives 72-page exercise books.
- The Senior and FET Phases receive 92-page exercise books.

TABLE 3: Plan for the distribution of exercise books

Phase	Maximum number of learners per class	Number of classes per grade	Number of learning areas/ subjects per grade	Maximum number of exercise books per phase
Foundation: Grades 1, 2 and 3	32	2	4	768
Intermediate: Grades 4, 5 and 6	36	2	**C**	1 080
Senior: Grades 7, 8 and 9	**B**	5	9	4 455
FET: Grades 10, 11 and 12	36	3	7	2 268
			TOTAL	**A**

Determine the following missing values in TABLE 3:

4.1.1 **A** (2)

4.1.2 **B** (2)

4.1.3 **C** (3)

4.2 The secretary at Xora Combined School summarised the prices from different suppliers to help the school governing body to decide on a suitable supplier.

TABLE 4: Prices (in rand) of different A4 exercise books from different suppliers

TYPE OF A4 EXERCISE BOOK	NAME OF SUPPLIER								
	Station Stationer	AB Books	Store K	The Book	School	Paper Shop	Books for All	Write On Me	Exell
72 pages	1,70	1,73	1,75	1,75	1,80	1,92	1,99	2,05	2,15
32 pages	1,50	1,52	1,32	1,47	1,10	1,32	1,48	1,52	1,25
92 pages	7,80	7,95	8,00	7,68	7,90	8,15	8,50	8,99	7,80

4.2.1 Identify the cheapest supplier of a 92-page exercise book. (1)

4.2.2 Determine the median price for a 72-page exercise book. (1)

4.2.3 Arrange the prices of the 32-page exercise books in descending order. (2)

4.2.4 Identify the modal price for a 32-page exercise book. (2)

4.2.5 Calculate the range of the prices of the 92-page exercise books. (2)

4.2.6 Calculate the mean (average) price of the 72-page exercise books. (3)

4.3 The packaging of A4 exercise books is done according to the table below.

TABLE 5: Packaging of A4 exercise books

Type	32 pages	72 pages	92 pages
Number of books per pack	200	100	20

4.3.1 Calculate the number of packs of 32-page exercise books that will be required to pack 768 books. (2)

4.3.2 The school was given a special price for bulk buying and paid only R16 200 for the 4 455 exercise books required for the Senior Phase.

Determine the price per pack of the 92-page exercise books.

Use the formula:

$$\textbf{Price per pack} = \frac{\textbf{R16 200} \times \textbf{Number of exercise books per pack}}{\textbf{Number of exercise books required}}$$

(3)

[23]

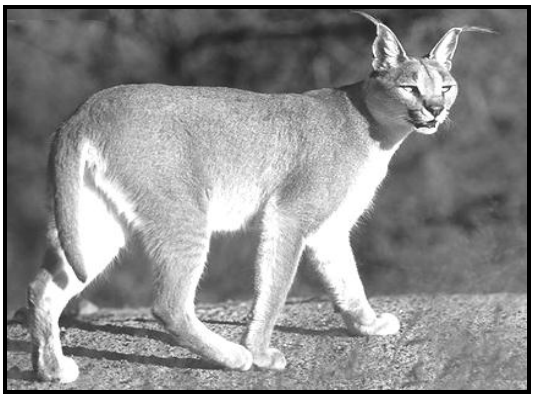
QUESTION 5

5.1 The Baviaanskloof Mega Reserve (BMR), situated in the Eastern Cape, was declared a World Heritage Site in 2004. It is currently caught in a human-carnivore conflict where farmers and predators clash as a result of the loss of stock.
[Carnivores are animals that eat meat. Predators are animals that hunt and kill other animals for food.]

PREDATORS



Jackal



Caracal

Use the map in APPENDIX A to answer the following questions:

5.1.1 Give the grid reference of St Francis Bay. (2)

5.1.2 Determine the shortest distance (in mm) on the map between Humansdorp and Jeffreys Bay. The ruler provided in APPENDIX A may be used. (2)

5.1.3 In which general direction is the Addo Elephant National Park from the Tsitsikamma National Park? (1)

5.1.4 Write down the names of the routes that one can use to travel from Uitenhage to Steytlerville. (2)

5.2 The Centre for African Conservation Ecology at the Nelson Mandela Metropolitan University initiated a project to determine which predators are involved in livestock losses in the BMR.

The table below presents the main causes of livestock mortality.

TABLE 6: Causes of livestock mortality in the BMR

Predators	Baboons	Birds	Bush Pigs	Caracals	Jackals	Leopards	Stray Dogs	Unknown
% contribution to livestock loss	6	13	2	20	37	5	2	15

[Source: *Environment People and Conservation in Africa: Autumn 2012/Issue 10*]

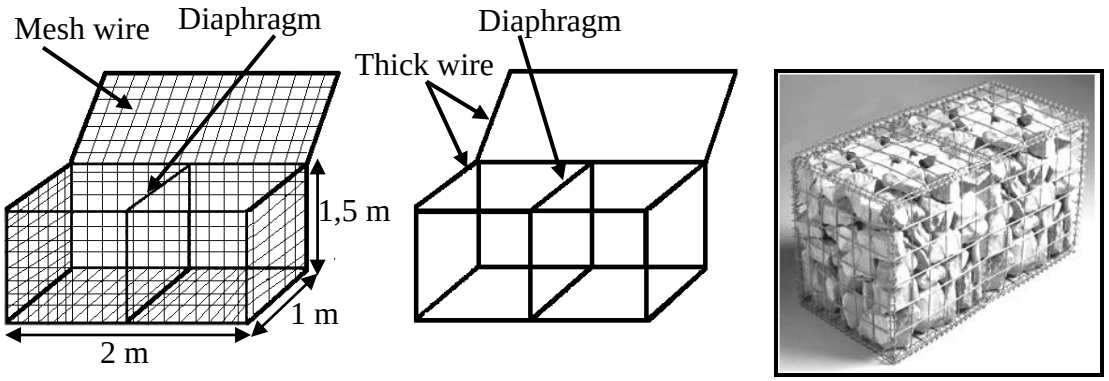
5.2.1 Which predator shows the highest percentage contribution to livestock losses in the BMR? (1)

5.2.2 Use TABLE 6 to draw a horizontal bar graph on ANNEXURE A, showing the relationship between the causes of livestock mortality and the percentage contribution to livestock losses. (6)

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5.3 The farmers in the BMR are also concerned about soil erosion. They decide to build gabion baskets (big cages) and use them to prevent further soil erosion.

Diagrams and a photograph of a gabion basket are shown below.



The centre panel of the gabion basket is called the diaphragm.

5.3.1 The dimensions of the gabion basket are:

L = Length = 2 m
B = Breadth = 1 m
H = Height = 1,5 m

(a) Determine the total length of the thick wire required to build the frame of the gabion basket. (4)

(b) Use the following formula to calculate the total area of the mesh wire required to make a gabion basket:

Total area of mesh wire = $3 \times B \times H + 2 \times L(H + B)$ (3)

5.3.2 The farmers want to determine the cost of the mesh wire that is needed to cover 20 gabion baskets. The total area to cover 20 baskets (including allowance for overlaps) is 699,3 m² and the cost of the mesh wire is R59,95 per m².

Calculate the total cost of the mesh wire needed for the 20 baskets, rounded off to the nearest R10. (3)

5.3.3 The farmers decide to build a bigger gabion basket but to keep the ratio of the dimensions of the original gabion basket the same, that is

$$L : B : H = 2 : 1 : 1,5$$

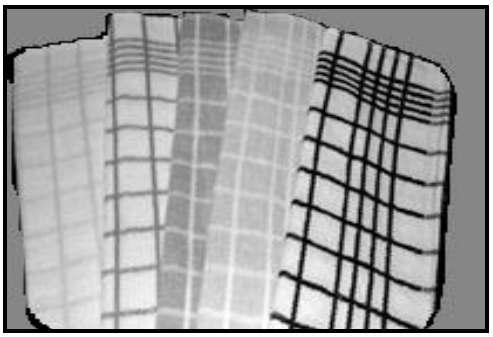
Calculate the height of the new gabion basket if it has a length of 3 m. (2)

[26]

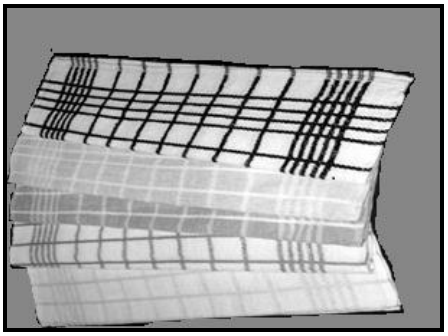
QUESTION 6

6.1 Zimkitha buys some material to make dish cloths and tea towels which she sells at a local flea market.

The material she buys has a fixed width of 120 cm and is cut into any required length. She cuts the material into rectangular pieces of 30 cm × 45 cm to make the tea towels and 30 cm × 30 cm to make the dish cloths, as shown in the photographs below.



Dish Cloth



Tea Towel

6.1.1 Calculate the area of the material needed to make ONE tea towel.

You may use the formula:

Area of a rectangle = length × breadth (2)

6.1.2 Zimkitha wants to make a decorative border on some of the tea towels.

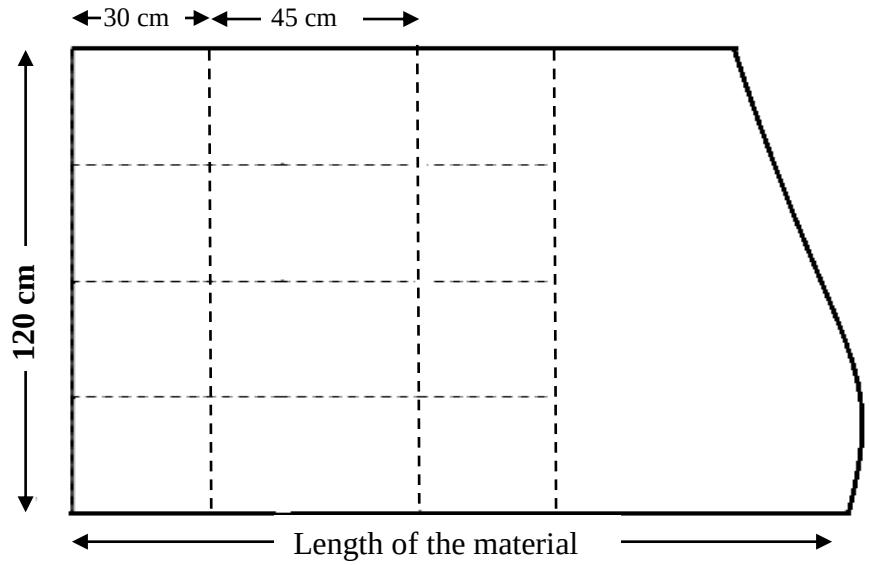
Calculate the perimeter of a tea towel.

You may use the formula:

Perimeter of a rectangle = 2(length + breadth) (3)

6.2 To make the dish cloths and tea towels she uses the cutting layout as shown in the sketch below.

Cutting layout for dish cloths and tea towels using dotted lines:

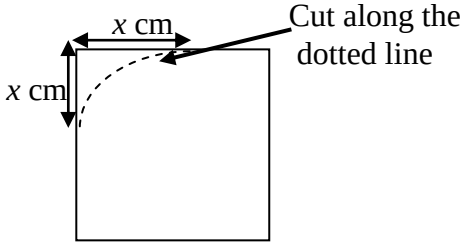


6.2.1 Determine the minimum length of material that Zimkitha will need if she wants to make exactly 4 dish cloths and 4 tea towels. (2)

6.2.2 Determine the maximum number of dish cloths and tea towels she can make if she has a piece of material that is exactly 180 cm long. (3)

6.2.3 The edges of the dish cloths are stitched, making the corners round as shown in the diagram alongside.

One corner of a dish cloth



To calculate the area of the finished dish cloth, she uses the following formula:

Area (in cm^2) = $900 - x^2 (4 - \pi)$

(x is the distance from the side of the square where she starts to make the corners round.)

Calculate the area of ONE finished dish cloth if $x = 3$ and using $\pi = 3{,}14$. (3)

6.3 Zimkitha buys the material at R45,00 per metre.

She uses the table below to help her calculate the cost of the material required.

TABLE 7: Cost of the material

Length of material (in metres)	0	2	4	5	7	**B**	10
Cost (in rand)	0	90	180	**A**	315	360	450

6.3.1 Complete the following formula:

Cost of the material = R45,00 × ... (2)

6.3.2 Calculate the missing values **A** and **B**. (4)

6.3.3 Use TABLE 7 to draw a line graph on ANNEXURE B that represents the relationship between the length and the cost of the material. (4)
[23]

TOTAL: 150

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CENTRE NUMBER:

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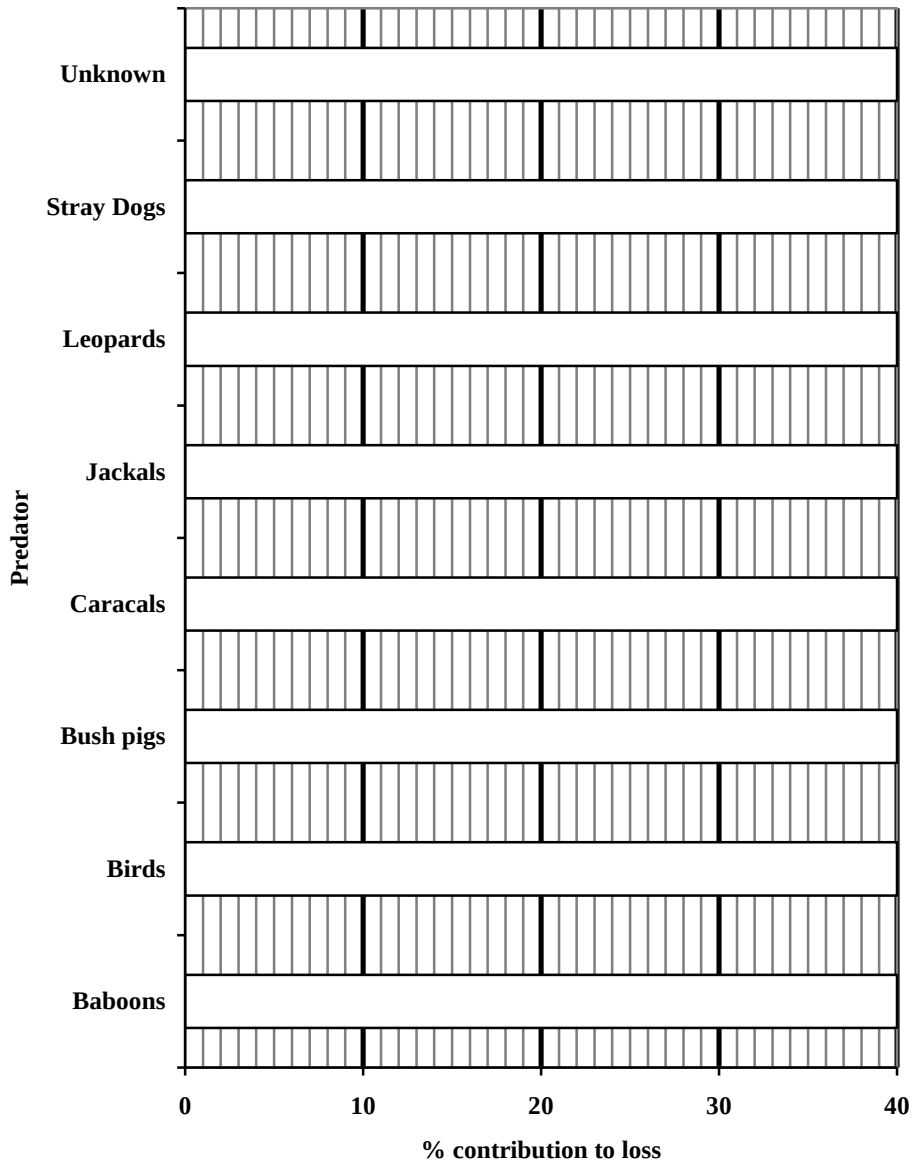
ANNEXURE A

QUESTION 5.2.2

TABLE 6: Causes of livestock mortality in the BMR

Predators	Baboons	Birds	Bush Pigs	Caracals	Jackals	Leopards	Stray Dogs	Unknown
% contribution to livestock loss	6	13	2	20	37	5	2	15

LOSS OF LIVESTOCK DUE TO PREDATORS



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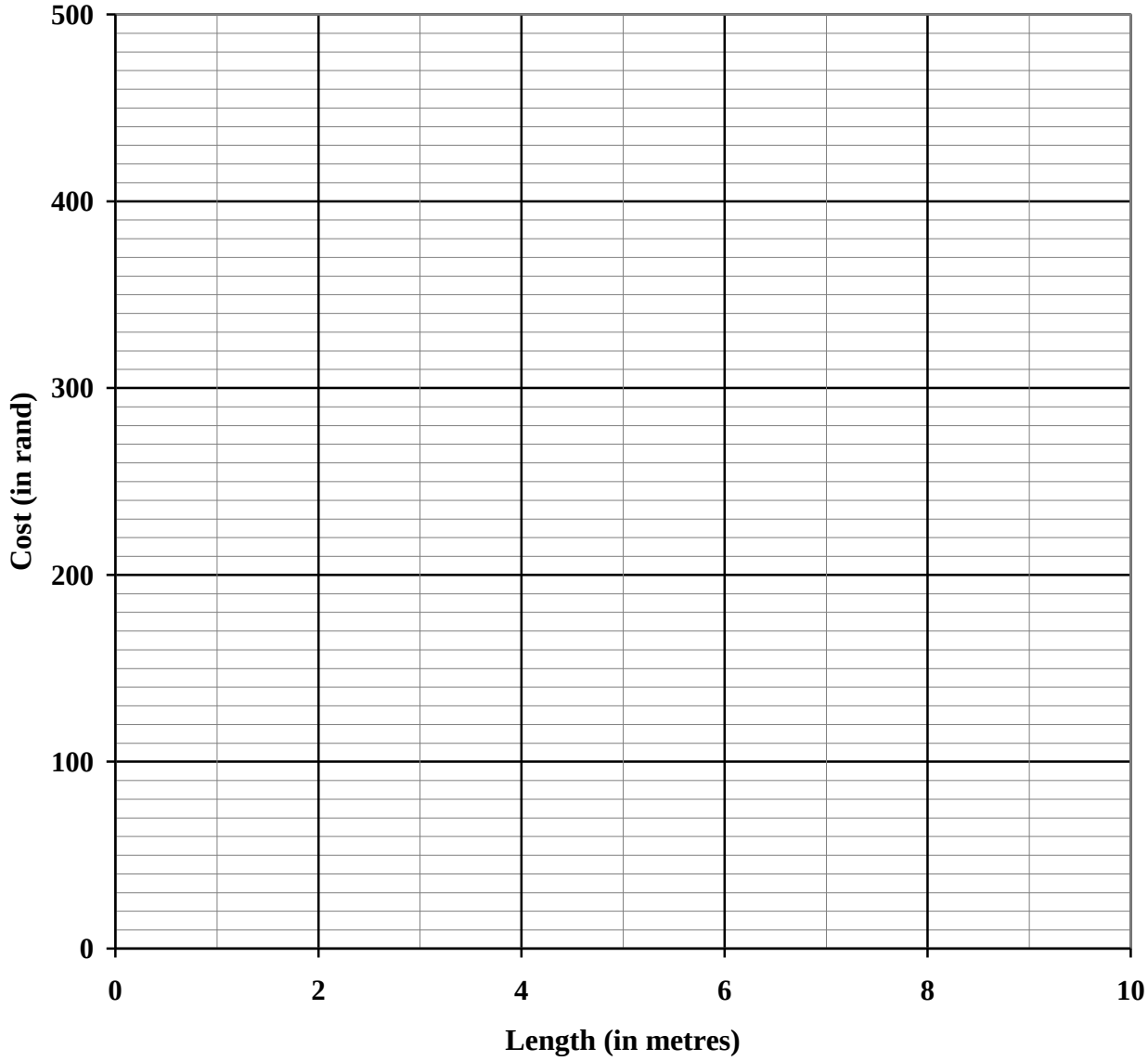
ANNEXURE B

QUESTION 6.3.3

TABLE 7: Cost of the material

Length of material (in metres)	0	2	4	5	7	**B**	10
Cost (in rand)	0	90	180	**A**	315	360	450

COST OF THE MATERIAL

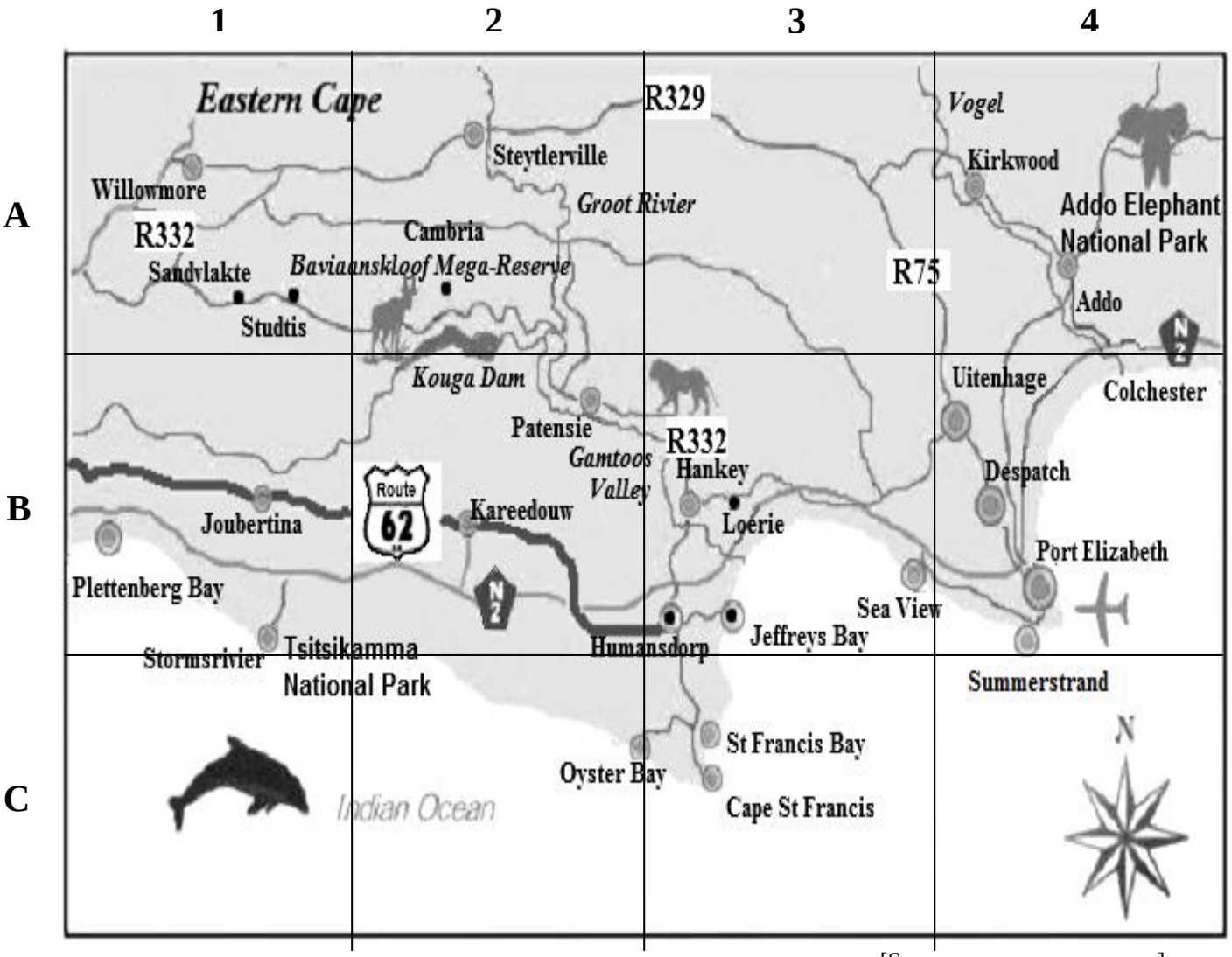


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APPENDIX A

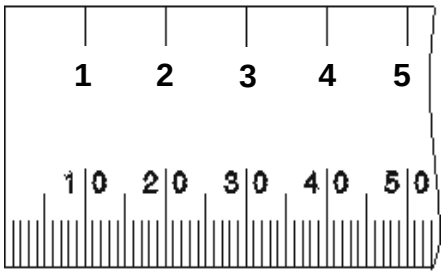
The map below shows part of the Eastern Cape with national routes indicated by N2

and regional routes by R332



[Source: www.savenues.com]

CENTIMETRES



MILLIMETRES

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