Education and Sport Development

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NORTH WEST PROVINCE

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2
JUNE 2019

MARKS: 100

TIME: 2 hours

This question paper consists of 15 pages including 1 answer sheet and 4 annexures

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR questions. Answer ALL the questions.
2. 2.1 Use the ANNEXURES below to answer the following questions:
    - ANNEXURE A for QUESTION 1.1
    - ANNEXURE B for QUESTION 1.2
    - ANNEXURE C for QUESTION 2.2
    - ANNEXURE D for QUESTION 4.1

    2.2 Answer QUESTION 2.1.5 on the attached ANSWER SHEET.

    2.3 Write your name in the spaces provided on the ANSWER SHEET and hand it in with your other answer scripts.
3. Number the answers correctly according to the numbering system used in this question paper.
4. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
5. Show ALL calculations clearly.
6. Round off ALL final answers appropriately according to the given context, unless stated otherwise.
7. Indicate units of measurement, where applicable.
8. Maps and diagrams are NOT necessarily drawn to scale, unless stated otherwise.
9. Write neatly and legibly.

QUESTION 1

1.1 Table 1 and 2 on ANNEXURE A indicates the Premier Soccer League (PSL) log standing for the 2016/2017 and 2017/2018 seasons.

Use ANNEXURE A to answer the questions that follow.

1.1.1 Express the probability (as a decimal) of randomly selecting a team which scored between 30 and 40 points in the 2016/2017 season. (3)

1.1.2 Calculate the teams whose points increased from the 2016/2017 season to the 2017/2018 , as a percentage of the total number of teams, (3)

1.1.3 Use the points in the 2017/2018 log to determine the interquartile range (IQR). (4)

1.2 ANNEXURE B shows the individual tax rates for the 2018/2019 tax year. One of the players from the Kaizer Chiefs football club, who is 31 years old, earned an annual taxable income of R1,5 million during the 2018/2019 tax year. Calculate the total income tax this player has to pay. (6)

1.3 Kaizer Chiefs football team calls the FNB stadium in Johannesburg their "homeground". This means that they play all their home games at this stadium

TABLE 3 below shows some facts about FNB stadium.

TABLE 3: FACTS ABOUT THE FNB STADIUM

Capacity	94 736
Record attendance	94 807 Kaizer Chiefs – Orlando Pirates 1/8/2015
Field size	105 m x 68 m
Surface	Grass
Opened	1989
Renovated	2006 – 2009
Construction cost	ZAR 3,3 billion / (US$ 440 million)

Use the information above to answer the questions that follow.

1.3.1 The construction costs for the FNB stadium were 3,3 billion South African rand (ZAR) in 2006, which was approximately 440 million American dollars (USD).

Determine what the exchange rate was in 2006. Write your answer in the form 1 ZAR = …….. USD (3)

1.3.2 The penalty area of the FNB stadium has dimensions 16,5 m × 40,3 m and is to be covered in grass. The two types of grass to be used are in the ratio Rye : Bermuda = 3 : 2.

The groundsman stated that he requires 60 kg rye seeds for the penalty area if 150 g of grass seed are sown per square metre.
Verify whether his statement is valid.
You may use the following formula:

Area = length × width (6)

1.3.3

To irrigate the soccer field, a special cylindrical water tank is used. The water tank has a maximum capacity of 10 997 litres of water.
The cylindrical water tank, containing water is shown below.

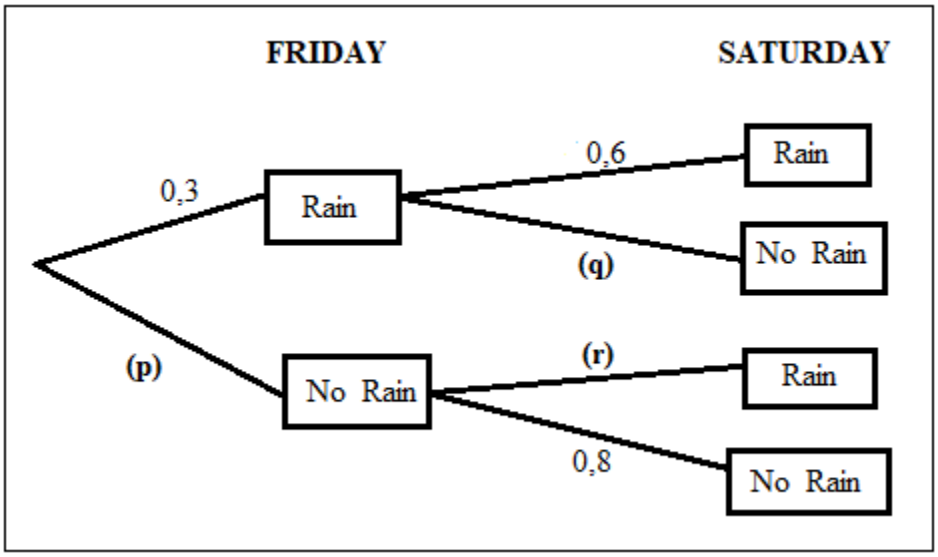
NOTE: The walls of the water tank are 5 mm thick.

1.3.3 Determine the maximum length (in cm) of the water in the tank if the outside diameter of the tank is 200 cm.

You may use the formula:
Volume of the cylinder = π × (radius)^2 × length
where π = 3,142 and 1 ℓ = 1 000 cm^3 (6)

1.3.4 Kaizer Chiefs has a match on Saturday. The weather forecast predicts that there is a 30% chance of rain on Friday. If it rains on Friday, the chance that it will rain on Saturday is 60%. If it does not rain on Friday, the chance that it will rain on Saturday is 20%.

(a) Complete the tree diagram below by using the information above. Give your answer correct to one decimal place where necessary. (3)



(b) Determine (as a percentage) the probability that it will not rain on Friday or Saturday. (2)

[36]

QUESTION 2

2.1 The Minister of Transport encourages all motorists to drive carefully at all times in order to prevent fatal crashes on our roads. He released the number of fatal crashes that occurred on South African roads during the period 2016 to 2017 as represented on TABLE 4 below.

TABLE 4: Number of fatal crashes per province for the period 2016/2017

Province	2016	2017	% Change
Eastern Cape	1 398	1 284	- 8,2
Free State	751	742	- 1,2
Gauteng	2 385	2 398	0,5
Kwazulu Natal	2 367	2 284	**A**
Limpopo	1 261	1 326	5,2
Mpumalanga	1 233	1 182	- 4,1
Northern Cape	318	349	9,7
North West	892	809	-9,3
Western Cape	1 071	1 063	-0,7

2.1.1 Determine (rounded off to 1 decimal place) the value of **A,** the % change of Kwazulu Natal.

You may use the following formula:

$$\textbf{\% Change} = \frac{\textbf{number of 2017 crashes} - \textbf{number of 2016 crashes}}{\textbf{number of 2016 crashes}} \times \mathbf{100} \quad (3)$$

2.1.2 Determine the median of the percentage change. (2)

2.1.3 Describe the trend in the number of fatal crashes per province for the period 2016/2017 (3)

2.1.4 Give ONE reason why Gauteng had the most number of crashes. (2)

2.1.5 Use the ANSWER SHEET provided to draw a bar graph representing the percentage change in the number of fatal crashes reported per province. The bar for the Eastern Cape has been drawn on the answer sheet (5)

2.2

Tom is planning a trip to Pietermaritzburg. ANNEXURE C shows a map of South Africa with all the towns, cities and all the national roads that Tom might pass on his trip from Pretoria to Pietermaritzburg.

2.2.1 State ONE advantage of using national roads. (2)

2.2.2 The straight line distance from Pretoria to Pietermaritzburg is approximately 545 km. Determine the scale of the map. Round off your answer to the nearest 1 000. (4)

2.3

Tom will use his new Mazda3, with 1.6 litre engine capacity to travel from Pretoria to Pietermaritzburg and back home.
A full tank of petrol for the car is 55 litres. The price of unleaded 95 petrol was R15,54 per litre in June 2018.The distance along the N3 to Pietermaritzburg is approximately 545 km.

2.3.1 The specifications of the car indicate that a full tank covers 650 km at an average speed of 120 km/h.
Use calculations to verify whether he will need 2 full tanks of petrol for the return trip. (3)

2.3.2 Calculate the total cost of petrol for the full tanks for a return trip. (3)

2.4

Tom states that the cost of petrol is not the only factor to consider when travelling by car. Table 5 below represents a list of other different cost for the car that Tom drives.

TABLE 5: LIST OF OTHER COSTS FOR THE CAR

COST FACTORS	**PRICE IN CENTS PER KILOMETRE**	**PETROL FACTOR**
Fixed costs	788	
Running Costs:		
Fuel		8,03
Service and Repair Cost	22,73	
Tyre Cost	16,70	

When Tom was taking the trip from Pretoria to Pietermaritzburg single trip, the petrol price was R15,54 per litre. Calculate the total operating cost of travelling between the two towns. Give your answer in Rand.
You may use the formula:

Total operating costs
= [Fixed cost + (Petrol factor × Petrol price per litre + Service and Repair cost + Tyre cost)] × distance travelled. (4)

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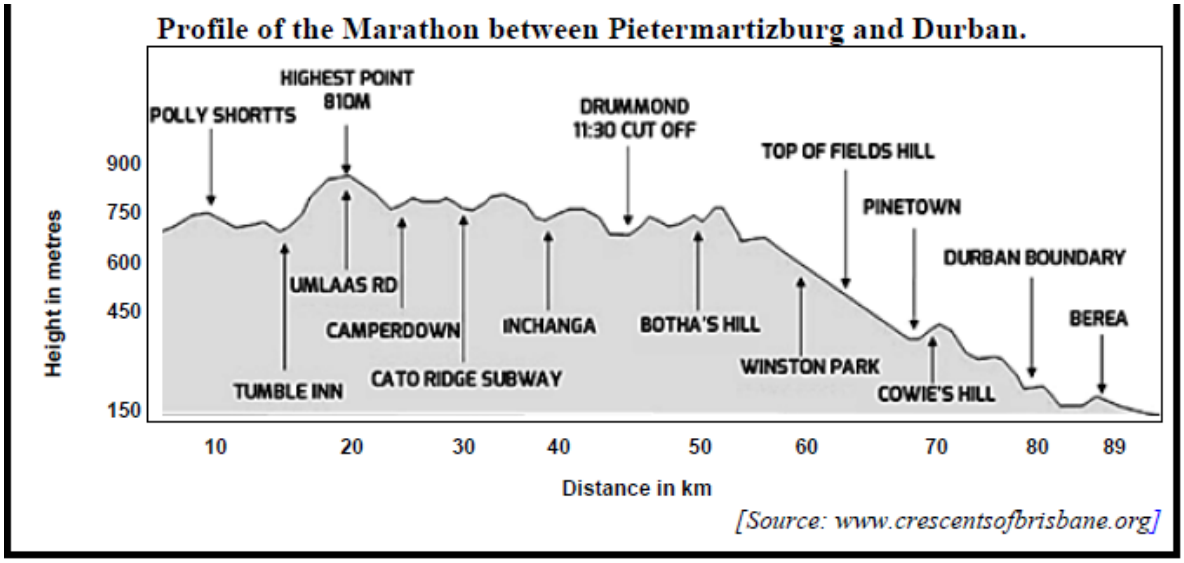
QUESTION 3

3.1

While in Pietermaritzburg, Tom decided to go and watch the Comrades marathon. Comrades marathon is run annually between Durban and Pietermaritzburg. An athlete needs to be aware of uphills, downhills and their distances while taking part in this race. **The 2018 distance was 90,184 km**.
The race has cut –off times i.e. certain compulsory distances to be covered within specific times. Runners who do not meet the cut-off times are forced to withdraw from the race.



Use the map and information above to answer questions that follow.

3.1.1 Explain why are there cut-off times in a marathon. (2)

3.1.2 Bongumusa Mthembu won the 2018 marathon in the time of five hours, twenty six minutes and thirty five seconds. Calculate his average speed.

You may use the formula:

Distance = average speed × Time (3)

3.1.3 Describe in detail the race from Botha's Hill to Pinetown, as indicated on the map. Use words such as uphill, downhill, slope and steep. (3)

3.2

A runner is advised to drink at least 0,5 ℓ of water every hour. The radius of the cylindrical part of the bottle is 3,25 cm and it is filled with water to a height of 15,1 cm, as shown in the sketch alongside.

Determine the surface area of the bottle correct to 1 decimal place

You may use the formula:

Surface area = 2 × π × r × h, where π = 3,142

(2)

3.3 Tom works for a company that installs alarm systems. The manager used a bank account to pay the employees' weekly wages.
Table 6 below shows a comparison of the cash – withdrawal fee structures of two banks.

TABLE 6: CASH-WITHDRAWAL FEE STRUCTURE FOR TWO BANKS.

BANK	**2018 FEE**
A	R5,95 + R1,50 per R100
B	R4,00 + 1,25% of withdrawal amount

The company withdrew R20 000 for the weekly wages every Friday. The financial officer stated that the company would have saved more than R200 in withdrawal fees if they had used Bank B rather than Bank A for the 4 withdrawals.

Verify whether this statement is valid. (8)

[18]

QUESTION 4

4.1 Tom's son, who is 20 years old, would like to take part in the 2020 Comrades marathon. He decides to visit the doctor to check whether he was healthy enough to take part in the race. The doctor recorded his weight as 86,5 kg and height as 186 cm and then concluded that the son was at risk of being overweight.

Verify whether the doctor's conclusion is valid.

Use ANNEXURE D, the formula and the information given below.

HEALTH STATUS CHART	
BMI FOR AGE PERCENTILE RANGE	**WEIGHT STATUS**
$<5^{th}$ percentile	Underweight
5^{th} to $< 85^{th}$ percentile	Healthy
85^{th} to $< 95^{th}$ percentile	At risk of overweight
$\geq 95^{th}$ percentile	Overweight

$$\textbf{BMI} = \frac{\textbf{weight(in kg)}}{(\textbf{height in m})^{\mathbf{2}}}$$ (5)

4.2

Tom approached **Busy Loans** to borrow money to pay for his son's preparations for the Comrades marathon. He applied for a loan of R50 000,00. **Busy Loans** have the following conditions:

- A once-off initial fee of R350.
- A monthly service fee of R57,00 including 15% VAT
- An interest rate of 10,75%, compounded annually

4.2.1 Calculate the VAT amount charged on the monthly service fee. (2)

4.2.2 Tom stated that the total loan value will be R13 046,00 more than the original amount if he paid it off over a 24 month period.

Verify, showing ALL calculations, whether Tom is correct. (8)

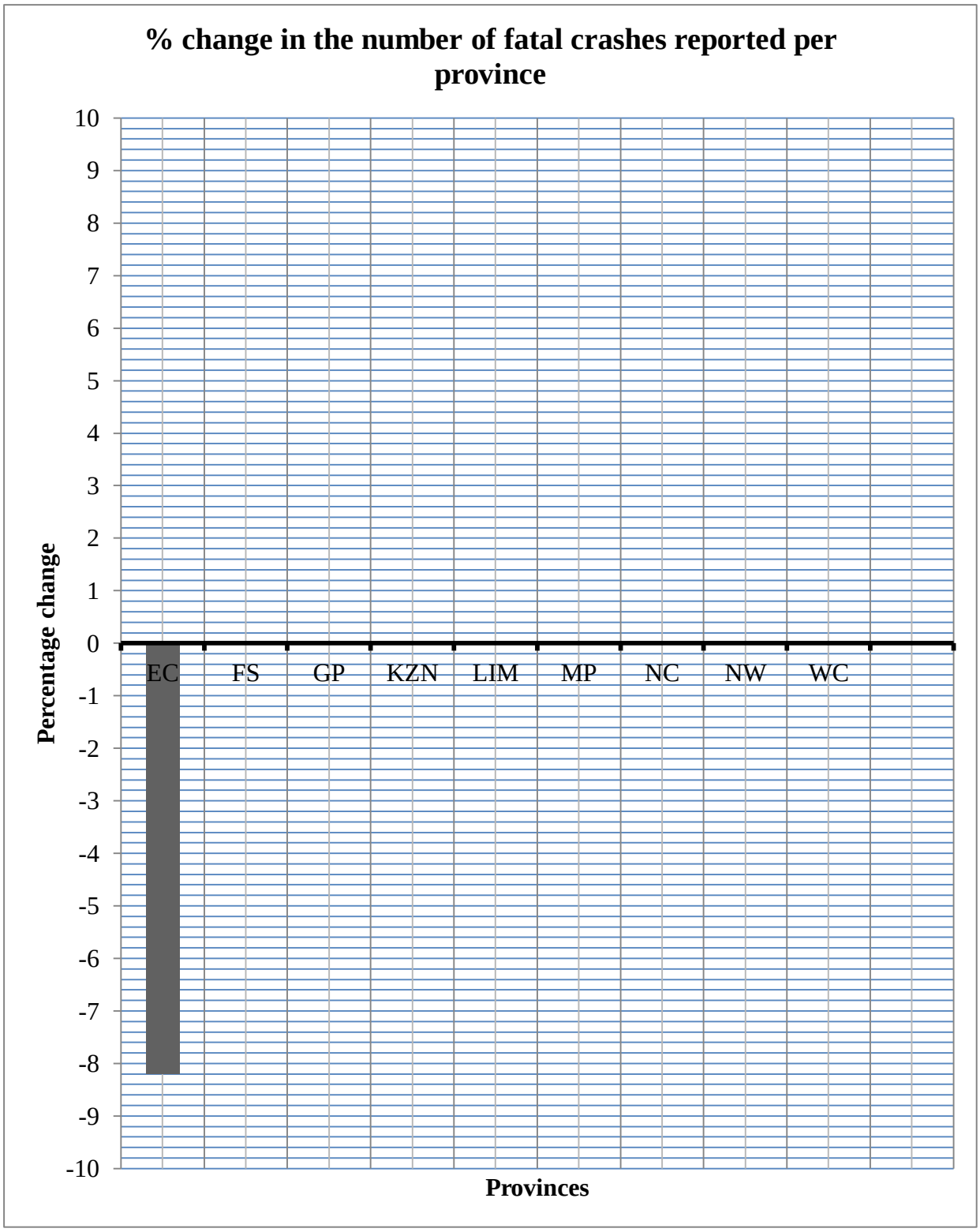
[15]

TOTAL: 100

ANSWER SHEET

QUESTION 2.1.5

NAME: …….. Grade 12…….



ANNEXURE A

QUESTION 1.1

TABLE 1: PSL LOG STANDING FOR 2016/2017

TEAMS	POINTS SCORED
Bidvest Wits	60
Mamelodi Sundowns	57
Cape Town City	55
Kaizer Chiefs	50
Supersport United	48
Polokwane City	43
Maritzburg United	38
Golden Arrows	38
Platinum Stars	37
Ajax Cape Town	36
Orlando Pirates	33
Bloemfontein Celtic	29
Chippa United	28
Free State Stars	28
Baroka FC	28
Highlands Park	26

TABLE 2: PSL LOG STANDING FOR 2017/2018

TEAMS	POINTS SCORED
Mamelodi Sundowns	60
Orlando Pirates	55
Kaizer Chiefs	48
Maritzburg United	44
Cape Town City	40
Freestate Stars	40
Supersport United	39
Golden Arrows	38
Highlands Park	38
Chippa United	37
Bloemfontein Celtic	37
Polokwane City	36
Bidvest Wits	36
Baroka FC	34
Platinum Stars	27
Ajax Cape Town	24

ANNEXURE B

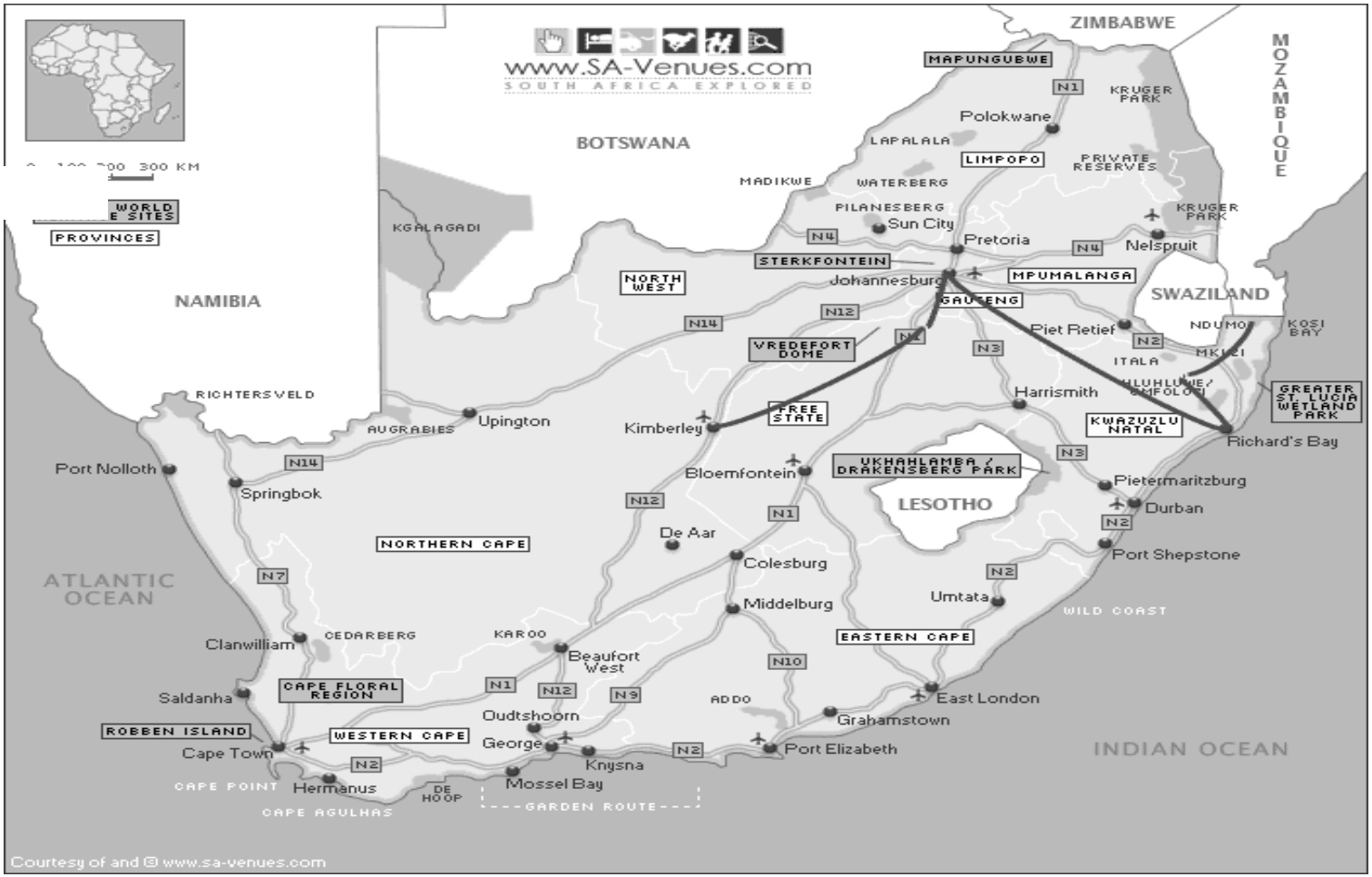
QUESTION 1.2

RATES OF TAX FOR INDIVIDUALS

2018/2019 Tax year (1 March 2018 – 28 February 2019)

TAXABLE INCOME (R)	**Rates of tax**
0 – 195 850	18% of taxable income
195 851 – 305 850	35 253 + 26% of the amount above 195 850
305 851 – 423 300	63 853 + 31% of the amount above 305 850
423 301 – 555 600	100 263 + 36% of the amount above 423 300
555 601 – 708 310	147 891 + 39% of the amount above 555 600
708 311 and above	207 448 + 41% of the amount above 708 310
TAX REBATES	
Primary	13 635
Secondary (65 years and older)	7 479
Tertiary (75 years and older)	2 493
TAX THRESHOLDS	
Person under 65	75 750
Person 65 years and older	117 300
Person 75 years and older	131 150
MEDICAL TAX CREDIT RATES	**Cost per month (R)**
For the taxpayer only	303
For the first dependent	303
For each additional dependent(s)	204

ANNEXURE C **QUESTION 2.2**



ANNEXURE D

QUESTION 4.1