# TABLE OF CONTENTS

## LEARNER NOTES

<table>
<thead>
<tr>
<th>SESSION</th>
<th>TOPIC</th>
<th>PAGE</th>
</tr>
</thead>
</table>
| 5       | 1. Consolidation exercise: volume, surface area, scale and misleading statistics  
          2. Consolidation exercise – ratio, percentage, best buys, data handling, equations, pie charts. | 3 - 9  |
|         |                                                                       | 10 - 16|
| 6       | 1. Consolidation exercise: calculator work, finance, tables, percentages, volume, income tax  
          2. Consolidation exercise: exchange rate, data handling, graphs, percentage, ratio. | 17 - 24|
|         |                                                                       | 24 - 30|
SECTION A: TYPICAL EXAM QUESTIONS

QUESTION 1:  46 minutes

Below is the floor plan of a shop. This floor plan is not drawn to scale. The entrance door is 12 feet wide and the door to the office is 3 feet wide. Both doors reach from floor to ceiling. The plastered walls are 9 feet high.

1 m = 3.281 feet
\[ \pi = 3.14 \]
A. Flooring

1.1 Calculate the total floor area – in metric units – of the front shop. (6)
1.2 Calculate the total floor area – in metric units – of the management offices. (3)
1.3 To account for possible broken tiles or floorboards you need to increase each of the floor areas by ten percent. What will the new floor areas be? Show all workings. (4)
1.4 You decide to investigate the costs involved of different types of floor covering. You decide to lay a different type of floor cover in the front of the shop to the management offices. To get quotes to do this, you can visit any shop or make use of printed adverts.
   1.4.1 Obtain two quotes for two different types of floor covering for the front of the shop. Submit/ attach your quotes.
   1.4.2 Obtain two quotes for two different types of floor covering for the management offices. Submit/ attach your quotes.
1.5 Use each of the quotes/ adverts to determine the cost of covering each area. Show all your calculations. (6)
1.6 Based on your answers in 1.4 decide which type of flooring you think is best to use in each area. Give reasons for your choices. (2)

B. Walls

1.7 Use the information at the beginning of this task to determine the total wall area – in metric units – of the inside of your shop. (9)
1.8 In order to work out how much paint you will need to paint the walls add 5% to the area calculated above to account for possible wasted paint. (2)
1.9 Determine what colour or colours you would like to paint the front of your shop. Visit a local hardware or paint store to find a colour sample and the cost of the paint. Attach the sample colour card to your work. Give reasons for your choice of colour(s). (4)
1.10 If paint comes in 1ℓ, 2ℓ, 5ℓ or 10ℓ containers, calculate the cost involved in purchasing paint for your shop. Which size paint containers would be the most cost effective to buy. Give reasons for your answer. (6)
QUESTION 2:  9 minutes
http://www.solarnavigator.net/sport/sport_images/Netball_court_layout_and_dimensions.png

2.1. Each of the thirds of the netball court measures 5.08 cm on the diagram. Calculate the scale used to draw this diagram.  (4)

2.2. The furthest a ball can be thrown is shown by the line from A to B. Use the Theorem of Pythagoras to calculate the distance, in metres, the ball is thrown. Round off your answer to THREE decimal places.  (5)
SECTION B: HOMEWORK

QUESTION 1: 15 minutes

One of the highlights at any child's birthday party is the cake. Little Josie, turning 5, wants a ladybug theme. Her mother finds two designs for a ladybug cake as illustrated in the pictures below.

Design 1 is made from a circular cake which must be baked in a baking pan with a 28cm diameter. If baked properly, it is expected to rise to a height of 8cm.

Design 2 on the other hand is made from a square cake with sides 20cm by 20cm. This cake once baked, reaches a height of 12cm.

1.1 Determine the volume of:
   i) the circular cake (to the nearest cm$^3$) if the volume of a cylinder is calculated as follows:
   \[
   \text{Volume} = \pi \times r^2 \times h_t
   \]
   where: \(r\) = the radius of the cake and \(h_t\) = the height of the cake

   ii) the square cake if the formula for calculating a rectangular prism is as follows:
   \[
   \text{Volume} = l \times b \times h_t
   \]
   Where: \(l\) = the length of the cake
   \(b\) = the breadth of the cake
   \(h_t\) = height of the cake

1.2 The cakes do not have the same volume.
   i) Which cake design has the greatest volume?
   ii) How much greater (as a percentage) is the one cake than the other?

1.3 i) The cake, Design 2, is cut into pieces so that each piece has a volume of 64cm$^3$. How many whole pieces of cake can be cut from this cake?
   iii) If there are 25 children at the party, determine how many pieces of cake each child can have.
Mr Magengenene must mark the lines on the four netball courts using lime. He uses the following recipe for the mixture

**White Wash (Lime Mixture)**

**Ingredients**
- 3 large coffee cans of hydrated lime (about 12 cups)
- 1 pound or 1 small coffee can of salt (about 4 cups)
- 2 gallons of water

**Method**
1. Mix in a large bucket, a five gallon paint bucket is ideal.
2. When you mix this together, mix a little lime/salt, then a little water, then a little lime, etc. If you just dump it all together you will not be able to stir the mixture

He is given the following information:
- 1 cup (16 tablespoons) = 237 ml
- 1 pint (16 fluid ounces) = 473.2 ml
- 8 pints = 1 gallon

2.1 Calculate how many litres of each of the following are needed to make the mixture:
   - Hydrated lime
   - Water

2.2 If you use a 5 gallon bucket as suggested in the recipe, how much ‘space’ in litres is not filled with mixture?

2.3 One bucket of lime mixture marks 110 m of line on the field. Calculate how many buckets of lime are needed to mark 4 netball courts.
SECTION C: SOLUTIONS AND HINTS TO SECTION A

QUESTION 1: 46 minutes

A. Flooring

1.1. Front shop- rectangle
   Length = $45 \times 0.305 = 13.725 \text{ m}$
   Breadth = $18 \times 0.305 = 5.49 \text{ m}$
   Area = $5.49 \times 13.725 = 75.35 \text{ m}^2$

   $2 \times$ quarter circle, i.e. half circle:
   Radius = 18 feet = 5.49 m
   Area = $0.5 \times \pi \times (5.49 \text{ m})^2 = 47.34 \text{ m}^2$

   Total Area:
   $75.35 + 47.34 = 122.69 \text{ m}^2$ (6)

1.2. Management Offices- rectangle
   Length: $45 \times 0.305 = 13.725 \text{ m}$
   Width: $21 \times 0.305 = 6.405 \text{ m}$
   Area: $13.725 \times 6.405 = 87.91 \text{ m}^2$ (3)

1.3. Shop: $122.69 \text{ m}^2 \times 110 \div 100 = 134.96 \text{ m}^2 = 135 \text{ m}^2$
   Office: $87.91 \text{ m}^2 \times 110 \div 100 = 96.701 \text{ m}^2 = 96.7 \text{ m}^2$ (4)

1.4. Getting Quotes
   1.4.1. Two valid quotes ✓ ✓ (2)
   OR One valid quote submitted / or two that are not entirely clear ✓ (1)
   OR No quotes submitted (0)
   1.4.2. Two valid quotes ✓ ✓ (2)
   OR One valid quote submitted / or two that are not entirely clear ✓ (1)
   OR No quotes submitted (0)

1.5. Calculation for each cost (Answer in Rands for both ✓ ✓)
   Shop:
   Cost per square meter of quote 1 multiplied by 135. ✓
   Cost per square meter of quote 2 multiplied by 135. ✓
   Offices:
   Cost per square meter of quote 1 multiplied by 96.7 ✓
   Cost per square meter of quote 2 multiplied by 96.7 ✓ (6)

1.6. 2 marks for logical reasoning. ✓ ✓ (2)
B. Walls

1.7. Back wall:
   Length = (2 × 18) + 45 – 3 = 78 ft
   78 × 0,305 = 23,79 m
   Height = 9 × 0,305 = 2,745 ft
   Area = 23,79 × 2,745 = 65,30 m²

Front wall:
   Length = 45 - 12 = 33 ft
   33 × 0,305 = 10,065 m
   Area = 10,065 × 2,745 = 27,63 m²

Total Area = 65,30 m² + 27,63 m² = 92,93 m² = 93 m²

1.8. Area to be painted + 5%
   92,93 m² × 105 ÷ 100 = 97,58 m² = 98 m²

1.9. Reasoning +
   Two valid quotes (with sample) submitted. ✓✓
   One valid quote (with sample) submitted or two that are not entirely clear. ✓ (1)
   No quotes submitted. (0)

1.10. e.g. 1 litre covers 5 square meters and costs R21,50
   98 m² ÷ 5 m² = 19,6 litres = 20 litres
   20 litres × R21,50 = R430,00
   Motivation for option. ✓✓ (It may be that they did not choose cheapest option) (6)

QUESTION 2: 9 minutes

http://www.solarnavigator.net/sport/sport_images/Netball_court_layout_and_dimensions.png

2.1  5,08 cm : 10,16 m
   5,08 cm : 1016 cm
   5,08 cm : 1016 cm
   5,08 cm : 5,08 cm
   1 cm : 200 cm
   The scale is 1 : 200

2.2  \( AB^2 = (15,25 \text{ m})^2 + (20,32 \text{ m})^2 \sqrt{645,4649.m^2} \)
   \( AB = 645,4649.m^2 \)
   \( AB = 25,40600.m \)
   \( AB = 25,406 \text{ m} \)
SECTION A: TYPICAL EXAM QUESTIONS

QUESTION 1: 29 minutes

1.1. How many grams are there in 8.67 kg?  (1)
1.2. Convert 35 g to kilograms.  (1)
1.3. Study the recipe on the left:

   1.3.1. Work out the amounts needed for 12 people
   ______ × 400g cans unsweetened pie apples (1)
   ______5ml ground cinnamon (1)
   ______60ml brown sugar (1)

   1.3.2. How many eggs are needed to make the cake for 24 people? (1)

   1.3.3. How much flour is needed to make the cake for 10 people? (1)

   1.4. To make this cake really tasty, Angela Day recommends that the recipe requires the apple mixture and the syrup be in the ratio 9:7. Together they measure 800ml.

   1.4.1. What fraction of the cake is apple mixture? (2)

   1.4.2. How many millilitres of syrup is needed to make this cake really tasty? (3)

   1.4.3. What percentage of the 800 ml does the apple mixture form? Round your answer off to one decimal place. (4)

1.5. The supermarket sells flour in four sizes 500g @ R3.49; 5kg @ R24.99; 1kg @ R5.99 and 12.5kg @ R49.99.

   1.5.1. Which size flour is the best buy? (5)

   1.5.2. THE HYPER-BARGAIN STORE does not sell 10 kg flour. Which is the cheapest way to buy 10 Kg? What will it cost? (3)

1.6. What fraction of a litre is the
   1.6.1. Vanilla essence? (2)
   1.6.2. Verjuice in the syrup? (2)
QUESTION 2:  26 minutes

Below are the results for the very important 1994 National Elections. There were 400 seats in the National Assembly.

TABLE 1.1– *Independent Electoral Commission (adapted from www.elections.org.za)*

<table>
<thead>
<tr>
<th>Party</th>
<th>E.CAPE</th>
<th>E. TVL</th>
<th>KWAZULU NATAL</th>
<th>N CAPE</th>
<th>N TVL</th>
<th>NTH WEST</th>
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2.1. What was the total number of valid votes in the 1994 elections? (1)
2.2. How many possible parties could a voter choose to vote from? (1)
2.3. In South Africa, the votes of the National Elections determine how many seats a party gets in the National Assembly. The National Assembly has 400 seats. In order to work out the number of seats a party will be allotted, the Independent Electoral Commission uses a quota system. One of the possible quotas to use to determine this is the Droop Quota. The Droop quota is calculated as the integer part (i.e. rounded off to the nearest whole number) of the following formula:

\[
\text{Number of votes required to get a seat} = \left( \frac{\text{Total Number Of Valid Votes}}{1 + \text{Total Number Of Seats}} \right) + 1
\]  

(3)

2.4. Which party will have the most seats?  
(2) 

2.5. What percentage of the votes did the top three parties get?  
(6) 

2.6. Why does the election result not represent the people of a nation if few people vote?  
(2) 

2.7. Which party is the most unpopular? Why do you say so?  
(2) 

2.8. How many votes did the IFP get in the Orange Free State?  
(2) 

2.9. For the Freedom Party (FP), calculate the  

2.9.1. mean number of votes  
(3) 

2.9.2. median number of votes  
(2) 

2.9.3. range of votes  
(2) 

[26]

SECTION B: HOMEWORK

QUESTION 1: 21 minutes

Results for National Elections 2009

<table>
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<tr>
<th>Party</th>
<th>Votes</th>
<th>Percentage of votes</th>
<th>Seats</th>
<th>Percentage of seats</th>
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<td>A PARTY</td>
<td>2 847</td>
<td>0,02%</td>
<td>0</td>
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<tr>
<td>ACDP</td>
<td>142 658</td>
<td>0,81%</td>
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<td>0</td>
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</table>

(c) Gauteng Department of Education, 2013
1.1. What is the value of x in the table for the 2009 elections? (1)

1.2. The Droop quota is calculated as the integer part (i.e. rounded off to the nearest whole number) of the following formula:

1.2.1. Use the formula below to calculate the Droop Quota for the 2009 elections. (3)

\[ \text{Number of votes required to get a seat} = \left( \frac{\text{Total Number Of Valid Votes}}{1 + \text{Total Number Of Seats}} \right) + 1 \]

1.2.2. What does the Droop Quota in 1.2.1 mean? (2)

1.3. How many seats did the IFP get in the 2009 election? (1)

1.4. What percentage of the vote did the PAC get in 2009? (1)

1.5. Calculate the percentage change in the total number of valid votes from 1994 to 2009. (4)

1.6. How many people did not vote in 2009? (2)

1.7. What percentage of registered voters cast valid votes in the 2009 election? (3)

1.8. During the counting process, what is the probability of:

1.8.1. Counting a vote for the PAM? (2)

1.8.2. Counting no votes for the DA? (2)

QUESTION 2: 16 minutes

Purpose of visit stated by foreign travellers, 2001 – 2005 (in thousands)
(Source: Statistics South Africa 2006)

<table>
<thead>
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<th>Purpose of visit</th>
<th>2001</th>
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<th>2003</th>
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<th>2005</th>
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<td>157</td>
<td>156</td>
<td>168</td>
<td>164</td>
</tr>
<tr>
<td>Work</td>
<td>62</td>
<td>58</td>
<td>72</td>
<td>83</td>
<td>94</td>
</tr>
<tr>
<td>Contract work</td>
<td>58</td>
<td>62</td>
<td>63</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>Study</td>
<td>77</td>
<td>94</td>
<td>123</td>
<td>137</td>
<td>133</td>
</tr>
<tr>
<td>Unspecified</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>5 908</strong></td>
<td><strong>6 550</strong></td>
<td><strong>6 640</strong></td>
<td><strong>6 815</strong></td>
<td><strong>7 518</strong></td>
</tr>
</tbody>
</table>
2.1. What proportion (percentage) of the 2001 travellers came to South Africa to study? (2)
2.2. Calculate the percentage change in foreign travellers to South Africa from 2003 to 2005? (4)
2.3. What trend, in the totals, do you notice? (2)
2.4. Study the pie chart below and answer the questions that follow.

![Pie chart showing the percentage of foreign travellers studying in South Africa from 2001 to 2005]

2.4.1. What percentage of the travellers came to South Africa in 2004 to study? (2)
2.4.2. Show how the 14% in 2001 was calculated. (3)
2.4.3. Calculate the angle represented by the 2003 sector. (3)

SECTION C: SOLUTIONS AND HINTS TO SECTION A

QUESTION 1: 29 minutes

1.1. 8 670 g ✓ 
1.2. 0,035 kg ✓ 
1.3. Study the recipe
   1.3.1. 3 × 400g cans ✓
          15 ml cinnamon ✓
          180 ml brown sugar ✓
   1.3.2. 12 eggs ✓
   1.3.3. 1 250 g flour / 1,250 kg ✓
1.4. The recipe requires the apple mixture and the syrup be in the ratio 9:7.

1.4.1. \(\frac{9}{16} \times 800 \text{ ml} \) = apple mixture \(\checkmark\) \(\checkmark\) (2)

1.4.2. \(\frac{7}{16} \times 800 \text{ ml} \) = 350 ml \(\checkmark\) (3)

1.4.3. \(\frac{9}{16} \times 100\% \) = 56,25 \(\checkmark\) = 56,25% \(\checkmark\) = 56,3% \(\checkmark\) (4)

1.5. The supermarket sells flour

1.5.1. Which size flour is the best buy?

<table>
<thead>
<tr>
<th>FLOUR BET</th>
<th>BUY</th>
<th>1 kg</th>
<th>OR</th>
<th>500 g</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 g =R3,49</td>
<td>R6,98</td>
<td>R3,49 (\checkmark)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 kg = R5,99</td>
<td>R5,99</td>
<td>R3,00 (\checkmark)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 kg = R24,99</td>
<td>R5,00</td>
<td>R2,50 (\checkmark)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12,5 kg =49,99</td>
<td>R4,00</td>
<td>R2,00 (\checkmark)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(\therefore 12,5 \text{ kg is the best buy} \checkmark\) (5)

1.5.2. \(2 \times 10 \text{ kg} \) \(\checkmark\) = \(2 \times R24,99 \checkmark\) = R49,98 \(\checkmark\) (3)

1.6. What fraction of a litre is the

1.6.1. \(\frac{5}{1000} \checkmark\) \(\checkmark\) = \(\frac{1}{200} \) \(\checkmark\) (3)

1.6.2. \(\frac{125}{1000} \checkmark\) = \(\frac{1}{8} \) \(\checkmark\) (2)

[29]

QUESTION 2: 26 minutes

2.1. 19 533 498 \(\checkmark\) (1)

2.2. 19 \(\checkmark\) (1)

2.3. \(\frac{19533498}{400+1} +1 \checkmark = 48712,96 \checkmark \approx 48713 \checkmark\) (3)

2.4. The ANC \(\checkmark\) \(\checkmark\) (2)
2.5. The NP received
\[
\frac{3983690}{19533498} \times 100% = 20.39%
\]
\[
= 20.1% \checkmark
\]

The IFP received
\[
\frac{2058294}{19533498} \times 100% = 10.54%
\]
\[
= 10.5% \checkmark
\]

The ANC received
\[
\frac{12237655}{19533498} \times 100% = 62.65% = 62.7% \checkmark
\]

2.6. If few people vote, one cannot tell if the people who did vote actually represent the entire population. Any other valid reason. \checkmark \checkmark

2.7. LUSAP. \checkmark It had the least number of votes. \checkmark

2.8. 8446 \checkmark \checkmark

2.9. For the Freedom Party (FP)

2.9.1. Mean = \[
\frac{17663}{9} \checkmark = 1962.55
\]
\[
\approx 1962,6 \text{ votes} \checkmark
\]

2.9.2. 162 310 500 519 527 750 3347 4704 6844 \checkmark ordering
\[
\text{Median} = 527 \text{ votes} \checkmark
\]

2.9.3. Range of votes = 6844 – 162 \checkmark
\[
= 6682 \text{ votes} \checkmark
\]
SESSION 6

TOPIC 1: CONSOLIDATION EXERCISE: CALCULATOR WORK, FINANCE, TABLES, PERCENTAGES, VOLUME, INCOME TAX

Learner Note: These questions are common in exams. You need practice in answering mixed questions.

SECTION A: TYPICAL EXAM QUESTIONS

**QUESTION 1: 19 minutes** *(Taken from DoE Feb-Mar Exam 2009 Paper 1)*
Do the following calculations: (Show ALL calculations in full.)

1.11 Write 47% as a common fraction

1.12 Write \( \frac{78}{120} \) as a decimal fraction

1.13 Simplify: \( \frac{1}{3} \times (3)^3 = \sqrt{64} \)

1.14 Calculate 14% VAT on R24 650.00

1.15 Convert R1 500 into Euros (€). Use the conversion R1 = €0,11.

1.16 Calculate the number of 30g portions of jam that can be obtained from a 450g tin.

1.17 Simplify: 1,2 m + (23,5 m × 5) − 4,7 m

1.18 Increase R1 250,00 by 24%.

1.19 Determine the cost of 6 bus tickets using the formula:

\[
\text{Cost of bus ticket} = \text{number of bus tickets} \times R12,15
\]

**QUESTION 2: 7 minutes** *(Taken from DoE Feb-Mar Exam 2009 Paper 1)*
Jabulani sells money boxes to earn some extra money. It costs him R25,50 to make one money box. He intends selling each money box for R30,00.

2.1 Calculate the percentage profit Jabulani will make on each money box.

2.2 How many money boxes will Jabulani need to sell in order to make a profit of at least R400.00?
QUESTION 3: 17 minutes  
(Taken from DoE Feb-Mar Exam 2009 Paper 2)

Annabel started working for a construction company on 3 July 2007. She earned a net income of R144 000 per annum without any bonus.

She set aside R8 400 per month for her monthly expenses, and each month set aside 90% of the balance towards a deposit for a car.

**TABLE 3: Annabel’s monthly expenditure before buying a car.**

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>MONTHLY EXPENDITURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent and electricity</td>
<td>R2 850</td>
</tr>
<tr>
<td>Groceries</td>
<td>R1 500</td>
</tr>
<tr>
<td>Student loan repayment</td>
<td>R900</td>
</tr>
<tr>
<td>Public transport</td>
<td>R700</td>
</tr>
<tr>
<td>Clothing</td>
<td>R350</td>
</tr>
<tr>
<td>Household insurance</td>
<td>R420</td>
</tr>
<tr>
<td>Entertainment</td>
<td>R350</td>
</tr>
<tr>
<td>Life insurance</td>
<td>R300</td>
</tr>
<tr>
<td>Other</td>
<td>R1 030</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>R8 400</strong></td>
</tr>
</tbody>
</table>

3.1. Calculate Annabel’s net monthly salary.  
(2)

3.2. How much did Annabel save towards the deposit for a car each month? 
(3)

3.3. Annabel was advised to invest some of her monthly savings in a special monthly savings account that pays more interest. She thus invested R3 000 of her monthly savings each month in this account. This special savings account paid an interest rate of 10,8% per annum, compounded monthly.

Use the formula below to calculate the total amount she will have for her deposit if she saves monthly for 11 months where

\[ F = \frac{x (1 + i)^n - 1}{i} \]

- **F** = total amount received;  
- **x** = monthly amount invested;  
- **i** = monthly interest rate;  
- **n** = number of months for which the money was invested  

(5)

3.4. On 1 July 2008, Annabel receives a 10% salary increase. Calculate Annabel’s new monthly net salary.  
(4)

3.5. On 1 July 2008, Annabel buys a car. She finds that she has to budget R3 900 per month for the car to cover the cost of petrol, repayments, insurance and maintenance. However, she no longer has to pay for public transport.

Determine her new total monthly expenditure.  
(3)
The Royal Bafokeng Stadium is one of the stadiums that was used during the 2010 Soccer World Cup. It has a seating capacity of 42 000. The stadium was used for five first-round matches and one second-round match. Seating categories are based on the position of the seat in the stadium. Category 1 seats have the best view of the soccer field.

Mr Buyapi attended all the 2010 Soccer World Cup matches played at the Royal Bafokeng Stadium. He purchased Category 1 tickets for all of these matches.

The table below gives the ticket prices for South African residents for the various types of matches and categories of seating.

<table>
<thead>
<tr>
<th>TYPE OF MATCH</th>
<th>CATEGORIES OF SEATING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Opening</td>
<td>3 150</td>
</tr>
<tr>
<td>First Round</td>
<td>1 120</td>
</tr>
<tr>
<td>Second round</td>
<td>1 400</td>
</tr>
<tr>
<td>Quarter-final</td>
<td>2 100</td>
</tr>
<tr>
<td>Semi-finals</td>
<td>4 200</td>
</tr>
<tr>
<td>3rd/4th place</td>
<td>2 100</td>
</tr>
<tr>
<td>Final</td>
<td>6 300</td>
</tr>
</tbody>
</table>

** Wheelchair-bound spectators pay Category 4 prices.

4.1. Calculate the total cost of his tickets. (3)

4.2. Mr Buyapi wants to purchase all his tickets on 1 January 2010. He started saving for the tickets on 1 November 2008. He decided to deposit an equal amount at the beginning of each month into a special Target Save account at an interest rate of 7% per annum, compounded monthly.

He uses the formula:  
\[ x = \frac{F \times i}{\left(1 + i\right)^n - 1} \]

where:
- \( x \) = equal amounts to be deposited each month
- \( F \) = total cost of tickets
- \( i \) = monthly interest rate
- \( n \) = number of monthly deposits

4.2.1. Calculate the percentage monthly interest rate, rounded off to TWO decimal places. (2)

4.2.2. Determine the number of monthly deposits to be made by Mr Buyapi. (1)

4.2.3. Calculate the equal amount that Mr Buyapi should deposit each month so that he would have enough money to purchase his tickets on 1 January 2010. (4)
SECTION B: HOMEWORK

QUESTION 1: 16 minutes  
(Taken from DoE November Exam 2008 Paper 2)

1.1 Increase R1 250.00 by 24%. (3)

1.2 Thandi washes her dishes by hand three times daily in two identical cylindrical basins. She uses one basin for washing the dishes and the other for rinsing the dishes. Each basin has a radius of 30 cm and a depth of 40 cm, as shown in the diagram below.

\[
\text{Volume of a cylindrical basin} = \pi \times (\text{radius})^2 \times \text{height}, \text{using } \pi = 3.14
\]

1.2.1 Calculate the volume of one cylindrical basin in cm\(^3\). (2)

1.2.2 Thandi fills each basin to half its capacity whenever she washes or rinses the dishes. Calculate how much water (in litres) she will use daily to wash and rinse the dishes by hand. \(1000 \text{ cm}^3 = 1 \text{ l}\) (6)

1.2.3 A manufacturer of a dishwasher claims that their dishwasher uses nine times less water in comparison to washing the same number of dishes by hand.
   a) How much water would this dishwasher use to wash Thandi’s dishes daily? (2)
   b) Is the claim of the manufacturer realistic? Justify your answer by giving a reason(s). (3)
QUESTION 2: 14 minutes

Use the tax table below to answer the questions that follow.

INCOME TAX FOR INDIVIDUALS – 1 Mar 2010 / 28 Feb 2011

<table>
<thead>
<tr>
<th>Tax Bracket</th>
<th>Taxable Income (R)</th>
<th>Rate of tax for years of assessment ending 28 February 2011 (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 – 140 000</td>
<td>18% of each R1</td>
</tr>
<tr>
<td>2</td>
<td>140 001 - 221 000</td>
<td>25 200 + (25% of amount above 140 000)</td>
</tr>
<tr>
<td>3</td>
<td>221 001 - 305 000</td>
<td>45 450 + (30% of amount above 221 000)</td>
</tr>
<tr>
<td>4</td>
<td>305 001 - 431 000</td>
<td>70 650 + (35% of amount above 305 000)</td>
</tr>
<tr>
<td>5</td>
<td>431 001 - 552 000</td>
<td>114 750 + (38% of amount above 431 000)</td>
</tr>
<tr>
<td>6</td>
<td>552 001 and above</td>
<td>160 730 + (40% of amount above 552 000)</td>
</tr>
</tbody>
</table>

2.1. How much tax would a person earning R140 000 pay? (2)

2.2. How much tax, a month, would a person earning R230 000 pay? (7)

2.3. Annabel and her friend are discussing salaries. Annabel tells her friend that she earns a gross salary of R178 940 per annum (rounded off). Looking at the pay slip, her friend says that she has been over-taxed. Determine whether her friend is correct using the table below and calculations. Annabel falls into the second tax bracket. (5)

SECTION C: SOLUTIONS AND HINTS TO SECTION A

QUESTION 1: 19 minutes

(Taken from DoE Feb-Mar Exam 2009 Paper 1)

1.1. $47\% = \frac{47}{100}$ ✓ (1)

1.2. $\frac{78 \div 6}{120 \div 6} = \frac{13}{20} = 0,65$ ✓ (2)

1.3. $\frac{1}{3} \times (3)^3 + \sqrt{64} = \frac{1}{3} \times 27 + 8 = 9 + 8 = 17$ ✓ (3)

1.4. VAT = 14% of R24 650.00

$= \frac{14}{100} \times R24 650.00 = R3 451.00$ ✓ (2)

OR $0,14 \times R24 650.00 = R3 451.00$ ✓
1.5 \( R1 = €0,11 \)
\[
R1 \ 500 = 1 \ 500 \times €0,11 \checkmark
\]
\[
= € \ 165 \checkmark
\]
\( \text{(2)} \)

1.6 Number of portions of jam = \( \frac{450g}{30g} \) \( \checkmark \) = 15 portions \( \checkmark \)  
\( \text{(2)} \)

1.7 \( 1,2 \ \text{m} + (23,5 \ \text{m} \times 5) - 4,7 \ \text{m} \)
\[
= 1,2 \ \text{m} + 117,5 \ \text{m} \checkmark - 4,7 \ \text{m} \\
= 114 \ \text{m} \checkmark
\]
\( \text{(2)} \)

1.8 \( R1250,00 + (24\% \text{ of } R1250,00) \checkmark \)
\[
= R1250,00 + R300,00 \checkmark \\
= R1550 \checkmark
\]
\( \text{(3)} \)

1.9 Cost = 6 tickets \times R12,15 \checkmark
\[
\text{Cost} = R72,90 \checkmark
\]
\( \text{(2)} \)

QUESTION 2: 7 minutes  
(Taken from DoE Feb-Mar Exam 2009 Paper 1)

2.1 Percentage profit = \( \frac{R30,00 - R25,50}{R25,50} \times 100\% \checkmark \checkmark \)
\[
= \frac{R4,50}{R25,50} \times 100\% \checkmark \\
= 17,65\% \checkmark
\]
\( \text{(4)} \)

2.2 Number of boxes = \( \frac{R400,00}{R4,50} \checkmark \)
\[
= 88,89 \checkmark \\
\approx 89 \text{ boxes} \checkmark
\]
\( \text{(3)} \)

\text{OR} \quad 100 \text{ boxes } \rightarrow R450,00 \checkmark \\
10 \text{ boxes } \rightarrow R45,00 \\
90 \text{ boxes } \rightarrow R405,00 \checkmark \\
\therefore R405,00 - R4,50 = R400,50

\therefore \text{He needs to sell 89 boxes} \checkmark
3.1 Net monthly salary = \( \frac{R144 000}{12} \)  
= R12 000,00

3.2 Amount remaining each month = R12 000 – R8 400 
= R3 600

90% of R3 600 = 0,9 x R3 600
= R3 240

3.3 \( X = R3000 \) 
\( i = 10,8\% \text{ p.a.} = \frac{0,108}{12} \) 
\( n = 11 \text{ months} \) 
\( F = ? \)

\[
F = \frac{X \left( (1 + \frac{i}{n})^n - 1 \right)}{i} \\
F = \frac{3000 \left( \left(1 + \frac{0,108}{12} \right)^{11} - 1 \right)}{0,108} \\
F = \frac{3000 \left( \left(1 + 0,009 \right)^{11} - 1 \right)}{0,008} \\
F = R34 \ 525,83
\]

3.4 Increase = 10% of R12 000
\( \frac{10}{100} \times R12 000 \)
= R1 200

New monthly salary = R12 000 + R12 00
= R13 200

OR
New monthly salary = 110% of R12 00
\( \frac{110}{100} \times R12 000 \)
= R13 200

OR
Annual increase = 10% of R144 000
\( \frac{10}{100} \times R144 000 \)
= R14 400

Annual new salary = R144 000 + R14 400
= R158 400

New monthly salary = \( \frac{R158 000}{12} \)
= R13 200

3.5 New monthly expenses = R8 400 + R3 900 - R700
= R11 600
QUESTION 4: 10 minutes  
(Taken from DoE November Exam 2009 Paper 2)

4.1 Total cost \( = (5 \times R1\,120) + (1 \times R1\,400) \) 
\( = R7\,000 \)  

4.2 Target Save

4.2.1 \( i = 7\% = \frac{7\%}{12} \) per month = 0.583333..%  

4.2.2 14 months  

4.2.3 
\( x = \frac{R7\,000 \times 0.0058}{(1 + 0.0058)^{14} - 1} \)  
\( x = R\,481,4225.. \)  
\( \therefore \) He must save R 481,42  

SESSION 6

TOPIC 2: CONSOLIDATION EXERCISE: EXCHANGE RATE, DATA HANDLING, 
GRAPHS, PERCENTAGE, RATIO.

Learner Note: These questions are common in exams. You can never get enough practice.

SECTION A: TYPICAL EXAM QUESTIONS

QUESTION 1: 2 minutes
Convert R1650 into euros (€). Use the conversion rate of R1 = €0,11.  

QUESTION 2: 15 minutes  
(Taken from ML (NCS) Grade 12 Exemplar 2008 Paper 2)
Tuberculosis (TB) is a lung disease found all over the world. The table on the following page is an extract from the world Health Organisation (WHO) report of 2004.
2.1. How many people were estimated to have TB in Europe in 2004? (1)

2.2. Which region had the highest number of cases in total? (1)

2.3. What is the range of the infection incidence per 100 000 of the population? (2)

2.4. Which region had the highest proportion of its people infected with TB? Explain how you know this from the table. (2)

2.5. Complete the sentence: 1 in every _____ people was/were infected with TB in 2004? (3)

2.6. The infection rate in the Americas was 41% per 100 000. How many cases would you estimate for a single South American country which had a population of 2 250 000 people? (3)

2.7. If there were a global reduction of 10% in the number of cases of TB by the end of 2005, how many cases would there have been that year? (3)

**QUESTION 3: 11 minutes**

(Taken from DoE Feb-Mar Exam 2008 Paper 1)

Jane participated in a sponsored 20 km walk to raise funds for Aids orphans. The organiser encouraged the walkers to have a fifteen-minute rest during the walk. The graph showing the distance covered by Jane against the time she takes is given on the following page.
3.1. At what time did the walk start?  
3.2. How many kilometres did Jane walk during the first hour?  
3.3. How far had Jane walked by 10:00?  
3.4. How long did Jane take to walk the first 9km?  
3.5. After how many hours of walking did Jane rest?  
3.6. At approximately what time did Jane finish the walk?
GAUTENG DEPARTMENT OF EDUCATION
SENIOR SECONDARY INTERVENTION PROGRAMME

MATHEMATICAL LITERACY GRADE 12 SESSION 6 (LEARNER NOTES)

QUESTION 4: 13 minutes

(Taken from DoE Feb-Mar 2009 Paper 1)

Learners were invited to enter a national essay-writing competition. The 70 winners attended a Youth Forum in Johannesburg.

A survey was done to find out how many winners came from each province. The results are given in the table alongside.

<table>
<thead>
<tr>
<th>PROVINCE</th>
<th>NUMBER OF WINNERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Cape</td>
<td>8</td>
</tr>
<tr>
<td>Free State</td>
<td>6</td>
</tr>
<tr>
<td>Gauteng</td>
<td>10</td>
</tr>
<tr>
<td>KwaZulu-Natal</td>
<td>11</td>
</tr>
<tr>
<td>Limpopo</td>
<td>8</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>7</td>
</tr>
<tr>
<td>Northern Cape</td>
<td>5</td>
</tr>
<tr>
<td>North West</td>
<td>6</td>
</tr>
<tr>
<td>Western Cape</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>70</strong></td>
</tr>
</tbody>
</table>

4.1. What percentages of the winners came from Mpumalanga? (2)

4.2. Calculate the ratio of the number of winners from Gauteng to the number of winners from Northern Cape. Give your answer in simplified form. (2)

4.3. Suppose one of the winners is chosen randomly. What is the probability that the learner is from:
   a) The Eastern Cape (2)
   b) South Africa (2)

4.4. Draw a bar graph to represent the data in the table (5)

QUESTION 5: 10 minutes

(Taken from DoE Feb-Mar 2009 Paper 1)

Mrs Lurie emphasised at the conference that the recycling of paper contributes to the conservation of trees. Trees are essential to remove carbon dioxide from the atmosphere.

A South African delegate at the conference reported that during 2005, 2 144 000 tons of paper was used in South Africa and 935 000 tons of this paper was recycled.

5.1. Write down the ratio of the mass of paper recycled to the total mass of paper consumed in South Africa. Give the ratio in simplified form. (2)

5.2. Research has shown that paper produced from ONE ton of recycled paper is equivalent to the paper produced from 17 trees. How many trees were saved by recycling paper in South Africa during 2005? (2)
5.3. Research has also shown that, on average, South Africans recycle 43% of the paper used annually. Suppose 2 560 000 tons of paper are used in the year 2010. Predict, by means of calculation, the number of tons of this paper that would be recycled. 

5.4. At the same conference, the principal of Rethabile High School reported on their glass-recycling project. The learners of the school agreed to bring all empty 1,25 l returnable cool drink bottles to the school.

The bottling company promised to pay the following for the bottles returned to them:
- R3,00 per bottle for the first 200 bottles
- R3,50 per bottle for the next 200 bottles
- R4,00 per bottle for any number of bottles more than 400

The school collected 650 bottles. Determine how much money the school raised by using the following formula:

\[
\text{Amount raised in Rand} = (\text{first 200 bottles} \times \text{R3,00}) + (\text{second 200 bottles} \times \text{R3,50}) + (\text{number of bottles more than 400} \times \text{R4,00})
\]

**SECTION B: HOMEWORK**

**QUESTION 1:** 7 minutes  
(Taken from DoE Nov. Exam 2009 Paper 1)

52 learners wrote the Grade 11 Geography examination. The age (in years) of a sample of 15 of these learners is as follows:

| 16 | 16 | 17 | 17 | 17 | 17 | 18 | 18 | 19 | 19 | 19 | 20 | 22 |

1.1. What age in the sample is the mode? 
1.2. Determine the median age of the sample of learners.
1.3. Calculate the mean age of the sample of learners.

**QUESTION 2:** 14 minutes

The table below shows the ages of learners at Siphiso Small Holding School. Study it and answer the questions that follow:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Number of learners</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 3</td>
<td>16</td>
</tr>
<tr>
<td>4 - 6</td>
<td>18</td>
</tr>
<tr>
<td>7 - 9</td>
<td>52</td>
</tr>
<tr>
<td>10 - 12</td>
<td>48</td>
</tr>
<tr>
<td>13 - 15</td>
<td>42</td>
</tr>
<tr>
<td>16 - 18</td>
<td>22</td>
</tr>
<tr>
<td>19 - 21</td>
<td>2</td>
</tr>
</tbody>
</table>
2.1. How many learners are there at Siphiso Small Holding School? (1)
2.2. How many learners are younger than 7 years? (1)
2.3. What percentage of the learners is older than 15 years? (3)
2.4. What does this tell you about the learners matriculating? (1)
2.5. What do you think happens to the other 88% of learners? (1)
2.6. How many learners are there in the 20\textsuperscript{th} percentile? (3)
2.7. What is the age of a learner at the 67\textsuperscript{th} percentile? (4)

QUESTION 3: 4 minutes

Lionel wrote two Maths Literacy tests out of 20 this term, and produced the graphs below to show his parents.

3.1. Discuss how he has manipulated EACH graph. (3)
3.2. Which graph would he choose to make his parents think highly of him? (1)

![Graph A](image1)

![Graph B](image2)

QUESTION 4: 6 minutes (Taken from DoE Nov Exam 2009 Paper 2)

All the members of the debating club at Mount Frere High are in Grades 10, 11 or 12. The number of learners belonging to the debating club is given in the table below:

<table>
<thead>
<tr>
<th></th>
<th>Grade 10</th>
<th>Grade 11</th>
<th>Grade 12</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls</td>
<td>33</td>
<td>77</td>
<td>0</td>
<td>110</td>
</tr>
<tr>
<td>Boys</td>
<td>132</td>
<td>0</td>
<td>60</td>
<td>192</td>
</tr>
<tr>
<td>TOTAL</td>
<td>165</td>
<td>77</td>
<td>60</td>
<td>302</td>
</tr>
</tbody>
</table>

Use the table to determine the probability of randomly choosing a member of the debating club who is:

4.1. A boy in Grade 12 (3)
4.2. A learner who is not in Grade 10 (3)
SECTION C: SOLUTIONS AND HINTS TO SECTION A

QUESTION 1
R1 = €0,11
R1 \( \times 650 \times €0,11 \) ✓
= € 181,50 ✓

[2]

QUESTION 2
2.1 445 000 people ✓
2.2 South East Asia ✓
2.3 41 to 356 ✓ per 100 000 ✓
2.4 Africa because it has the highest rate per 100 000 ✓
2.5 \( \frac{100 000}{140} \) ✓ = 714 ✓
2.6 \( \frac{2 250 000}{100 000} = 22,5 \) ✓
\( 22,5 \times 41 = 922,5 \) ✓

anywhere between 900 and 950 people ✓

(3)

2.7 \( \frac{8 918 000 \times 10}{100} \) ✓
= 891 800 ✓

\( 918 000 – 891 800 = 8 026 20 \) cases ✓

(3)

[15]

QUESTION 3
3.1 0:700 (7am) ✓
3.2 6km ✓
3.3 16.5km ✓
3.4 She had walked 9km by 8.30 ✓
Time taken = 08.30 – 07.00
= 1,5hrs ✓
3.5 She had walked for 09.00 – 07.00 ✓
= 2hrs ✓
3.6 She finished just before 10.30 ✓

OR
She finished at approximately 10:28 (any answer after 10:15 and before 10:30)

[11]