This question paper consists of 16 pages and 2 annexures.
INSTRUCTIONS AND INFORMATION

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

2. Answer QUESTION 5.1.3 on ANNEXURE A and QUESTION 6.3.2 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.

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 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.
QUESTION 1

1.1 1.1.1 Simplify: \( \sqrt{\frac{1225.51}{4}} - 27\% \times 1,514 \)  

1.1.2 Simplify: 1,02 million – 950 000  

1.1.3 10 mℓ of sugar weighs 8 g.  
Calculate the weight of 245 mℓ of sugar.  

1.1.4 The time (in seconds) taken by a moving object to cover a distance of 50 m is given by: 

\[ \text{Time (in seconds)} = \frac{d}{s} \]

Where \( s \) = average speed in metres per second  
\( d \) = distance in metres  
Calculate the time taken if the object is moving at an average speed of 8 metres per second.  

1.1.5 Diasha can consistently pack 9 450 apples in 170 minutes.  

(a) Determine the time at which Diasha would finish packing the 9 450 apples if she started at 07:50.  

(b) Calculate the average rate, rounded off to the nearest whole number, (in apples per minute) at which Diasha packed the 9 450 apples.  

1.1.6 A bag contains nine red balls and one white ball.  
Determine the probability of randomly selecting a white ball from the bag.  

1.1.7 The only animals on Nico's farm are sheep and cattle. The ratio of sheep to cattle is 35 : 1.  
Calculate the number of sheep on the farm if there is a total of 288 animals.
1.2 Janice bought a pack of 50 writeable compact discs (CDs). Each CD can store a maximum of 700 megabytes of data.

1.2.1 Calculate the cost per CD if she paid R64,50 for the pack. (2)

1.2.2 Determine the minimum number of CDs she would require in order to store 2 940 megabytes of data. (3)

1.2.3 Below is a picture and an enlarged diagram of a writeable CD.

![Picture of a CD and Enlarged diagram of the CD]

The CD has a centre hole with a radius ($r$) of 7.5 mm. The radius ($R$) of the CD is 58 mm, as shown in the diagram.

The writeable area is 85% of the area of the CD.

Determine the writeable area (in mm$^2$) of the CD.

Use the following formula:

$$\text{Writeable area} = 85\% \times \pi (R^2 - r^2), \text{ where } \pi = 3.14$$ (3)
1.3 Xolani's mother saw an advertisement showing specials for the week at her local store. The advertised prices included value added tax (VAT) of 14%.

**SPECIALS FOR THE WEEK**  
(Promotion valid until Sunday)

<table>
<thead>
<tr>
<th>Product</th>
<th>Old Price</th>
<th>New Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pampers Nappies 120's</td>
<td>R304.99</td>
<td>R269.99</td>
</tr>
<tr>
<td>Choc-Kits White 200 g</td>
<td>R14.99</td>
<td>R12.49</td>
</tr>
<tr>
<td>Sparletta 2ℓ</td>
<td>R12.99</td>
<td>R10.99</td>
</tr>
</tbody>
</table>

1.3.1 If Xolani's baby sister requires 6 to 8 disposable nappies per day, determine the maximum number of days a complete pack of 120 nappies will last.  

1.3.2 Calculate the percentage discount that was offered on the Pampers nappies.  

1.3.3 Calculate the new price, excluding VAT, of the Choc-Kits biscuits.  

1.3.4 Xolani's mother sent him to buy one pack of nappies, four boxes of biscuits and three bottles of cool drink. Calculate the total cost of the goods.
QUESTION 2

2.1 Sharheem made a herb garden that has a square centre section surrounded by identical semicircles on each side of the square as shown in the layout plan below. The diameter of each semicircle is 250 cm.

2.1.1 Determine the maximum length (in centimetres) of the herb garden. (2)

2.1.2 Calculate the total area of the semicircular sections of the herb garden. Use the following formula:

\[ \text{Area of a circle} = \pi \times \left(\frac{d}{2}\right)^2 \]

where \( \pi = 3,14 \)
\( d \) = the diameter of the semicircle (4)

2.1.3 Calculate the perimeter of the herb garden. Use the following formula:

\[ \text{Perimeter of the herb garden} = 2 \times \pi \times d \]

where \( \pi = 3,14 \)
\( d \) = the diameter of the semicircle (2)

2.1.4 Sharheem wanted to plant thyme in one of the semicircular sections of the herb garden as shown in the diagram alongside.

He worked out that the number of thyme plants he can plant in a row is given by the following formula:

\[ \text{Number of thyme plants} = 2 \times (\text{the number of the row}) - 1 \]

Calculate the number of thyme plants Sharheem can plant in the 5th row. (2)
2.2 Thandeka has a shop with a scrapbooking department and a toy department. She kept a record of the ages of the customers who visited the two departments on a particular day.

Scrapbooking is a hobby which involves cutting and pasting photos, pictures and other decorative items into a book.

<table>
<thead>
<tr>
<th>Ages of customers who visited the scrapbooking department</th>
</tr>
</thead>
<tbody>
<tr>
<td>35  60  46  57  54</td>
</tr>
<tr>
<td>34  60  54  56  46</td>
</tr>
<tr>
<td>47  67  65  54  45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ages of customers who visited the toy department</th>
</tr>
</thead>
<tbody>
<tr>
<td>5   15  25  7   36  21  70</td>
</tr>
<tr>
<td>20  17  6   15  65  9   15</td>
</tr>
</tbody>
</table>

2.2.1 Arrange the ages of the customers who visited the toy department in ascending order. (2)

2.2.2 Calculate the range of the ages of the customers who visited the toy department. (2)

2.2.3 Determine the modus of the ages of customers who visited the scrapbooking department. (2)

2.2.4 Calculate the mean (average) age of the customers who visited the scrapbooking department. (3)

2.2.5 The upper quartile of the ages of customers who visited the toy department is 25.

List the ages of the customers who visited the toy department that are greater than the upper quartile. (2)

2.2.6 The total value of the demo toys that children can play with is currently R15 000 and the depreciation rate is 17.5% per annum. Thandeka uses the straight-line depreciation method to determine the value of the demo toys.

Calculate the depreciated value of the demo toys at the end of 4 years.

Use the formula \( A = P(1 - i \times n) \)

where \( A \) = the depreciated value  \( P \) = the present value
\( i \) = the annual depreciation rate  \( n \) = the number of years (3)
2.3 Leslie travels to work in a minibus. His monthly petrol cost for this vehicle is R2 400 if he travels alone. He decides to let some of his colleagues travel with him so that they may share the petrol costs equally.

The graph below shows the relationship between the monthly petrol cost and the number of people sharing the cost.

![Petrol Costs Shared Graph]

**PETROL COSTS SHARED**

<table>
<thead>
<tr>
<th>Number of people sharing the cost</th>
<th>Cost in rand</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>2 500</td>
</tr>
<tr>
<td>2</td>
<td>2 000</td>
</tr>
<tr>
<td>3</td>
<td>1 500</td>
</tr>
<tr>
<td>4</td>
<td>1 000</td>
</tr>
<tr>
<td>5</td>
<td>500</td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

2.3.1 What type of proportion is represented by the graph above? (1)

2.3.2 Determine the monthly petrol cost per person if Leslie shares the petrol costs with SEVEN colleagues. (2)

2.3.3 Determine the number of people sharing the cost if the monthly cost per person is R800. (2)

2.3.4 Write down a formula that Leslie can use to calculate the monthly petrol costs per person sharing with him, in the form:

\[
\text{Monthly petrol cost per person} = \ldots
\] (2)

[31]
QUESTION 3

ACE swimming club wants to raise funds to improve their facilities. They decide to have a swimming competition for which spectators will be charged an entrance fee.

The swimming pool at the club is in the form of a rectangular prism as shown in the picture below.

3.1 The inside measurements of the walls of the pool are as follows:

Length = 50 m, breadth = 25 m and height = 1.5 m

3.1.1 The inside walls and the floor of the pool need to be repainted. Determine the total area of the pool that will be repainted.

Use the following formula:

\[
\text{Area to be repainted} = \ell \times b + 2h(\ell + b)
\]

where \( \ell = \text{length} \)
\( b = \text{breadth} \)
\( h = \text{height} \)

3.1.2 Calculate the height of the water in the pool if the volume of water in the pool is 1 500 m\(^3\).

Use the following formula:

\[
\text{Height of a rectangular prism} = \frac{\text{volume}}{\text{length} \times \text{breadth}}
\]

3.2 The temperature of the water in the pool needs to be maintained at 22 °C. The temperature gauge used shows the temperature in degrees Fahrenheit (°F).

Convert (rounded off to the nearest degree) 22 °C to degrees Fahrenheit.

Use the following formula:

\[
\text{Temperature (in °F)} = 32 + 1.8 \times (\text{Temperature in °C})
\]
3.3 The spectators at the swimming competition will be charged an entrance fee as indicated in TABLE 1 below.

**TABLE 1: Entrance fee for spectators attending the swimming competition**

<table>
<thead>
<tr>
<th>Group</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children 3 years and younger</td>
<td>No Fee</td>
</tr>
<tr>
<td>Children between 3 years and 12 years</td>
<td>R7,50</td>
</tr>
<tr>
<td>Children 12 years and older</td>
<td>R10,50</td>
</tr>
<tr>
<td>Adults</td>
<td>R10,50</td>
</tr>
<tr>
<td>Pensioners</td>
<td>R7,50</td>
</tr>
</tbody>
</table>

The following is a record of the number of spectators who attended the swimming competition:

- 50 children between 3 years and 12 years old
- 45 children 12 years and older
- 50 adults
- 15 pensioners

3.3.1 Determine the number of children 3 years and younger who attended the swimming competition if there was a total of 177 spectators. (2)

3.3.2 Calculate the total income the club received from entrance fees.

Use the following formula:

\[
\text{Total income from entrance fees} = a \times R7,50 + b \times R10,50
\]

Where \( a \) = the number of people paying R7,50

\( b \) = the number of people paying R10,50

(4)

3.4 The ACE swimming club also sold branded sports bags at the competition. Each bag cost the club R65,00 and was sold for R87,00.

Calculate the number of branded sports bags that was sold if a profit of R594,00 was made. (3)

3.5 The funds generated will contribute to the purchase of a new pump for the swimming pool. A new pump costs R4 999,00. The club receives a 12% discount.

Calculate the discounted price the club has to pay for a new pump. (3)

3.6 A few weeks after the swimming competition, an Australian tourist who had been a spectator at the competition deposited 1 500 Australian dollars (AUD$) into the club’s bank account as a donation. The bank converted this amount to rand as R14 595,00.

Calculate the exchange rate, in rand per AUD$, used by the bank. (2)
QUESTION 4

Towards the end of each year, crime statistics of the preceding year are released. The data is collected from official police reports and questionnaires handed out to a sample of households. One of the questions in the questionnaire asked the respondents how safe they felt walking around during daytime and after dark.

4.1 Study the graphs and data below and answer the questions that follow.

4.1.1 Calculate the missing value A in the second graph. (1)

4.1.2 Identify the percentage of respondents who felt a bit unsafe while walking around during daytime in 2010. (2)

4.1.3 During which year did the largest percentage of respondents feel fairly safe while walking around after dark? (2)

4.1.4 At which time of the day (daytime or after dark) did most of the respondents in both years, 2010 and 2011, feel very unsafe while walking around? (2)

4.1.5 Determine the difference in the percentage of respondents who felt very safe walking around during daytime between 2011 and 2010. (2)

4.1.6 Write down the ratio of the percentage of respondents during 2011 who felt very safe walking around during daytime to those who felt very safe walking around after dark.

Give the ratio in simplified form, rounded off to the nearest whole number. (2)
4.2 The map below is included in the crime statistics for 2011.

**Percentage categories of respondents per province who feel very unsafe when walking around after dark**

**KEY:**
Percentage of respondents who feel very unsafe after dark:
- 1–40
- 1–50
- 1–60
- 1–70

4.2.1 In which province(s) did 31% to 40% of the respondents feel very unsafe when walking around after dark? (2)

4.2.2 In which province did the most respondents feel very unsafe when walking around after dark? (1)

4.2.3 In which percentage category do the majority of the provinces fall? (2)

4.2.4 In which province(s) was the percentage of respondents who felt very unsafe when walking around after dark more than 50%? (2)

4.2.5 Which province is south-west of the Free State and at the same time south of the Northern Cape? (2)

4.2.6 Calculate, using measurements, the scale used on the map in the form 1 : ... (3)
5.1.1 Determine the missing value $K$. \hspace{1cm} (2)

5.1.2 Determine the time it takes the number of bacteria in a culture to increase to 8 times the original number. \hspace{1cm} (2)

5.1.3 Use the grid on ANNEXURE A to draw a curve to represent the information in TABLE 2. \hspace{1cm} (5)

5.1.4 Calculate the average growth rate between the 4th and the 8th hour. Use the following formula:

$$\text{Average growth rate} = \frac{s - t}{r}$$

where $s$ = number of bacteria at the 8th hour  
$t$ = number of bacteria at the 4th hour  
$r$ = difference in time \hspace{1cm} (3)
5.2 Below is a layout plan of the laboratory where Hloni works.

![Laboratory Layout Diagram]

KEY: = Microscope

5.2.1 Which item is located at the far left-hand corner of the laboratory as a person enters the laboratory? (1)

5.2.2 Hloni is in the radioactive waste section and sends a visually impaired person to fetch something from the refrigerator in the laboratory. How would Hloni clearly direct the person to get to the refrigerator after going out of the door of the radioactive waste section? (3)

5.2.3 Calculate the width of the laboratory if the total floor area is 18,9 m². Use the formula: Width = total floor area / length (3)

5.2.4 The scale used on the layout plan is 1 : 58. Calculate the actual length of the table on the layout plan if its scaled length is 2,26 cm. (2) [21]
QUESTION 6

6.1 A Grade 7 teacher at a primary school compiled a weather chart for the 210 school days in an academic year. She recorded the number of days that were: sunny with no rain, cloudy with no rain, intermittent rain, light rain and heavy rain. She represented her data in the pie chart below.

**Daily Weather**

<table>
<thead>
<tr>
<th>KEY</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Sunny with no rain</td>
<td>33%</td>
</tr>
<tr>
<td>B Cloudy with no rain</td>
<td>10%</td>
</tr>
<tr>
<td>C Intermittent rain</td>
<td>9%</td>
</tr>
<tr>
<td>D Light rain</td>
<td>19%</td>
</tr>
<tr>
<td>E Heavy rain</td>
<td>10%</td>
</tr>
</tbody>
</table>

6.1.1 Calculate the percentage of days when there was intermittent rain. (2)

6.1.2 Determine the total number of school days when there was no rain. (3)

6.2 Mrs Louw intends starting a home industry making school jerseys for local primary schools. In November, she conducted a survey at her school to determine the number of learners who might buy a new school jersey in the new year. The jersey types are shown in the pictures below.

She recorded her findings in the table below.

**TABLE 3: Number of new jerseys according to type and size**

<table>
<thead>
<tr>
<th>TYPE OF JERSEY</th>
<th>SIZE</th>
<th>20</th>
<th>22</th>
<th>24</th>
<th>26</th>
<th>28</th>
<th>30</th>
<th>32</th>
<th>34</th>
<th>36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleeveless</td>
<td></td>
<td>24</td>
<td>32</td>
<td>26</td>
<td>25</td>
<td>20</td>
<td>18</td>
<td>10</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Long-sleeved</td>
<td></td>
<td>42</td>
<td>16</td>
<td>20</td>
<td>25</td>
<td>26</td>
<td>23</td>
<td>20</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>

6.2.1 Identify the number of learners that might buy a size 30 long-sleeved jersey. (1)

6.2.2 Calculate the total number of learners who might buy a sleeveless jersey. (2)

6.2.3 Mrs Louw's survey showed that for a particular jersey size, the number of sleeveless jerseys is double the number of long-sleeved jerseys. Identify the jersey size referred to. (2)
Mrs Louw bought a knitting machine for R5 600,00 to make the jerseys. It will cost her an average of R60,00 (including wool and electricity) to make one long-sleeved jersey (irrespective of the jersey size). The school shop buys a long-sleeved jersey for R95,00 and then sells it to the learners.

TABLE 4 below shows the relationship between the costs and income for making and selling 200 long-sleeved jerseys.

### TABLE 4: Costs and income for making and selling 200 long-sleeved jerseys

<table>
<thead>
<tr>
<th>NUMBER OF JERSEYS MADE</th>
<th>0</th>
<th>60</th>
<th>A</th>
<th>120</th>
<th>160</th>
<th>180</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs (in rand)</td>
<td>5 600</td>
<td>9 200</td>
<td>11 600</td>
<td>12 800</td>
<td>15 200</td>
<td>16 400</td>
<td>17 600</td>
</tr>
<tr>
<td>Income (in rand)</td>
<td>0</td>
<td>5 700</td>
<td>9 500</td>
<td>11 400</td>
<td>15 200</td>
<td>B</td>
<td>19 000</td>
</tr>
</tbody>
</table>

6.3.1 Determine the missing values A and B. (4)

6.3.2 On ANNEXURE B, the line graph showing Mrs Louw's income from the sale of 200 long-sleeved jerseys is drawn. Draw another line graph on the same grid representing the costs of making 200 long-sleeved jerseys. (4)

6.3.3 Determine the minimum number of jerseys Mrs Louw should make and sell to start showing a profit. (2)

TOTAL: 150
### QUESTION 5.1.3

**TABLE 2: Growth of bacteria over a 12-hour period**

<table>
<thead>
<tr>
<th>Time in hours</th>
<th>0</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of bacteria</td>
<td>50</td>
<td>100</td>
<td>200</td>
<td>400</td>
<td>800</td>
<td>K</td>
</tr>
</tbody>
</table>

![Growth of bacteria over time](chart.png)
QUESTION 6.3.2

TABLE 4: Costs for making and selling 200 long-sleeved jerseys

<table>
<thead>
<tr>
<th>Number of jerseys made</th>
<th>0</th>
<th>60</th>
<th>A</th>
<th>120</th>
<th>160</th>
<th>180</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs (in rand)</td>
<td>5 600</td>
<td>9 200</td>
<td>11 600</td>
<td>12 800</td>
<td>15 200</td>
<td>16 400</td>
<td>17 600</td>
</tr>
</tbody>
</table>

COSTS AND INCOME FOR MAKING 200 LONG-SLEEVED JERSEYS
This memorandum consists of 19 pages.
## QUESTION 1 [33 MARKS] Answer only – full marks

<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS/L</th>
</tr>
</thead>
</table>
| 1.1.1 | \[
\sqrt{\frac{1225.51}{4}} - 27\% \times 1,514
\] = 17,50364... – 0,40878 \( \checkmark \) A = 17,0948... \( \checkmark \) CA | 1A simplification 1CA final value No penalty for rounding | 12.1.1 L1 |
<p>| 1.1.2 | 1 020 000 – 950 000 = 70 000 ( \checkmark ) A OR 1,02 million – 0,95 million = 0,07 million ( \checkmark ) A | 1A simplification OR 1A simplification (No mark if million omitted) | 12.1.1 L1 |
| 1.1.3 | 1 mℓ of sugar weighs 0,8 g ( \therefore ) 245 mℓ of sugar weighs ( (0,8 \times 245) ) g ( \checkmark ) M/A = 196 g ( \checkmark ) CA OR ( \checkmark ) M/A ( \therefore ) ( 245 \times \frac{8}{10} ) = 196 g ( \checkmark ) CA OR ( 10 : 8 = 245 : x ) ( x = \frac{8 \times 245 \text{ g}}{10} ) ( \checkmark ) M/A = 196 g ( \checkmark ) CA | 1M/A multiplication with correct values 1CA mass of sugar OR 1M/A multiplying by ( \frac{8}{10} ) 1CA mass of sugar OR 1M/A proportion 1CA mass of sugar | 12.3.2 L2 |
| 1.1.4 | Time (in seconds) = ( \frac{\sqrt{50}}{8} = \frac{25}{4} ) ( \checkmark ) SF 1A solution ( \checkmark ) A ( \frac{1}{4} ) ( \checkmark ) OR ( 6,25 ) ( \checkmark ) A | 1SF substitution 1A solution | 12.2.1 L1 |</p>
<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.5</td>
<td><strong>(a)</strong>&lt;br&gt;170 minutes = 2 hours and 50 minutes OR 2,83 h&lt;br&gt;Time finished = 07H50 + 2H50 OR 10H40&lt;br&gt;OR 10:40 OR Twenty to Eleven AM</td>
<td>1C conversion&lt;br&gt;1M adding&lt;br&gt;1CA time&lt;br&gt;OR&lt;br&gt;1C conversion&lt;br&gt;1M adding&lt;br&gt;1CA time</td>
<td>12.3.2 L2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>170 minutes = 3hrs – 10 min OR C&lt;br&gt;7H50min + 3 hrs = 10H50 min&lt;br&gt;10H50min – 10 min = 10H40min OR 10:40 OR Twenty to Eleven AM</td>
<td>1C conversion&lt;br&gt;1M adding&lt;br&gt;1CA time&lt;br&gt;OR&lt;br&gt;1C conversion&lt;br&gt;1M adding&lt;br&gt;1CA time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR 10:40 OR Twenty to Eleven AM OR CA&lt;br&gt;170 min = 60 + 60 + 50 OR C&lt;br&gt;From 07:50 to 08:50 is 60 min&lt;br&gt;From 08:50 to 09:50 is 60 min&lt;br&gt;From 09:50 to 10:40 is 50 min</td>
<td>OR&lt;br&gt;1M adding&lt;br&gt;1CA time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR 10:40 OR Twenty to Eleven AM OR CA&lt;br&gt;In 170 minutes she packs 9,450 apples&lt;br&gt;: in 1 minute she packs ( \frac{9,450}{170} ) OR M/A&lt;br&gt;( \approx 55,588.9 ) apples OR A&lt;br≈ 55 apples OR A</td>
<td>OR&lt;br&gt;1M/A dividing by 170&lt;br&gt;1R correct rounding&lt;br&gt;OR&lt;br&gt;1M proportion&lt;br&gt;1R correct rounding</td>
<td>12.1.1 L1</td>
</tr>
<tr>
<td></td>
<td>170 : 9,450 = 1: x&lt;br&gt;( x = \frac{1 \times 9,450}{170} ) apples OR M&lt;br&gt;( \approx 55 ) apples OR A</td>
<td>(2)</td>
<td></td>
</tr>
<tr>
<td>1.1.5</td>
<td><strong>(b)</strong>&lt;br&gt;P(white ball) = ( \frac{1}{10} ) OR 0,1 OR 10%</td>
<td>1A correct numerator&lt;br&gt;1A correct denominator</td>
<td>12.4.5 L2</td>
</tr>
<tr>
<td>1.1.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ques</td>
<td>Solution</td>
<td>Explanation</td>
<td>AS/L</td>
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<tr>
<td>------</td>
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</tr>
</tbody>
</table>
| 1.1.7 | Number of sheep = \( \frac{35}{36} \times 288 \) \( \checkmark \) M  
= 280 \( \checkmark \) CA  
Or  
1 part = \( \frac{288}{36} \) = 8 animals \( \checkmark \) M  
Number of sheep = 288 – 8 = 280 \( \checkmark \) CA  
Or  
1 part = 8 animals \( \checkmark \) M  
Number of sheep = 35 \times 8 = 280 \( \checkmark \) CA  | 1M using ratio  
1CA simplification  
Or  
1M using ratio  
1CA simplification  
Or  
1M using ratio  
1CA simplification | 12.1.1 L2 |
| 1.2.1 | Cost per CD = \( \frac{\text{R} 64.50}{50} \) \( \checkmark \) M  
= \text{R} 1.29 \( \checkmark \) CA  | 1M dividing by 50  
1CA simplification | 12.1.1 L1 |
| 1.2.2 | Minimum number of CDs = \( \frac{2940}{700} \) \( \checkmark \) M  
= 4.2 \( \checkmark \) A  
\approx 5 \( \checkmark \) R  
Or  
\((700 + 700 + 700 + 700 + 700) \) MB \( \checkmark \) M  
= 3500 MB  
\((3500 - 2940) \) MB = 560 MB  
\( \vdots \) 5 CD’s \( \checkmark \) A  | 1M dividing by 700  
1A simplification  
1 R rounding up  
Or  
1M adding all 700’s  
2A number of CD’s | 12.1.1 L1 |
| 1.2.3 | Writeable area = 85% of \( \pi (R^2 - r^2) \)  
= 0.85 \times 3.14 (58^2 - 7.5^2) \text{ mm}^2 \( \checkmark \) SF  
= 2669 (3307.75) \text{ mm}^2 \( \checkmark \) S  
= 882838475 \text{ mm}^2  
\approx 882838 \text{ mm}^2  
\( \checkmark \) CA  | 1SF substituting  
1S finding 3307.75 or \( \checkmark \) S  
2669  
1CA simplification  
Accept 8832.86 using \( \pi \)  
If \((r^2 - R^2) \) used, max 2 marks  
(no penalty for rounding) | 12.3.3 L1 |
| 1.3.1 | Maximum number of days = \( \frac{120}{6} \) \( \checkmark \) M  
= 20 \( \checkmark \) CA  | 1M dividing by 6  
1CA simplification | 12.1.1 L1 |
### Ques 1.3.2
Discount: \[
\text{Discount} = \frac{304,99 - 269,99}{304,99} \times 100\% \\
= \frac{35}{304,99} \times 100\% \\
= 11,48\% 
\]
\text{OR}
Percentage: \[
\text{Percentage} = \frac{269,99}{304,99} \times 100\% = 88,52\% \\
\text{Percentage discount} = 100\% - 88,52\% \\
= 11,48\% 
\]

### Ques 1.3.3
New price excluding VAT: \[
\text{New price excluding VAT} = \frac{R12,49}{114\%} \times 100\% \\
= R10,96 
\]
\text{OR}
New price excluding VAT: \[
\text{New price excluding VAT} = \frac{R12,49}{1,14} \\
= R10,96 
\]
\text{OR}
VAT: \[
\text{VAT} = R12,49 \times \frac{14\%}{114\%} \\
= R1,53 \\
\text{Price excluding VAT} = R12,49 - R1,53 \\
= R10,96 
\]
\text{OR}
\[
x = \text{new price excluding VAT} \\
12,49 : x = 114\% : 100\% \\
x = \frac{R12,49}{114\%} \times 100\% \\
= R10,96 
\]
<table>
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<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.4</td>
<td>Total cost = R269,99 + 4 × R12,49 + 3 × R10,99 &lt;br&gt; = R352,92</td>
<td>1M/A adding and multiplying correct values &lt;br&gt; 1CA simplification (CA only if at least one of the values are multiplied by 3 or 4 or if 3 and 4 with incorrect costs)</td>
<td>12.2.1 L1</td>
</tr>
</tbody>
</table>
## QUESTION 2 [31 MARKS]

<table>
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<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS/L</th>
</tr>
</thead>
</table>
| 2.1.1 | Maximum length = 125 cm + 250 cm + 125 cm ✓M/A  
        = 500 cm ✓CA  
        **OR**  
        Maximum length = 250 cm × 2 ✓M/A  
        = 500 cm ✓CA  
        **Answer only: full marks** | 1M/A adding correct lengths  
1CA simplification | 12.3.3  
L2 |
| 2.1.2 | Total area = \(2 \times \pi \times \left(\frac{d}{2}\right)^2\) ✓M/A  
        = 2 × 3,14 × \(\frac{250}{2}\)^2 \(\text{cm}^2\) ✓SF  
        = 6,28 × 15 625 \(\text{cm}^2\)  
        = 98 125 \(\text{cm}^2\) ✓CA ✓A  
        **OR**  
        Area of a circle = \(\pi \times \left(\frac{d}{2}\right)^2\)  
        = 3,14 × \(\frac{250}{2}\)^2 ✓SF  
        = 49 062,5 \(\text{cm}^2\) ✓A ✓A  
        Total Area = 49 062,5 \(\text{cm}^2\) × 2  
        = 98 125 \(\text{cm}^2\) ✓CA  
        **OR**  
        Area of a semi-circle = \(\pi \times \left(\frac{d}{2}\right)^2 + 2\)  
        = 3,14 × \(\frac{250}{2}\)^2 + 2 ✓SF  
        = 24 531,24 \(\text{cm}^2\) ✓A ✓A  
        Total Area = 24 531,24 \(\text{cm}^2\) × 4  
        = 98 124,96 \(\text{cm}^2\) ✓CA  
        **Answer only: full marks** | 1M/A area of 2 circles  
1SF substitution  
1CA simplification  
1A unit  
Accept 98 174,77  
using \(\pi\)  
**OR**  
1SF substitution  
1A simplification  
1A unit  
1CA multiplying by 2  
**OR**  
1SF substitution  
1A simplification  
1A unit  
1 CA multiplying by 4  
**Answer only: full marks** | 12.3.1  
L2 |
<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.3</td>
<td>Perimeter of the herb garden $= 2 \times \pi \times d$ ✓SF</td>
<td>1SF substitution 1CA simplification Accept $1570.80$ using $\pi$</td>
<td>12.3.1 L1</td>
</tr>
<tr>
<td></td>
<td>$= 2 \times 3.14 \times 250 \text{ cm}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$= 1570 \text{ cm}$ ✓CA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.4</td>
<td>Number of thyme plants $= 2 \times 5 - 1$ ✓SF</td>
<td>1SF substitution 1A number of plants</td>
<td>12.2.1 L1</td>
</tr>
<tr>
<td></td>
<td>$= 9$ ✓A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2.1</td>
<td>5 6 7 9 15 15 15 ✓A</td>
<td>1A ascending order 1A all values</td>
<td>12.4.3 L1</td>
</tr>
<tr>
<td></td>
<td>17 20 21 25 36 65 70 ✓A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2.2</td>
<td>Range $= 70 - 5$ ✓M #</td>
<td>1M identifying range concept 1A simplification</td>
<td>12.4.3 L1 L2</td>
</tr>
<tr>
<td></td>
<td>$= 65$ ✓A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td># CA from Question 2.2.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2.3</td>
<td>54 ✓A</td>
<td>2A correct mode (for the incorrect data set, if answer 15 max 1 mark)</td>
<td>12.4.3 L1</td>
</tr>
<tr>
<td></td>
<td>(including 60 and/or 46, max 1 mark)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2.4</td>
<td>Mean $= \frac{35 + 60 + 46 + 57 + 54 + 34 + 60 + 54 + 56 + 46 + 47}{15}$</td>
<td>1A sum of data 1A dividing by number of data entries</td>
<td>12.4.3 L1 L2</td>
</tr>
<tr>
<td></td>
<td>$= \frac{67 + 65 + 54 + 45}{15}$ ✓A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$= 780$ ✓A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$= 52$ ✓CA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ques</td>
<td>Solution</td>
<td>Explanation</td>
<td>AS/L</td>
</tr>
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</tr>
<tr>
<td>2.2.5</td>
<td>36; 65; 70 ✓✓A</td>
<td>2A correct values (one or two values correct, 1 mark) Including an incorrect value max 1 mark</td>
<td>12.4.3 L2</td>
</tr>
<tr>
<td>2.2.6</td>
<td>[ A = P(1 - i \times n) ] ✓SF ✓SF ✓SF = R15 000(1 - 0,175 \times 4) OR R15 000 ( \frac{17,5}{100} \times 4 ) = R4 500 ✓CA ✓SF ✓SF ✓CA OR R15 000 ( \frac{17,5}{100} \times 4 ) = R4 500 ✓CA</td>
<td>1SF substituting any 2 values correctly 1SF substituting the 3rd value correctly 1CA value</td>
<td>12.1.3 L2</td>
</tr>
<tr>
<td>2.3.1</td>
<td>Inverse OR Indirect ✓A</td>
<td>1A answer Accept Not direct</td>
<td>12.2.1 L1</td>
</tr>
<tr>
<td>2.3.2</td>
<td>R300 ✓✓RG OR ( \frac{R2 400}{7 + 1} ) = R 300 ✓A</td>
<td>2RG correct reading OR 1M dividing by 8 1A simplification If divided by 7 max 1 mark Accept a range of values from 340 to 350 max 1 mark</td>
<td>12.2.1 L1</td>
</tr>
<tr>
<td>2.3.3</td>
<td>3 ✓✓RG OR ( \frac{R2 400}{R800} ) = 3 ✓A</td>
<td>2RG correct reading OR 1M dividing by 800 1A simplification</td>
<td>12.2.1 L1</td>
</tr>
<tr>
<td>Ques</td>
<td>Solution</td>
<td>Explanation</td>
<td>AS/L</td>
</tr>
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<td>------</td>
</tr>
<tr>
<td>2.3.4</td>
<td>Monthly petrol costs per person = $\frac{\text{R} , 2400}{\text{number of persons}}$</td>
<td>NOTE: if there is no variable, symbol or words used, then 0 marks</td>
<td>12.2.1 L2</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>1A using R2 400 in an equation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monthly petrol costs per person = $\frac{\text{R} , 2400}{n}$, where n is the number of persons</td>
<td>1A dividing by number of persons</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>1A using R2 400</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monthly petrol costs per person = $\frac{\text{R} , 2400}{\text{number of persons}}$</td>
<td>1A dividing by number of persons</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>1A using R2 400</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monthly petrol costs per person = $\frac{\text{R} , 2400}{\text{number of persons}}$</td>
<td>1A total petrol cost</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>1A dividing by number of persons</td>
<td></td>
</tr>
<tr>
<td>Ques</td>
<td>Solution</td>
<td>Explanation</td>
<td>AS/L</td>
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</tbody>
</table>
| 3.1.1 | Area to be repainted \[= \ell \times b + 2h(\ell + b)\]  
\[= [50 \times 25 + 2 \times 1,5(50 + 25)] \text{ m}^2\]  
\[= [1250 + 3(75)] \text{ m}^2\]  
\[= 1475 \text{ m}^2\]  
1SF substitution \(\ell\) and \(b\)  
1SF substitution \(h\)  
1CA area \(\text{Incorrect use of BODMAS, no CA}\)  
Answer only: full marks | (3) |
| 3.1.2 | Height of a rectangular prism \[= \frac{1500 \text{ m}^3}{50\text{cm} \times 25\text{cm}}\]  
\[= 1,2 \text{ m}\]  
\(\text{1SF substitution}\)  
1A height  
Answer only: full marks | (2) |
| 3.2 | Temperature in °F = 32 + 1,8 \times (\text{Temperature in °C})\]  
\[= 32 + 1,8 \times (22)\]  
\[= 71,6\]  
\(\text{1SF substitution}\)  
1CA simplification  
1R rounding | (3) |
| 3.3.1 | Number of children 3 years and under \(\text{1M/A subtracting from 177}\)  
\(= 177 - (50 + 45 + 50 + 15)\]  
\[= 17\]  
\(\text{1CA simplification}\)  
If the answer is 0 max 1 mark  
Subtracting at least 2 values from 177 max 1 mark | (2) |
| 3.3.2 | Total Income = \(a \times R7,50 + b \times R10,50\)  
\[= (50 + 15) \times R7,50 + (45 + 50) \times R10,50\]  
\[= R487,50 + R997,50\]  
\[= R1 485,00\]  
\(\text{1SF substitution}\)  
1A correct values  
1S simplification  
1CA solution (only if number of people multiplied by fee)  
If only single values are used for \(a\) and \(b\), max 3 marks | (4) |
| 3.4 | Profit per bag = R22,00  
Number of bags sold = \[\frac{R594,00}{R22,00}\]  
\[= 27\]  
\(\text{1A profit per bag}\)  
1M/A dividing by correct values  
1CA number of bags | (3) |
### Ques 3.5

Discounted price of pump = \[
\frac{0.88}{100} \times R\ 4\ 999,00 \quad \checkmark \text{M} \\
= R\ 4\ 399,12 \quad \checkmark \text{CA}
\]

**OR**

Discounted price of pump = \[
0.88 \times R\ 4\ 999,00 \quad \checkmark \text{M} \\
= R\ 4\ 399,12 \quad \checkmark \text{CA}
\]

**Discount**

\[
\frac{0.12}{100} \times R\ 4\ 999,00 \quad \checkmark \text{M/A} \\
= R\ 599,88
\]

Discounted price of pump = \[
R\ 4\ 999 - R\ 599,88 \quad \checkmark \text{M} \\
= R\ 4\ 399,12 \quad \checkmark \text{CA}
\]

**Explanation**

1M/A subtracting 12%  
1M calculating 88%  
1CA simplification  
**OR**

1M/A subtracting 0.12  
1M calculating 0.88  
1CA simplification  
**OR**

1M/A concept of %  
1M concept of % decrease  
1CA simplification

### Ques 3.6

Exchange rate = \[
\frac{R\ 14\ 595,00}{AUD\$1\ 500,00} \quad \checkmark \text{M} \\
= R\ 9.73/AUD\$ \quad \checkmark \text{A} \quad \checkmark \text{OR} \quad R\ 9.73 \text{ per AUD}\$
\]

**Explanation**

1M division with correct values  
1A simplification  
If R1 = 0.102 AUD$, max 1 mark  
**Answer only: full marks**

### AS/L

12.1.1  
L1  
L2
<table>
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<th>QUESTION 4 [23 MARKS]</th>
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</thead>
<tbody>
<tr>
<td>Ques</td>
<td>Solution</td>
<td>Explanation</td>
<td>AS/L</td>
</tr>
<tr>
<td>4.1.1</td>
<td>( A = 20.6 ) ✓✓A</td>
<td>1A correct value of A Accept a range of values from 20 to 21</td>
<td>12.1.1 L1</td>
</tr>
<tr>
<td>4.1.2</td>
<td>7.6% ✓✓RT</td>
<td>2RT correct reading from table Accept 7.6</td>
<td>12.4.4 L1</td>
</tr>
<tr>
<td>4.1.3</td>
<td>2011 ✓✓RG</td>
<td>2RG correct reading from graph</td>
<td>12.4.4 L1</td>
</tr>
<tr>
<td>4.1.4</td>
<td>After dark ✓✓A</td>
<td>2A conclusion Accept dark or evening or night</td>
<td>12.4.4 L1</td>
</tr>
<tr>
<td>4.1.5</td>
<td>% Difference = 62.8 – 57 ✓M/A = 5.8 ✓CA</td>
<td>1M/A identifying correct values 1CA simplification If negative max 2 marks Answer only: full marks</td>
<td>12.1.1 L1</td>
</tr>
<tr>
<td>4.1.6</td>
<td>✓✓RT 57:14 ✓CA</td>
<td>1RT reading from the table 1CA writing as a ratio If incorrect reading max 1 for simplifying ratio If incorrect order max 1 mark Incorrect values, rounded to the nearest integer max 1 mark</td>
<td>12.4.4 L1</td>
</tr>
<tr>
<td>4.2.1</td>
<td>✓✓RG Any of the province(s)</td>
<td>2RG province</td>
<td>12.4.4 L1</td>
</tr>
<tr>
<td>4.2.2</td>
<td>Free State ✓RG</td>
<td>1RG province</td>
<td>12.4.4 L1</td>
</tr>
<tr>
<td>4.2.3</td>
<td>✓✓A 1 – 50 OR 41 – 50 OR white category</td>
<td>2A category (must be an interval)</td>
<td>12.4.4 L2</td>
</tr>
<tr>
<td>4.2.4</td>
<td>✓✓A Free State and Mpumalanga</td>
<td>1A Free State 1A Mpumalanga If additional province max 1 mark (If 4 or more provinces zero marks)</td>
<td>12.4.1 L1</td>
</tr>
<tr>
<td>Ques</td>
<td>Solution</td>
<td>Explanation</td>
<td>AS/L</td>
</tr>
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</tr>
<tr>
<td>4.2.5</td>
<td>Western Cape</td>
<td>✓ ✓ A</td>
<td>2A correct province (2)</td>
</tr>
</tbody>
</table>
| 4.2.6 | 0,8 cm : 125 km ✓ M  
= 8 cm : 125 000 000 cm ✓ C  
= 1 : 15 625 000 ✓ CA | 1M concept of scale  
1C conversion  
1CA simplification | 12.3.4 L1 |
| OR | 0,7 cm : 125 km ✓ M  
= 7 cm : 125 000 000 cm ✓ C  
= 1 : 17 857 142,86 ✓ CA | | |
| OR | 0,9 cm : 125 km ✓ M  
= 9 cm : 125 000 000 cm ✓ C  
= 1 : 13 888 888,89 ✓ CA | | |
| OR | 1,6 cm : 250 km ✓ M ✓ C  
1,6 cm = 25 000 000 cm  
=1: 15 625 000 ✓ CA | | |
| OR | 1,5 cm : 250 km ✓ M ✓ C  
1,5 cm = 25 000 000 cm  
=1: 16 666 666,67 ✓ CA | | |
| OR | 1,7 cm : 250 km ✓ M ✓ C  
1,7 cm = 25 000 000 cm  
=1: 14 705 882,35 ✓ CA | | |
| OR | 3,2 cm : 500 km ✓ M ✓ C  
3,2 cm = 50 000 000 cm  
= 1: 15 625 000 ✓ CA | | |
| OR | 3,1 cm : 500 km ✓ M ✓ C  
3,1 cm = 50 000 000 cm  
= 1: 16 129 032,26 ✓ CA | | |
| OR | 3,3 cm : 500 km ✓ M ✓ C  
3,3 cm = 50 000 000 cm ✓ C  
= 1: 15 151 515,15 ✓ CA | | |
### QUESTION 5 [21 MARKS]

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<th>Solution</th>
<th>Explanation</th>
<th>AS/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1.1</td>
<td>3 200 ✓ ✓ A</td>
<td>2A value of K</td>
<td>12.2.3 L1</td>
</tr>
<tr>
<td>5.1.2</td>
<td>Number of bacteria = 50 × 8 = 400 ✓ A</td>
<td>1A finding 400 1CA reading from table</td>
<td>12.2.3 L1</td>
</tr>
<tr>
<td></td>
<td>Time taken = 6 hours ✓ CA</td>
<td>Answer only: full marks</td>
<td></td>
</tr>
<tr>
<td>5.1.3</td>
<td></td>
<td></td>
<td>12.2.2 L2</td>
</tr>
</tbody>
</table>

#### Growth of bacteria over time

3A one mark per two points plotted accurately (CA from Question 5.1.1)
1CA joining points
1CA curve (the curve must start on the y-axis and pass through at least two points)

<table>
<thead>
<tr>
<th>5.1.4</th>
<th>Average growth rate</th>
<th></th>
<th>12.2.1 L1 L2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \frac{s - t}{r} )</td>
<td>1SF substituting ( s ) and ( t )</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( \frac{800 - 200}{8 - 4} ) ✓ SF</td>
<td>1A value of ( r )</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( \frac{600}{4} ) ✓ A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>( = 150 ) bacteria per hour ✓ CA</td>
<td>1CA simplification</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>If ( r = 8 ), max 2 marks</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>If ( r = 12 ), max 2 marks</td>
<td></td>
</tr>
</tbody>
</table>

(3)
<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2.1</td>
<td>Fume hood <strong>OR</strong> Non-radioactive waste ✓A</td>
<td>1A correct item</td>
<td>12.3.4 L2</td>
</tr>
</tbody>
</table>
| 5.2.2 | • Exit the radioactive waste room then turn left. ✓A  
• Walk straight down until you get to the end of the table. ✓A  
• Then turn right and continue walking straight ahead till you reach the refrigerator. ✓A | 1A turn left  
1A walk straight down, end of table  
1A Turn right, straight ahead | 12.3.4 L2 |
|      | **OR**  
• Exit the radioactive waste room then walk straight past the sink to the fume hood. ✓A  
• Then turn left. ✓A  
• Walk past the microscope and the next object is the refrigerator. ✓A | 1A walk past sink to fume hood  
1A turn left  
1A walk past microscope | 3 |
| 5.2.3 | Width = \[
\frac{\text{Total floor area}}{\text{length}}
\]
\[
= \frac{18,9 \text{ m}^2}{4,5 \text{ m}}
\] ✓ SF
\[
= 4,2 \text{ m}
\] ✓ CA ✓ A | 1 SF substitution  
1 CA simplification  
1A unit | 12.3.1 L1 |
| 5.2.4 | Actual length = \[2,26 \text{ cm} \times 58\] ✓ M ✓ A  
\[= 131,08 \text{ cm} \textbf{ OR } 1,31 \text{ m} \textbf{ OR } 1310,8 \text{ mm}\] | 1M multiplying correct values  
1A actual length  
If 1,31 or 1310,8 (without unit) max 1 mark | 12.3.3 L1 |
## QUESTION 6  [20 MARKS]

<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1.1</td>
<td><strong>C = 100% – (33 + 10 + 9 + 19)%  ✓M/A</strong>&lt;br&gt;[= 29% ✓ A]</td>
<td>1M/A subtracting from 100%&lt;br&gt;1A solution</td>
<td>(2)</td>
</tr>
<tr>
<td>6.1.2</td>
<td>Total days (no rain) = (33 + 10)% × 210&lt;br&gt;[= 43% × 210 OR 0,43 OR \frac{43}{100} × 210]&lt;br&gt;[= 90,3 ✓ CA]&lt;br&gt;[≈ 90 ✓ A]&lt;br&gt;<strong>OR</strong>&lt;br&gt;Total days (no rain) = 33% × 210 + 10% × 210&lt;br&gt;[= 69,3 + 21]&lt;br&gt;[= 90,3 ✓ CA]</td>
<td>1A adding correct values&lt;br&gt;1M multiplying&lt;br&gt;1CA solution&lt;br&gt;<strong>OR</strong>&lt;br&gt;1M multiplying&lt;br&gt;1A adding correct values&lt;br&gt;If 91 max 2 marks</td>
<td>(3)</td>
</tr>
<tr>
<td>6.2.1</td>
<td>23 ✓ A</td>
<td>1A number</td>
<td>(1)</td>
</tr>
<tr>
<td>6.2.2</td>
<td>Total number of learners&lt;br&gt;[= 24 + 32 + 26 + 25 + 20 + 18 + \frac{10}{4} + 0]&lt;br&gt;[= 159 ✓ CA]</td>
<td>1M/A finding the sum&lt;br&gt;1CA solution&lt;br&gt;If wrong set is used max 1&lt;br&gt;Answer only: full marks</td>
<td>(2)</td>
</tr>
<tr>
<td>6.2.3</td>
<td>22 ✓ ✓ A</td>
<td>2A correct size&lt;br&gt;If 32 give 1 mark</td>
<td>(2)</td>
</tr>
<tr>
<td>Ques</td>
<td>Solution</td>
<td>Explanation</td>
<td>AS/L</td>
</tr>
<tr>
<td>------</td>
<td>----------</td>
<td>-------------</td>
<td>------</td>
</tr>
</tbody>
</table>
| 6.3.1 | A = \( \frac{9500}{95} \) ✓M  
= 100 ✓A  

**OR**  
A = \( \frac{11600 - 5600}{60} \) ✓M  
= 100 ✓A  

B = 180 × 95 ✓M  
= R17 100 ✓A | 1M dividing by R95  
1A simplification  

**OR**  
1M finding difference and dividing  
1A simplification  
1M multiplying  
1A simplification | 12.2.1  
L1 |
### Ques 6.3.2

**COST AND INCOME FOR THE MAKING OF 200 LONG-SLEEVED JERSEYS**

<table>
<thead>
<tr>
<th>Number of long-sleeved jerseys made</th>
<th>Amount in Rand</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>200</td>
<td>20000</td>
</tr>
<tr>
<td>200</td>
<td>20000</td>
</tr>
<tr>
<td>180</td>
<td>18000</td>
</tr>
<tr>
<td>160</td>
<td>16000</td>
</tr>
<tr>
<td>140</td>
<td>14000</td>
</tr>
<tr>
<td>120</td>
<td>12000</td>
</tr>
<tr>
<td>100</td>
<td>10000</td>
</tr>
<tr>
<td>80</td>
<td>8000</td>
</tr>
<tr>
<td>60</td>
<td>6000</td>
</tr>
<tr>
<td>40</td>
<td>4000</td>
</tr>
<tr>
<td>20</td>
<td>2000</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

3A one mark per two points plotted accurately **(CA on Question 6.3.1)**

1CA joining plotted points

**Full marks if first and last points are correct and joined with a straight line and no other values plotted OR if any two points correctly plotted to draw a complete straight line.**

(4)

### Ques 6.3.3

| 161 ✓ CA ✓ CA |

2CA minimum value
1 mark for 160 (break-even point)
If 'more than 160' stated in words, max 1 mark

(2)

**TOTAL 150**
This question paper consists of 13 pages and 4 annexures.
INSTRUCTIONS AND INFORMATION

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

2. Answer QUESTION 3.2.1 on ANNEXURE A and QUESTION 4.2.3 on ANNEXURE C. Use ANNEXURE B and ANNEXURE D to answer QUESTION 3.4 and QUESTION 4.3. Write your centre number and examination number in the spaces on the ANNEXURES and hand in the ANNEXURES 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 stated otherwise.

6. Show ALL the 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.
QUESTION 1

Franz is a citrus farmer in Zebediela, Limpopo. He supplies oranges to the local and export market.

The harvesting of oranges requires various phases. Oranges are first hand-picked and collected into cylindrical baskets. The baskets are then emptied into a trailer to be transported to the packing house.

Franz also has another company that makes orange juice.

Consider all oranges to be spherical in shape. The average diameter measurement of an orange is 90 mm.

1.1 Approximately 2,5 kg of oranges are used to make 1 ℓ of juice. The juice is poured into 5 ℓ plastic bottles.

Determine the number of 5 ℓ bottles of juice that can be made from 400 kg of oranges. (3)

1.2 Determine the:

1.2.1 Surface area (in mm$^2$) of an orange (3)

1.2.2 Volume (in mm$^3$) of an orange (2)

The following formulae may be used:

Surface area of a sphere = \(4 \times \pi \times r^2\)

Volume of a sphere = \(\frac{4}{3} \times \pi \times r^3\)

where \(\pi = 3,14\) and \(r = \text{radius}\)

1.3 The cylindrical section of a basket has a height of 25 cm and a diameter of 30 cm. The space in the cylindrical basket not occupied by the oranges is 113 040 mm$^3$.

Franz states that a basket can hold at most 44 oranges.

Verify, by showing ALL the necessary calculations, whether Franz's statement is correct.

The following formula may be used:

Volume of a cylinder = \(\pi \times r^2 \times h\)

where \(\pi = 3,14\), \(r = \text{radius}\) and \(h = \text{height}\) (7)
1.4 Franz uses rectangular boxes to pack the oranges as shown in the diagram below. He then packs the boxes of oranges into the rectangular trailer of his truck for delivery.

**Open box of oranges**

**Measurements of the box**

\[ b = \text{breadth} = 0,215 \text{ m} \]
\[ \ell = \text{length} = 0,3 \text{ m} \]

\[ h = \text{height} = 0,235 \text{ m} \]

The boxes can be arranged in the trailer in two possible ways with the top of the box always facing upwards as shown in the two options below:

<table>
<thead>
<tr>
<th>OPTION 1</th>
<th>OPTION 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="OPTION 1 layout" /></td>
<td><img src="image2" alt="OPTION 2 layout" /></td>
</tr>
</tbody>
</table>

The trailer is imported and the dimensions are given as:

Length = 394 inches; breadth = 119 inches; height = 94,5 inches

**NOTE:** 1 inch = 2,54 cm

Show, with calculations, which ONE of the two options (Option 1 or Option 2) you would advise Franz to use so that he can pack the maximum number of boxes on the floor of the trailer.
QUESTION 2

2.1 Rodney is a public servant who owns two vehicles with engine capacities of 1,5 ℓ and 2,3 ℓ.

The government has two vehicle subsidy schemes for distances travelled while on official duty:

**Scheme A:** The vehicles are subsidised* and maintained by the government (employer). Employees are re-imburse (paid back) per kilometre travelled for petrol cost only.

**Scheme B:** The vehicles are owned and paid for by the employee, who also has to maintain the vehicle. Employees are re-imburse per kilometre travelled at a higher rate than that of scheme A to cover petrol and maintenance costs.

*Subsidised vehicles are proportionally paid for by both the employee and the employer.

Rodney has to submit a travel claim each month.

The following table shows the claim tariffs for 2012:

<table>
<thead>
<tr>
<th>ENGINE CAPACITY (in litres)</th>
<th>CLAIM TARIFF (in cents per km)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SCHEME A</td>
</tr>
<tr>
<td>Up to 1,250</td>
<td>77,9</td>
</tr>
<tr>
<td>1,251 to 1,550</td>
<td>88,8</td>
</tr>
<tr>
<td>1,551 to 1,750</td>
<td>96,7</td>
</tr>
<tr>
<td>1,751 to 1,950</td>
<td>108,3</td>
</tr>
<tr>
<td>1,951 to 2,150</td>
<td>111,9</td>
</tr>
<tr>
<td>2,151 to 2,500</td>
<td>130,3</td>
</tr>
<tr>
<td>2,501 to 3,500</td>
<td>137,1</td>
</tr>
<tr>
<td>Greater than 3,500</td>
<td>160,6</td>
</tr>
</tbody>
</table>

(Source: www.kzntransport.gov.za)

2.1.1 Write down a formula that can be used to calculate the amount that can be claimed for a 2,3 ℓ vehicle using scheme B, in the form:

**Amount claimed (in rand) = ...**

(2)

2.1.2 Rodney, using scheme B, claimed an amount of R9 430 for travelling 1 960 km using his 2,3 ℓ vehicle while performing official duties for the month of November 2012.

Verify, showing ALL calculations, whether Rodney claimed the correct amount.

(3)
2.2 Rodney needs to determine whether it is better for him to use his 1,5 ℓ or 2,3 ℓ vehicle. He travels approximately 1 960 km per month while performing his official duties.

The comparison of the monthly maintenance and petrol cost per kilometre is summarised in Table 2 below.

<table>
<thead>
<tr>
<th>ENGINE CAPACITY</th>
<th>MAINTENANCE (in rand)</th>
<th>PETROL (in rand per km)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Service</td>
<td>Tyres</td>
</tr>
<tr>
<td>1,5 ℓ</td>
<td>450</td>
<td>125</td>
</tr>
<tr>
<td>2,3 ℓ</td>
<td>700</td>
<td>210</td>
</tr>
</tbody>
</table>

2.2.1 Calculate Rodney's total monthly cost (including petrol and maintenance) if he uses his 1,5 ℓ vehicle. 

2.2.2 In October 2012 Rodney, using scheme B, used his 1,5 ℓ vehicle for his official duties and in November 2012 he used his 2,3 ℓ vehicle for his official duties. He travelled 1 960 km each month.

Determine the difference in the remaining amount from his claims for October 2012 and November 2012 after the maintenance and petrol costs have been deducted.

[The remaining amount is the difference between the amount claimed and the total monthly cost for the vehicle.]

2.3 Rodney decides to deposit a fixed amount into his bank account at the end of each month. The bank offers an interest rate of 9% per annum, compounded monthly.

At the end of two years, the final amount in his account was R104 753,89.

Calculate the fixed amount that was regularly deposited at the end of each month.

The following formula may be used:

\[ x = \frac{A \times \frac{i}{12}}{\left[ \left(1 + \frac{i}{12} \right)^n - 1 \right]} \]

where \( x \) = fixed monthly deposited amount \( A \) = final amount
\( i \) = annual interest rate \( n \) = number of deposits
2.4 Rodney's wife is 66 years old. Her taxable income for 2012 was R315 054.

The amount of tax payable is calculated using the following table:

**TABLE 3: Tax calculation table**

<table>
<thead>
<tr>
<th>TAXABLE INCOME (in rand)</th>
<th>RATES OF TAX (in rand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 160 000</td>
<td>18%</td>
</tr>
<tr>
<td>160 001 to 250 000</td>
<td>28 800 + 25% of the amount above 160 000</td>
</tr>
<tr>
<td>250 001 to 346 000</td>
<td>51 300 + 30% of the amount above 250 000</td>
</tr>
<tr>
<td>346 001 to 484 000</td>
<td>80 100 + 35% of the amount above 346 000</td>
</tr>
<tr>
<td>484 001 to 617 000</td>
<td>128 400 + 38% of the amount above 484 000</td>
</tr>
<tr>
<td>617 001 and above</td>
<td>178 940 + 40% of the amount above 617 000</td>
</tr>
</tbody>
</table>

[Source: www.sars.gov.za on 17 November 2012]

Taxpayers qualify for:

- A primary rebate* of R11 440
- An additional rebate* of R6 390 if they are 65 years or older

* A rebate is an amount by which an individual's calculated tax is reduced.

Determine the amount of tax payable by Rodney's wife after the rebates have been deducted.  

(5)

[26]
3.1 The results of Census 2011 were released by Statistics South Africa in November 2012.

TABLE 4 below summarises the highest level of education for all South Africans who were 20 years and older in the years 1996, 2001 and 2011.

<table>
<thead>
<tr>
<th>EDUCATION LEVEL</th>
<th>1996</th>
<th>2001</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
</tr>
<tr>
<td>No schooling</td>
<td>4 055 646</td>
<td>19,1</td>
<td>4 567 498</td>
</tr>
<tr>
<td>Some primary</td>
<td>3 522 956</td>
<td>16,6</td>
<td>4 083 742</td>
</tr>
<tr>
<td>Completed primary</td>
<td>1 571 774</td>
<td>7,4</td>
<td>1 623 467</td>
</tr>
<tr>
<td>Some secondary</td>
<td>7 130 121</td>
<td>33,6</td>
<td>7 846 125</td>
</tr>
<tr>
<td>Grade 12</td>
<td>3 458 434</td>
<td>16,3</td>
<td>5 200 602</td>
</tr>
<tr>
<td>Tertiary education</td>
<td>1 512 602</td>
<td>7,0</td>
<td>2 151 336</td>
</tr>
</tbody>
</table>

[Source: Census 2011 Fact sheet]

3.1.1 The number of persons aged 20 years and older with no schooling increased from 1996 to 2001.

Explain, with calculations, why the table shows a lower percentage of persons with no schooling in 2001 compared to 1996. (5)

3.1.2 In 2011, the number of persons who were 20 years and older was approximately 59,7% of the total South African population.

Determine the total number of persons who were younger than 20 years in 2011. (4)

3.1.3 The total population in South Africa was 44 819 778 in 2001.

If a person was randomly chosen in 2001, determine the probability that the person's highest level of education would only be Grade 12. (3)

3.2 Line graphs representing the highest level of education for persons 20 years and older for 1996 and 2001 have already been drawn on ANNEXURE A.

3.2.1 Use ANNEXURE A and TABLE 4 to draw the line graph that represents the highest level of education for 2011. (6)

3.2.2 Describe TWO trends in the highest level of education by comparing Grade 12 and tertiary education from 1996 to 2011. (4)
3.3

The percentage distribution (per province) of persons aged 20 years and older whose highest level of education was Grade 12 in 2011 is shown in the table below.

### TABLE 5: Percentage distribution (per province) of persons with Grade 12 as highest level of education during 2011

<table>
<thead>
<tr>
<th>Province</th>
<th>KZN</th>
<th>EC</th>
<th>FS</th>
<th>WC</th>
<th>NC</th>
<th>NW</th>
<th>GP</th>
<th>MP</th>
<th>LP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>30,9</td>
<td>19,8</td>
<td>26,8</td>
<td>28,2</td>
<td>22,7</td>
<td>25,2</td>
<td>34,4</td>
<td>29,0</td>
<td>22,4</td>
</tr>
</tbody>
</table>

**KEY:**
- KZN – KwaZulu-Natal
- EC – Eastern Cape
- FS – Free State
- WC – Western Cape
- NC – Northern Cape
- NW – North West
- GP – Gauteng
- MP – Mpumalanga
- LP – Limpopo

3.3.1 Explain why the total of the percentages in Table 5 does not add up to 100%.

3.3.2 Determine the province that had the median percentage of persons with grade 12 as the highest level of education in 2011.

3.3.3 For the data given above, the 25th percentile is 22,55% and the 75th percentile is 29,95%.

Identify the province(s) whose percentage distribution is less than the lower quartile.

3.3.4 Give a reason why each of the following types of graphs is NOT suitable to represent the above data:

(a) A pie chart

(b) A histogram

3.4

ANNEXURE B contains a map that shows the provincial boundary changes from 2001 to 2011. The provincial boundary changes are changes to the borders of provinces as a result of municipalities that were absorbed into other provinces.

3.4.1 Write down the names of the provinces which gained land from North West due to the boundary changes.

3.4.2 Tshidi resides at point T in the Northern Cape.

Determine, using measurement, the actual distance (TS) from Tshidi’s home (T) to point S on the new boundary.

Give your answer in kilometres.
QUESTION 4

4.1 Koos lives in Pelican Road in Port Elizabeth. He is making a pentagonal post box for his house as shown in the diagrams below.

The front and rear ends of the post box are regular pentagons with side lengths equal to 270 mm. The bottom, top and sides of the post box are rectangles with a length of 360 mm and a breadth of 270 mm.

4.1.1 Calculate the perimeter of ONE of the pentagonal ends of the post box. (2)

4.1.2 Calculate the total surface area (in m²) of the post box (excluding the openings for the newspaper and letter), if the following are given:

<table>
<thead>
<tr>
<th>SHAPE</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentagon</td>
<td>0,13 m²</td>
</tr>
<tr>
<td>Letter opening</td>
<td>0,017 m²</td>
</tr>
<tr>
<td>Newspaper opening</td>
<td>0,013 m²</td>
</tr>
</tbody>
</table>

The following formula may be used:

\[ \text{Area of a rectangle} = \text{length} \times \text{breadth} \] (5)

4.1.3 A newspaper folded into a cylindrical shape has a diameter of 12 cm. The area of the newspaper opening of the post box is 0,013 m².

Show, with calculation, whether the folded newspaper will fit in the newspaper opening of the post box.

The following formula may be used:

\[ \text{Area of a circle} = \pi \times r^2 \] (5)

where \( \pi = 3,14 \) and \( r = \text{radius} \)
4.2 A courier company charges a certain rate for the delivery of ordinary parcels. It costs R30,50 to deliver an ordinary parcel for the first kilogram or less. If a parcel has a mass of more than 1 kg, there is an additional charge of R4,50 per kg.

4.2.1 Write down the formula that could be used to calculate the delivery cost of ordinary parcels of different masses. (3)

4.2.2 TABLE 6 below summarises the delivery cost of ordinary parcels according to mass.

Table 6: Delivery cost of an ordinary parcel according to mass

<table>
<thead>
<tr>
<th>Mass (in kg)</th>
<th>0</th>
<th>0,5</th>
<th>1</th>
<th>2,5</th>
<th>3</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost (in rand)</td>
<td>0</td>
<td>30,50</td>
<td>30,50</td>
<td>A</td>
<td>39,50</td>
<td>70,55</td>
</tr>
</tbody>
</table>

Determine the missing values A and B. (6)

4.2.3 Use TABLE 6 above and the grid on ANNEXURE C to draw a line graph that represents the relationship between the delivery cost and mass of an ordinary parcel. (6)

4.3 ANNEXURE D shows a section of the map of Port Elizabeth where Koos lives.

Use the map on ANNEXURE D to answer the following questions:

4.3.1 Koos was given directions to travel from his home to a particular place.

From his home he should:

* turn left into Pelican Road,
* then turn left into Swift Road,
* then turn left into Aylesbury Road,
* then turn right into Coly Road,
* then turn left into Villiers Road,
* then turn right into 14th Ave, and
* then drive across Main Road to his destination on the left-hand side.

Determine the place that was Koos's destination. (3)

4.3.2 Zoliswa, a property developer, bought the vacant land enclosed by Swallow Crescent and Starling Crescent with a plan to build houses.

She measured the vacant land and claimed that if she marked sites with an area of 0,15 cm² each on the map, she can get 14 sites on which she can build houses.

Verify, showing all calculations, whether her claim is valid. (4)
QUESTION 5

5.1 Toni owns a driving school and she teaches learners how to drive.

Toni recorded the number of learners that passed their driver's licence test at the first attempt on a monthly basis for a full year. Below is a graph that she drew based on the data.

5.1.1 Give a possible explanation why the number of learners that passed their test the first time was more in December than in any other month of the year.

5.1.2 Determine the range of the number of learners passing the test at the first attempt.

5.1.3 Toni looked at the graph and claimed: 'There has been a marked increase in the number of learners that pass their driver's licence test the first time.'

Explain why her claim is INCORRECT. Give ONE example to justify your explanation.
5.2 Toni charges the learners according to the payment options illustrated in the line graphs below. The line graphs only show the first 22 hours.

**COST OF DRIVING LESSONS**

<table>
<thead>
<tr>
<th>Cost (in rand)</th>
<th>Time (in hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>400</td>
<td>4</td>
</tr>
<tr>
<td>800</td>
<td>8</td>
</tr>
<tr>
<td>1 200</td>
<td>12</td>
</tr>
<tr>
<td>1 600</td>
<td>16</td>
</tr>
<tr>
<td>Option A</td>
<td>Option B</td>
</tr>
<tr>
<td>Option B</td>
<td>Option A</td>
</tr>
</tbody>
</table>

5.2.1 Interpret the horizontal section of the line graph for payment Option A. (2)

5.2.2 Payment Option B starts at point P.

(a) Explain why point P is represented by an open circle on the graph. (2)

(b) Describe in detail the cost of driving lessons if option B is used. (3)

5.2.3 The graphs intersect at points Q and R. Interpret the graphs at point Q. (2)

5.2.4 Zaheera budgeted R1 200 for her driving lessons.

Explain which option would be better for:

(a) Zaheera (2)

(b) Toni (2)

5.2.5 In an attempt to further reduce the total cost of her driving lessons, Zaheera asks a friend to teach her some basic driving skills. After a series of free lessons with her friend, she realises that she only requires 6 hours of lessons from a driving school.

Identify the option she should now choose. Explain your answer. (3)

5.2.6 Calculate the difference in cost for a learner using OPTION A and another learner using OPTION B if they both require 30 hours of lessons. (5)

TOTAL: 150
QUESTION 3.2.1

PERCENTAGE HIGHEST EDUCATION LEVEL

- No schooling
- Some primary
- Completed primary
- Some secondary
- Grade 12
- Tertiary education

Percentage

Highest Education Level

1996
2001
ANNEXURE B

QUESTION 3.4

<table>
<thead>
<tr>
<th>Region</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KZN</td>
<td>KwaZulu-Natal</td>
</tr>
<tr>
<td>EC</td>
<td>Eastern Cape</td>
</tr>
<tr>
<td>FS</td>
<td>Free State</td>
</tr>
<tr>
<td>WC</td>
<td>Western Cape</td>
</tr>
<tr>
<td>NC</td>
<td>Northern Cape</td>
</tr>
<tr>
<td>NW</td>
<td>North West</td>
</tr>
<tr>
<td>GP</td>
<td>Gauteng</td>
</tr>
<tr>
<td>MP</td>
<td>Mpumalanga</td>
</tr>
<tr>
<td>LP</td>
<td>Limpopo</td>
</tr>
</tbody>
</table>

Scale: 1 : 10 000 000
[Source: Provincial boundaries – MDB] 2011
COST OF ORDINARY PARCELS
ACCORDING TO MASS
ANNEXURE D

QUESTION 4.3

Koos's house
Vacant land

Koos’s house
Vacant land
MARKS: 150

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Accuracy</td>
</tr>
<tr>
<td>CA</td>
<td>Consistent accuracy</td>
</tr>
<tr>
<td>C</td>
<td>Conversion</td>
</tr>
<tr>
<td>J</td>
<td>Justification (Reason/Opinion)</td>
</tr>
<tr>
<td>M</td>
<td>Method</td>
</tr>
<tr>
<td>MA</td>
<td>Method with accuracy</td>
</tr>
<tr>
<td>P</td>
<td>Penalty, e.g. for no units, incorrect rounding off, etc.</td>
</tr>
<tr>
<td>R</td>
<td>Rounding off</td>
</tr>
<tr>
<td>RT/RG</td>
<td>Reading from a table/Reading from a graph</td>
</tr>
<tr>
<td>S</td>
<td>Simplification</td>
</tr>
<tr>
<td>SF</td>
<td>Correct substitution in a formula</td>
</tr>
<tr>
<td>O</td>
<td>Own opinion/Example</td>
</tr>
<tr>
<td>NPR</td>
<td>No penalty for rounding</td>
</tr>
</tbody>
</table>

This memorandum consists of 22 pages.
QUESTION 1 [24 MARKS]

<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Amount of juice (in litres)</td>
<td>2,5 kg makes 1 ( \ell ) ( \frac{400 \text{ kg}}{2,5 \text{ kg}} ) = 160 ( \checkmark ) A</td>
<td>1M dividing by 2,5</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>400 kg makes ( \frac{2,5 \text{ kg}}{\ell} ) ( \frac{400 \text{ kg}}{2,5 \text{ kg}} ) ( \checkmark ) M</td>
<td>1A simplification</td>
</tr>
<tr>
<td></td>
<td>Number of 5 ( \ell ) bottles</td>
<td>Number of 5 ( \ell ) bottles ( \frac{160 \ell}{5 \ell} ) = 32 ( \checkmark ) CA</td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>( \frac{160 \ell}{5 \ell} ) = 32 ( \checkmark ) CA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 : 2,5 = ( x : 400 )</td>
<td>2,5( x ) = 400 ( \frac{400}{2,5} ) = 160 ( \checkmark ) A</td>
<td>1M using proportion</td>
</tr>
<tr>
<td></td>
<td>( x = \frac{400}{2,5} ) ( \checkmark ) M</td>
<td>( x = 160 ) ( \checkmark ) A</td>
<td>1A simplification</td>
</tr>
<tr>
<td></td>
<td>Number of 5 ( \ell ) bottles ( = \frac{160 \ell}{5 \ell} ) ( = 32 ) ( \checkmark ) CA</td>
<td>Number of 5 ( \ell ) bottles ( = \frac{160 \ell}{5 \ell} ) ( = 32 ) ( \checkmark ) CA</td>
<td>1CA simplification</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>( 5 \ell ) juice is made from ( 5 \times 2,5 \text{ kg} = 12,5 \text{ kg} ) fruit ( \checkmark ) A</td>
<td>1A mass of fruit</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>( \therefore ) Number of 5 ( \ell ) bottles ( = \frac{400 \text{ kg}}{12,5 \text{ kg}} ) ( \checkmark ) M</td>
<td>1M dividing by 12,5</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>( = 32 ) ( \checkmark ) CA</td>
<td>1CA simplification</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>( \frac{400 \text{ kg}}{5 \ell} = 80 \text{ kg}/\ell ) ( \checkmark ) A</td>
<td>1A using proportion</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>( \frac{400 \text{ kg}}{5 \ell} = 80 \text{ kg}/\ell ) ( \checkmark ) M</td>
<td>1M dividing by 2,5</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>( \frac{80 \text{ kg}/\ell}{2,5 \text{ kg}/\ell} = 32 ) ( \checkmark ) CA</td>
<td>1CA simplification</td>
</tr>
<tr>
<td></td>
<td>Correct answer only: full marks</td>
<td>(3)</td>
<td></td>
</tr>
</tbody>
</table>
### Ques 1.2.1

**Solution**

Radius (in mm) = \( \frac{90}{2} = 45 \)  

\( A \)

Surface area (in mm\(^2\)) = \( 4 \times 3.14 \times 45^2 \)  

\( SF \)

\( = 25434 \)  

\( CA \)

<table>
<thead>
<tr>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A value of radius</td>
<td>L2</td>
</tr>
<tr>
<td>1SF substitution</td>
<td></td>
</tr>
<tr>
<td>1CA simplification</td>
<td></td>
</tr>
<tr>
<td>Using diameter max 2 marks</td>
<td></td>
</tr>
<tr>
<td><strong>Correct answer only:</strong> full marks</td>
<td></td>
</tr>
</tbody>
</table>

(3)

### Ques 1.2.2

**Solution**

Volume (in mm\(^3\)) = \( \frac{4}{3} \times 3.14 \times 45^3 \)  

\( SF \)

\( = 381510 \)  

\( CA \)

<table>
<thead>
<tr>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA from 1.2.1</td>
<td>L2</td>
</tr>
<tr>
<td>1SF substitution</td>
<td></td>
</tr>
<tr>
<td>1CA simplification</td>
<td></td>
</tr>
<tr>
<td><strong>Correct answer only:</strong> full marks</td>
<td></td>
</tr>
</tbody>
</table>

(2)

### Ques 1.3

**Solution**

Radius of basket = \( \frac{30}{2} = 15 \) cm  

\( A \)

Volume of basket = \( 3.14 \times (15 \text{ cm})^2 \times 25 \text{ cm} \)  

\( SF \)

\( = 3.14 \times (150 \text{ mm})^2 \times 250 \text{ mm} \)  

\( C \)

\( = 17662500 \text{ mm}^3 \)  

\( CA \)

The number of oranges = \( \frac{17662500 \text{ mm}^3 - 113040 \text{ mm}^3}{381510 \text{ mm}^3} \)  

\( M/A \)

\( = 46 \)

\( M/CA \)

\( \therefore \) Franz’s statement is **not correct**  

\( CA \)

**OR**

### Ques 1.2.3

<table>
<thead>
<tr>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A radius of basket</td>
<td>L2</td>
</tr>
<tr>
<td>1SF substitution</td>
<td></td>
</tr>
<tr>
<td>1C converting to mm</td>
<td></td>
</tr>
<tr>
<td>1CA volume of basket</td>
<td></td>
</tr>
<tr>
<td><strong>Correct answer only:</strong> full marks</td>
<td></td>
</tr>
</tbody>
</table>

(3)

**OR**
OR
Radius of basket = \[ \frac{30}{2} = 15 \text{ cm} \]  
\[ \checkmark \text{A} \]

Volume of basket = \[ 3.14 \times (15 \text{ cm})^2 \times 25 \text{ cm} \]  
\[ = 17 662.5 \text{ cm}^3 \]  
\[ \checkmark \text{CA} \]

The number of oranges = \[ \frac{17 662.5 \text{ cm}^3 - 113 040 \text{ mm}^3}{381 510 \text{ mm}^3} \]  
\[ = \frac{17 662.5 \text{ cm}^3 - 113 040 \text{ cm}^3}{381 510 \text{ cm}^3} \]  
\[ = 46 \]

\((46 > 44)\)
∴ Franz’s statement is not correct  
\[ \checkmark \text{CA} \]

OR
Radius of basket = \[ \frac{30}{2} = 15 \text{ cm} \]  
\[ \checkmark \text{A} \]

Volume of basket = \[ 3.14 \times (15 \text{ cm})^2 \times 25 \text{ cm} \]  
\[ = 3.14 \times (150 \text{ mm})^2 \times 250 \text{ mm} \]  
\[ = 17 662 500 \text{ mm}^3 \]  
\[ \checkmark \text{CA} \]

Space in the basket for oranges (in mm\(^3\))  
\[ = 17 662 500 - 113 040 = 17 549 460 \]  
\[ \checkmark \text{M} \]

Space occupied by oranges (in mm\(^3\))  
\[ = 381 510 \text{ mm}^2 \times 44 = 16 786 440 \text{ mm}^2 \]  
\[ \checkmark \text{A} \]

(∵ there is space for more oranges)
∴ Franz’s statement is not correct  
\[ \checkmark \text{CA} \]

Correct conclusion only: 1 mark (7)
### Ques 1.4

**Trailer length**

\[ 394 \times 2.54 \text{ cm} = 1000.76 \text{ cm} \quad \text{OR} \quad 10.0076 \text{ m} \]

**Trailer breadth**

\[ 119 \times 2.54 \text{ cm} = 302.26 \text{ cm} \quad \text{OR} \quad 3.0226 \text{ m} \]

**Option 1:**

Maximum number of boxes packed **lengthwise** along the breadth of the trailer:

\[ \frac{302.26}{30} = 10.075… \approx 10 \]

Maximum number of boxes packed **breadthwise** along the length of the trailer:

\[ \frac{1000.76}{21.5} = 46.54… \approx 46 \]

Maximum number of boxes of oranges = \( 10 \times 46 = 460 \)

**Option 2:**

Maximum number of boxes packed **breadthwise** along the breadth of the trailer:

\[ \frac{302.26}{21.5} = 14.05… \approx 14 \]

Maximum number of boxes packed lengthwise along the length of the trailer:

\[ \frac{1000.76}{30} = 33.35… \approx 33 \]

Maximum number of boxes = \( 33 \times 14 = 462 \)

\[ \therefore \text{OPTION 2 is the best} \]

<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
</table>
| 1.4  | **Trailer length**

\[ 394 \times 2.54 \text{ cm} = 1000.76 \text{ cm} \quad \text{OR} \quad 10.0076 \text{ m} \]

**Trailer breadth**

\[ 119 \times 2.54 \text{ cm} = 302.26 \text{ cm} \quad \text{OR} \quad 3.0226 \text{ m} \]

**Option 1:**

Maximum number of boxes packed **lengthwise** along the breadth of the trailer:

\[ \frac{302.26}{30} = 10.075… \approx 10 \]

Maximum number of boxes packed **breadthwise** along the length of the trailer:

\[ \frac{1000.76}{21.5} = 46.54… \approx 46 \]

Maximum number of boxes of oranges = \( 10 \times 46 = 460 \)

**Option 2:**

Maximum number of boxes packed **breadthwise** along the breadth of the trailer:

\[ \frac{302.26}{21.5} = 14.05… \approx 14 \]

Maximum number of boxes packed lengthwise along the length of the trailer:

\[ \frac{1000.76}{30} = 33.35… \approx 33 \]

Maximum number of boxes = \( 33 \times 14 = 462 \)

\[ \therefore \text{OPTION 2 is the best} \]

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<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
</table>
| 1.4  | **Trailer length**

\[ 394 \times 2.54 \text{ cm} = 1000.76 \text{ cm} \quad \text{OR} \quad 10.0076 \text{ m} \]

**Trailer breadth**

\[ 119 \times 2.54 \text{ cm} = 302.26 \text{ cm} \quad \text{OR} \quad 3.0226 \text{ m} \]

**Option 1:**

Maximum number of boxes packed **lengthwise** along the breadth of the trailer:

\[ \frac{302.26}{30} = 10.075… \approx 10 \]

Maximum number of boxes packed **breadthwise** along the length of the trailer:

\[ \frac{1000.76}{21.5} = 46.54… \approx 46 \]

Maximum number of boxes of oranges = \( 10 \times 46 = 460 \)

**Option 2:**

Maximum number of boxes packed **breadthwise** along the breadth of the trailer:

\[ \frac{302.26}{21.5} = 14.05… \approx 14 \]

Maximum number of boxes packed lengthwise along the length of the trailer:

\[ \frac{1000.76}{30} = 33.35… \approx 33 \]

Maximum number of boxes = \( 33 \times 14 = 462 \)

\[ \therefore \text{OPTION 2 is the best} \]
OR
Trailer length \( = 394 \times 2.54 \text{ cm} = 1\,000.76 \text{ cm} \) OR 10,0076 m

Trailer breadth \( = 119 \times 2.54 \text{ cm} = 302.26 \text{ cm} \) OR 3,0226 m

Height \( = 94.6 \times 2.54 \text{ cm} = 240.03 \text{ cm} \) OR 240,03 m

Number of layers of boxes \( = \frac{240.03}{0.235} = 10.214... \approx 10 \)

Option 1:
Maximum number of boxes packed **lengthwise** along the breadth of the trailer:

\[ \frac{3.0226}{0.3} = 10.075... \approx 10 \]

Maximum number of boxes packed **breadthwise** along the length of the trailer:

\[ \frac{10.0076}{0.215} = 46.54... \approx 46 \]

Number of boxes to be packed in this option
\( = 10 \times 46 = 460 \) CA

Option 2:
Maximum number of boxes packed **breadthwise** along the breadth of the trailer:

\[ \frac{3.0226}{0.215} = 14.05... \approx 14 \]

Maximum number of boxes packed **lengthwise** along the length of the trailer:

\[ \frac{10.0076}{0.3} = 33.35... \approx 33 \]

Number of boxes to be packed in this option
\( = 14 \times 33 \times 10 \)
\( = 4620 \) CA

\[ : \text{ OPTION 2 is the best.} \]

\[ \]
### QUESTION 2 [26 MARKS]

<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
</table>
| 2.1.1 | Amount claimed (in rand)  
                   \[= 4.67 \times \text{number of kilometres travelled} \]  
                   OR  
                   \[= 467 \text{ cents} \times \text{number of kilometres travelled} \]  
                   OR  
                   \[= 467 \times \text{number of kilometres travelled} \div 100 \]  
                   OR  
                   Amount claimed (in rand) = 4.67 \times n  
                   where n = number of kilometres travelled  
                   OR  
                   Amount claimed (in rand) = 467 \text{ cents} \times n  
                   where n = number of kilometres travelled  
                   \[\text{NOTE: No variable (symbol or words), NO marks}\]  
| 2.1.2 | Amount claimed (in rand)  
                   \[= 4.67 \times 1\,960 \]  
                   \[= 9\,153.20 \]  
                   \[\therefore \text{The amount claimed by Rodney was incorrect.} \]  
                   OR  
                   The rate of claim used = \[\frac{9\,430}{1\,960} = 4.8112...\]  
                   \[\text{(4.8112... is more than the correct rate of 4.67)}\]  
                   \[\therefore \text{The amount claimed by Rodney was incorrect.} \]  
                   OR  
                   Number of kilometres claimed = \[\frac{9\,430}{4.67} = 2019.27...\]  
                   \[\text{(2019.27... is more than the 1960 km travelled.)}\]  
                   \[\therefore \text{The amount claimed by Rodney was incorrect.} \]  
|      |          | 1A correct fuel tariff  
                   1A multiplying tariff in rand by number of kilometres travelled | 12.2.1 L3(2) |
|      |          | 1SF substitution in formula from Q 2.1.1  
                   1CA simplification | 12.2.1 L4(3) |
|      |          | 1CA conclusion  
                   OR  
                   1M concept  
                   1A calculated rate  
                   1CA conclusion  
                   OR  
                   1M concept  
                   1A number of km | (2) |
<p>|      |          | Correct conclusion only: 1 mark | (3) |</p>
<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
</table>
| 2.2.1 | Petrol cost (in rand) = $1960 \times 1,013 = 1 \, 985,48$  
     Maintenance cost (in rand) = $450 + 125 + 500 + 200 = 1 \, 275$  
     Monthly cost (in rand) = $1 \, 985,48 + 1 \, 275 = 3 \, 260,48$  
     OR  
     Monthly cost (in rand)  
     = $(450 + 125 + 500 + 200) + 1 \, 960 \times 1,013$  
     = $1 \, 275 + 1 \, 985,48$  
     = $3 \, 260,48$  | 1M/A petrol cost  
     1M/A maintenance  
     1CA monthly cost  
     OR  
     1M/A maintenance  
     1M/A petrol cost  
     1CA monthly cost | 12.1.1  
     L2  
     12.2.1  
     12.1.1  
     L2(3)  
     L3(3)  
     L4(3) |
| 2.2.2 | **Finding remaining amount using the 1,5/l vehicle: October**  
     Claim amount = $2994 \text{ cents} \times 1 \, 960 \text{ km}$  
     = $586 \, 824 \text{ cent}$  
     = $R5 \, 868,24$  
     Remaining amount = $R5 \, 868,24 - R3 \, 260,48$  | 1M multiplying the  
     tariff with distance  
     1CA claim amount  
     1M subtracting the  
     monthly cost (Q2.2.1) from a  
     calculated claim  
     amount  
     1CA remaining  
     amount | 12.2.1  
     L2(3)  
     L3(3)  
     L4(3) |
| | **Finding remaining amount using the 2,3/l vehicle: November**  
     Petrol cost (in rand) = $1960 \times 1,317 = 2 \, 581,31$  
     Maintenance cost (in rand) = $700 + 210 + 800 + 450 = 2 \, 160$  
     Monthly cost (in rand) = $2 \, 581,31 + 2 \, 160 = 4 \, 741,32$  
     Using CORRECT claim  
     amount:  
     Remaining amount  
     = $R9 \, 153,20 - R4 \, 741,32$  
     = $R4 \, 411,88$  
     Using RODNEY's  
     claim amount:  
     Remaining amount  
     = $R9 \, 430 - R4 \, 741,32$  
     = $R4 \, 688,68$  | 1M/A Petrol cost  
     1M/A maintenance  
     1CA monthly cost | 12.2.1  
     L2(3)  
     L3(3)  
     L4(3) |
| | :: Difference in  
     remaining amounts  
     = $R4 \, 411,88 - R2 \, 607,76$  
     = $R1 \, 804,12$  
     :: Difference in  
     remaining amounts  
     = $R4 \, 688,68 - R2 \, 607,76$  
     = $R2 \, 080,92$ | 1CA remaining  
     amount (Q2.1.2)  
     1CA difference  
     NPR except if  
     R2,99 is used then  
     max 8 marks | (9) |
## Ques 2.3

**Solution**

- Given:
  - \( i = 9\% \text{ pa} \)
  - \( n = 24 \text{ months} \)
  - \( A = \text{R104 753,89} \)

- Calculations:

  \[
  x = \frac{\text{R104 753,89} \times \frac{9\%}{12}}{\left[1 + \frac{9\%}{12}\right]^{24} - 1} \quad \checkmark \text{A}
  \]

  \[
  x = \frac{\text{R104 753,89} \times 0.09}{\left[1 + \frac{0.09}{12}\right]^{24} - 1} \quad \checkmark \text{SF} \checkmark \text{A}
  \]

  \[
  x = \frac{\text{R104 753,89} \times 0.0075}{\left[1 + \frac{0.09}{12}\right]^{24} - 1} \quad \checkmark \text{SF} \checkmark \text{A}
  \]

  \[
  x = \frac{\text{R104 753,89} \times 0.01}{\left(1 + 0.01\right)^{24} - 1} \quad \checkmark \text{SF} \checkmark \text{A}
  \]

- Results:

  \[
  x = \text{R4 000} \quad \checkmark \text{CA}
  \]

  \[
  x = \text{R4 000} \quad \checkmark \text{CA}
  \]

  \[
  x = \text{R4 000} \quad \checkmark \text{CA}
  \]

  \[
  x = \text{R3 883,59} \quad \checkmark \text{CA}
  \]

**Explanation**

1A interest rate per month

[Note: do not penalise if % sign is omitted but calculation is done correctly]

1SF substitution

1A number of months

1CA simplification

**AS**

12.1.3 L3
<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
</table>
| 2.4  | Tax(before rebate)  
✓A ✓M/A  
= R51 300 + 30% × (R315 054 – R250 000)  
= R51 300 + \(\frac{30}{100}\) × R65 054  
= R51 300 + R19 516,20  
= R70 816,20 ✓CA | 1A identifying correct tax interval  
1M/A finding amount above R250 000  
1CA tax amount | 12.1.3  
L2(3)  
L3(2) |
|      | Tax payable (after rebate)  
= R70 816,20 – R11 440,00 – R6 390 ✓M  
= R52 986,20 ✓CA | 1M subtracting both rebates from the tax amount.  
1CA simplification  
If rebates are subtracted before calculating the tax max 3 marks [If incorrect tax bracket used max 3 marks] |  
Correct answer only: full marks | (5) |

[26]
### QUESTION 3 [38 MARKS]

#### Ques Solution

| 3.1.1 | Total number of persons 20 years and older in 1996 is 21 251 533 ✓A ✓M |
|       | Total number of persons 20 years and older in 2001 is 25 472 770 ✓A |

∴ The increase in the total population from 1996 to 2001 is greater than the increase in the number of persons with no schooling. ✓ ✓O

**OR explanation with calculation**

Total number of persons 20 years and older in 1996 is 21 251 533 ✓A ✓M

| 3.1.1 | Total number of persons 20 years and older in 2001 is 25 472 770 ✓A |

Percentage growth of persons with no schooling in 2001

\[
\frac{4 567 498 - 4 055 646}{4 055 646} \times 100\% = 12,6207\ldots\%
\]

Percentage growth of persons 20 years and older in 2001

\[
\frac{25 472 770 - 21 251 533}{21 251 533} \times 100\% = 19,8632\ldots\%
\]

Percentage growth of persons 20 years and older was more than the percentage growth of people with no schooling. ✓O

| 3.1.2 | Total number 20 years and older in 2011 = 30 915 706 ✓A |

59,7% of population = 30 915 706

\[
\text{Total population} = \frac{30915706}{0.597} \approx 51 785 102,18 \approx 51 785 102 ✓CA
\]

Total **younger** than 20 years

\[
= 51 785 102 - 30 915 706 \quad \text{OR} \quad = 40,3\% \text{ of } 51 785 102
\]

\[
= 20 869 396 \quad \text{CA} \quad = 20 869 396,11 \approx 20 869 396 \quad \text{CA}
\]

**OR**
<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OR</strong></td>
<td>Total number 20 years and older in 2011 = 30 915 706 ✓A</td>
<td>1A total 20 years and older</td>
<td>12.4.4 L3</td>
</tr>
<tr>
<td></td>
<td>Total younger than 20 years</td>
<td>1M dividing by 59.7%</td>
<td>(4)</td>
</tr>
<tr>
<td></td>
<td>= 30 915 706 × 40.3% ✓M</td>
<td>1M multiplying by 40.3%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 20 869 396 ✓CA</td>
<td>1CA solution</td>
<td></td>
</tr>
<tr>
<td><strong>3.1.3</strong></td>
<td>Number of persons with Gr 12 in 2001 = 5 200 602</td>
<td>1A number with Gr 12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P(Grade 12) = 5 200 602 ✓A</td>
<td>1A denominator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= (\frac{5 200 602}{44 819 778}) ✓A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(\frac{2 600 301}{22 409 889}) (\frac{866 767}{7 469 963}) OR ✓CA</td>
<td>1CA simplifying</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11.6% OR ≈ 0.12 OR (\frac{1}{8.6}) ✓CA</td>
<td>Correct answer only: full marks</td>
<td>(3)</td>
</tr>
</tbody>
</table>
3.2.1

PERCENTAGE HIGHEST EDUCATION LEVEL

1 or 2 points plotted incorrectly max 5 marks
3 points plotted incorrectly max 4 marks
4 points plotted incorrectly max 3 marks
5 points plotted incorrectly max 2 marks
ICA joining all the points by means of a line
Penalty of one mark if graph is moved either left or right

(6)

Copyright reserved
<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
</table>
| 3.2.2 | ANY TWO possible trends:  
* From 1996 to 2011 there was an increase in the number of persons with Grade 12. ✔✔CA  
* From 1996 to 2011 there was an increase in the number of persons with Tertiary education. ✔✔CA  
* The percentage increase of persons with Grade 12 is higher than that of persons with Tertiary education. ✔✔CA  
* There are always more persons in Grade 12 than persons with Tertiary education. ✔✔CA | 2CA per trend  
2CA per trend  
(4) | 12.4.4 L4 |
| 3.3.1 | The percentages given represent the number of people with Grade 12 as a percentage of the number of people 20 years and older in each province and not nationally. ✔✔O  
OR  
Data is per province ✔✔O | 2O acceptable explanation | 12.4.4 L4 |
| 3.3.2 | The ascending order is ✔M/A  
19,8 ; 22,4 ; 22,7 ; 25,2 ; 26,8 ; 28,2 ; 29,0 ; 30,9 ; 34,4  
∴ **Free State** has the median percentage ✔CA  
OR  
The ascending order is ✔M/A  
EC; LP; NC; NW; FS; WC; MP; KZN; GP  
∴ **Free State** has the median percentage ✔CA | 1M/A arranging in ascending order  
1CA province  
(2) | 12.4.3 L3(2) L4(1) |
| 3.3.3 | ✔A  
Eastern Cape and Limpopo ✔A | 1A EC  
1A LP | 12.4.3 L4 |
| 3.3.4(a) | The percentages do not add up to 100% ✔J  
OR  
The degrees to not add up to 360° ✔J  
OR  
There are too many sectors ✔J | 2J explanation | 12.4.2 L4 |
<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3.4(b)</td>
<td>The histogram cannot be used since the data is qualitative. <strong>J</strong> OR The data is not continuous <strong>J</strong> OR Data is not given in class intervals <strong>J</strong></td>
<td>2J explanation</td>
<td>12.4.2 L4</td>
</tr>
<tr>
<td>3.4.1</td>
<td>Northern Cape; Gauteng</td>
<td>1A Northern Cape 1A Gauteng Limpopo can also be included</td>
<td>12.3.3 L4</td>
</tr>
<tr>
<td>3.4.2</td>
<td>TS ≈ 7 mm <strong>A</strong></td>
<td>1A measurement [accept answers from 5 mm to 8 mm] 1M using scale 1CA simplifying 1C converting to km [accept answers from 50 km to 80 km]<strong>A</strong></td>
<td>12.3.3 L4</td>
</tr>
<tr>
<td></td>
<td>Actual distance ≈ 7 mm × 10 000 000 <strong>M</strong></td>
<td>1C converting scale to km</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 70 000 000 mm <strong>CA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 70 km <strong>C</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scale is 1 mm : 10 000 000 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>∴ 1 mm : 10 km <strong>C</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TS ≈ 7 mm <strong>A</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Actual distance ≈ 7 mm × 10 km/mm <strong>M</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 70 km <strong>CA</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Correct answer only: full marks

(4)
### QUESTION 4 [34 MARKS]

<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
</table>
| 4.1.1 | Perimeter = $5 \times 270 \text{ mm}$  
$= 1350 \text{ mm}$  
**OR**  
Perimeter = $(270 + 270 + 270 + 270 + 270) \text{ mm}$  
$= 1350 \text{ mm}$ | 1M/A multiplying side by 5 *only*  
1A simplification  
**OR**  
1M/A adding 5 sides  
1A simplification  
Correct answer only: full marks | 12.3.1 L2 |
| 4.1.2 | Area of rectangle = length $\times$ breadth  
$= 360 \text{ mm} \times 270 \text{ mm}$  
$= 0,36 \text{ m} \times 0,27 \text{ m}$  
$= 0,0972 \text{ m}^2$  
Surface area of front pentagon (in $\text{m}^2$) = $0,13 - 0,017 - 0,013$  
$= 0,1 \text{ m}^2$  
Surface area of rear pentagon (in $\text{m}^2$) = $0,13 - 0,013$  
$= 0,117 \text{ m}^2$  
Total surface area (in $\text{m}^2$) = $5 \times 0,0972 + 0,1 + 0,117$  
$= 0,703 \text{ m}^2$  
**OR**  
Total surface area  
$= 2 \times$ pentagons $+ 5 \times$ rectangles $-$ (letter opening $+ 2 \times$ newspaper openings)  
$= 2 \times (0,13 \text{ m}^2 + 5 \times 360 \text{ mm} \times 270 \text{ mm} - (0,017 \text{ m}^2 + 2 \times 0,013 \text{ m}^2))$  
$= 0,26 \text{ m}^2 + 5 \times 0,36 \text{ m} \times 0,27 \text{ m} - 0,043 \text{ m}^2$  
$= 0,26 \text{ m}^2 + 0,486 \text{ m}^2 - 0,043 \text{ m}^2$  
$= 0,703 \text{ m}^2$ | 1M subtracting the openings  
1M five rectangles  
1CA simplification using all the faces  
Correct answer only: full marks | 12.3.1 L3 |
### Ques 4.1.3

Area of a newspaper opening = \( \pi \times r^2 \)

- \( 0,013 \, \text{m}^2 = 3,14 \times r^2 \)  \( \checkmark \) SF
- \( 0,00414... \, \text{m}^2 = r^2 \)  \( \checkmark \) C
- \( 41,401... \, \text{cm}^2 = r^2 \)  \( \checkmark \) CA

\[ r \approx 6,434... \, \text{cm} \]

The radius of the newspaper is 6 cm  \( \checkmark \) A

\[ \therefore \text{The newspaper will fit.} \]  \( \checkmark \) CA

**OR**

Newspaper radius (in cm) = \( \frac{12}{2} = 6 \)  \( \checkmark \) A

Area of a circle = \( \pi \times r^2 \)

- \( 3,14 \times (6 \, \text{cm})^2 \)  \( \checkmark \) SF
- \( 3,14 \times (0,06 \, \text{m})^2 \)  \( \checkmark \) C
- \( \approx 0,0113 \, \text{m}^2 \)  \( \checkmark \) CA

\[ \therefore \text{The newspaper will fit.} \]  \( \checkmark \) CA

### Ques 4.2.1

\( \checkmark \) A  \( \checkmark \) M  \( \checkmark \) M

Cost = R30,50 + R4,50 \times \text{mass of parcel greater than 1kg}

**OR**

\( \checkmark \) A  \( \checkmark \) M

Cost = R30,50 + R4,50 \times a  \( \checkmark \) M

where \( a \) is the mass of a parcel greater than 1 kg

**OR**

\( \checkmark \) A  \( \checkmark \) M  \( \checkmark \) M

Cost = R30,50 + R4,50 \times (\text{mass of parcel} – 1)

### Ques 4.2.2

\( \checkmark \) SF

A = R30,50 + R4,50 \times (2,5 – 1) = R37,25  \( \checkmark \) CA

Additional mass in kg = \( \frac{R70,55 – R30,50}{R4,50} \)  \( \checkmark \) M

\[ = 8,9 \]  \( \checkmark \) CA

\[ \therefore B = 1 + 8,9 = 9,9 \]  \( \checkmark \) CA

**OR**

\( \checkmark \) SF

A = R30,50 + R4,50 \times (2,5 – 1) = R37,25  \( \checkmark \) CA

\[ R70,55 = R30,50 + R4,50 \times a \]  \( \checkmark \) SF

\[ R40,05 = R4,50 \times a \]  \( \checkmark \) S

\[ 8,9 = a \]  \( \checkmark \) CA

\[ \therefore B = 1 + 8,9 = 9,9 \]  \( \checkmark \) CA

### Explanation

1SF substitution  
1C conversion  
1CA value of \( r \)  
1A radius of newspaper  
1CA conclusion

**OR**

1A radius

1SF substitution  
1C converting  
1CA simplification  
1CA conclusion

**Answer only 1 mark**

### Ques 4.2.1 (continued)

\( \checkmark \) A  \( \checkmark \) M  \( \checkmark \) M

\[ \text{NOTE No variable in second term (symbol or words), max 1 mark} \]

1A basic rate R30,50  
1M the rate for more than 1 kg  
1M multiplied with the mass greater than 1 kg

**Answer only: full marks**
4.2.3

THE COST OF AN ORDINARY PARCEL PER MASS

1A plotting points (0,5; 30,50) and (1; 30,5)
1A plotting point (3; 39,50)
1A drawing horizontal line with open circle between 0 and 0,5
1A drawing horizontal line between 0,5 to 1
1CA drawing the line from 1 to 3
1A continue line beyond (3; 39,50) with correct slope

4.3.1

Walmer Health Centre ✓ ✓ ✓ A

2A correct place across Main Road
1A place on left
1If DIY Store 2 marks

12.2.2 L3
12.3.4 L3
<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3.2</td>
<td>The length of the vacant land on the map $\approx 16$ mm  &lt;br&gt; The width of the land on the map $\approx 13$ mm</td>
<td>1A measurements  &lt;br&gt; (accept lengths from 15 mm to 19 mm; Accept widths from 12 mm to 14 mm)</td>
<td>L3 (1) L4 (3)</td>
</tr>
<tr>
<td></td>
<td>Area of vacant land on the map $= 1,6 \text{ cm} \times 1,3 \text{ cm}$  $= 2,08 \text{ cm}^2$ ✔CA</td>
<td>1CA area of vacant land</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of sites $= \frac{2,08 \text{ cm}^2}{0,15 \text{ cm}^2}$  $= 13,866$  $\approx 13$ ✔CA</td>
<td>1CA number of sites</td>
<td></td>
</tr>
<tr>
<td></td>
<td>She can only get 13 sites on the vacant land</td>
<td>1CA verification</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\therefore$ Her claim is <strong>not valid</strong> ✔CA</td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>OR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The length of the vacant land on the map $\approx 16$ mm ✔A  &lt;br&gt; The width of the land on the map $\approx 13$ mm</td>
<td>1A measurements  &lt;br&gt; (accept lengths from 15 mm to 19 mm; Accept widths from 12 mm to 14 mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Area of vacant land on the map $= 1,6 \text{ cm} \times 1,3 \text{ cm}$  $= 2,08 \text{ cm}^2$ ✔CA</td>
<td>1CA area of vacant land</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Area covered by the sites $= 14 \times 0,15 \text{ cm}^2$  $= 2,1 \text{ cm}^2$ ✔CA</td>
<td>1CA area of the sites</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This area is more than the area on the map</td>
<td>1CA verification</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\therefore$ Her claim is <strong>not valid</strong> ✔CA</td>
<td>Answer only:  &lt;br&gt; NO marks</td>
<td>(4)</td>
</tr>
</tbody>
</table>
**QUESTION 5 [28 MARKS]**

<table>
<thead>
<tr>
<th>Ques</th>
<th>Solution</th>
<th>Explanation</th>
<th>AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1.1</td>
<td>Schools and industries are closed therefore more people book their drivers test in December OR With schools etc. closed there are less cars on the road during holidays, so less chance to make mistakes and fail the test.</td>
<td>2O explanation</td>
<td>12.4.4 L4</td>
</tr>
<tr>
<td>5.1.2</td>
<td>Minimum = 16 and maximum = 60 OR Range = 44</td>
<td>1M identifying min and max values (accept minimum values of 14 to 18) 1CA range (accept values from 42 to 46) Correct answer only: full marks</td>
<td>12.4.3 L2</td>
</tr>
<tr>
<td>5.1.3</td>
<td>Toni did not arrange the bars in calendar/chronological order, hence creating the impression that there was an increase. Example: January the number of learners was 52 and February was 24 OR any other suitable example</td>
<td>2J explanation 1CA example</td>
<td>12.4.6 L4</td>
</tr>
<tr>
<td>5.2.1</td>
<td>No change in the cost after 15 hours. OR Constant cost from 15 hours onwards. OR For 15 hours or more of driving lessons there is a fixed rate of R1 500.</td>
<td>2J correct description</td>
<td>12.2.3 L4</td>
</tr>
<tr>
<td>Ques</td>
<td>Solution</td>
<td>Explanation</td>
<td>AS</td>
</tr>
<tr>
<td>----------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------</td>
<td>----------</td>
</tr>
<tr>
<td>5.2.2(a)</td>
<td><strong>No payment for zero lessons.</strong> √ √ J</td>
<td></td>
<td>12.2.3 L4</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Payment will only be made once the driving lessons start.</strong> √ √ J</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.2.2(b)</td>
<td>• <strong>A learner driver pays a basic amount of R600 for the first two hours.</strong> √ A</td>
<td></td>
<td>12.2.3 L4</td>
</tr>
<tr>
<td></td>
<td>• <strong>Then R50 per hour for every additional hour.</strong> √ A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.2.3</td>
<td><strong>At point Q, both Options cost the same at the same time.</strong> √ O √ O</td>
<td></td>
<td>12.2.1 L4</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>There were 10 hours of driving that cost R1 000 for both Options.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.2.4(a)</td>
<td><strong>With Option B Zaheera will get 14 hours of driving lessons.</strong> √ A √ J</td>
<td>1A correct option</td>
<td>12.2.3 L4</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>1J justification</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Zaheera must choose Option B to get 2 more hours of driving lessons than in Option A.</strong> √ A √ J</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.2.4(b)</td>
<td><strong>Toni would benefit more from Option A.</strong> √ A √ J</td>
<td>1A correct option</td>
<td>12.2.3 L4</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>1J justification</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Option A, she will have 2 hours to train someone else.</strong> √ A √ J</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.2.5</td>
<td><strong>Option A is cheaper for Zaheera.</strong> √ A √ J</td>
<td>1A correct option</td>
<td>12.2.3 L4</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>2J justification</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>She must choose Option A she will pay R600 for the driving lessons.</strong>√ A √ J</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ques</td>
<td>Solution</td>
<td>Explanation</td>
<td>AS</td>
</tr>
<tr>
<td>------</td>
<td>----------</td>
<td>-------------</td>
<td>----</td>
</tr>
</tbody>
</table>
| 5.2.6 | **Option A:**  
Cost for 30 hours = R1 500 | ✓A | 1A cost option A |
|     | **Option B:**  
Cost for 30 hours = R600 + (R50 per hour × 28 hours)  
= R600 + R1 400  
= R2 000  ✓ CA | ✓A ✓A | 1A basic rate  
1A rate multiplied by hours  
1CA cost |
|     | ∴ Difference in cost = R2 000 – R1 500  
= R500  ✓ CA | ✓CA | 1CA difference in cost |
|     | **Option A:**  
Cost for 30 hours = R1 500 | ✓A | 1A cost option A |
|     | **Option B:**  
Cost for 30 hours  
= R600 + (R100 per two hours × 14 two hour periods)  
= R600 + R1 400  
= R2 000  ✓ CA | ✓A ✓A | 1A basic rate  
1A rate multiplied by period  
1CA cost |
|     | ∴ Difference in cost = R2 000 – R1 500  
= R500  ✓ CA | ✓CA | 1CA difference in cost |
|     | **Option B:**  
For 22 hours it costs R1 600  
It is increasing with R100 every 2 hours  ✓A | ✓A | 1A rate  
1A extra cost  
1CA cost |
|     | ∴ Extra cost = 4 × R100 = R400  ✓A | ✓A | 1CA cost |
|     | Cost for 30 hours = R1 600 + R400  
= R2 000  ✓ CA | ✓CA | 1CA difference in cost |
|     | **Option A:**  
Cost for 30 hours = R1 500 | ✓A | 1A cost option A |
|     | ∴ Difference in cost = R2 000 – R1 500  
= R500  ✓ CA | ✓CA | 1CA difference in cost |
|     | **Correct answer only: full marks** | | |
|      | | (5) | |

Total: 150