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| GRADE 12 MATHEMATICAL LITERACY PAPER 2 | |
| DATE 27 July 2016 | TIME 3 Hours |
| EXAMINER Cluster | MODERATOR Y Fourie |

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|--------------|--|-----------------------|--|
| Name: | | Maths Teacher: | |
|--------------|--|-----------------------|--|

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of:
 - 13 pages and 4 questions.
 - an ANSWER SHEET of 2 pages
 - an APPENDIX of 1 page with 1 diagram
 Please check that your paper is complete.
2. Answer all the questions..
3. An approved (non-programmable) calculator may be used.
4. All the necessary working details must be clearly shown in order to justify marks.
5. Units of measurement must be included where applicable.
6. Round off appropriately according to context, unless otherwise stated.
7. It is in your own interest to write legibly and to present your work neatly.
8. Maps and diagrams are not necessarily drawn to scale, unless stated otherwise

FOR EXAMINERS USE ONLY:

| QUESTION | MARKS ALLOCATED | ACTUAL MARK | SIGNATURE |
|--------------|-----------------|-------------|-----------|
| 1 | 52 | | |
| 2 | 41 | | |
| 3 | 24 | | |
| 4 | 33 | | |
| TOTAL | 150 | | |

QUESTION 1

- 1.1 Rodney is a public servant who owns two vehicles with engine capacities of 1,5 l and 2,3 l respectively. The government has two vehicle subsidy schemes for distances travelled while on official work duty.

| | |
|--|---|
| <p>Scheme A:</p> <p>The vehicles are subsidised* and maintained by the government (employer).</p> <p>Employees are reimbursed (paid back) per kilometre travelled for petrol cost only.</p> | <p>Scheme B:</p> <p>The vehicles are owned and paid for by the employee who also has to maintain the vehicle.</p> <p>Employees are reimbursed (paid back) per kilometre travelled at a higher rate than that of Scheme A.</p> |
|--|---|

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

The following table shows the tariffs used for claiming for travel in 2015:

| Engine capacity (in litres) | Claim tariff (in cents per km) | |
|-----------------------------|--------------------------------|-----------------|
| | Scheme A | Scheme B |
| Up to 1,250 | 77,9 | 236,2 |
| 1,251 to 1,550 | 88,8 | 299,4 |
| 1,551 to 1,750 | 96,7 | 328,6 |
| 1,751 to 1,950 | 108,3 | 384,4 |
| 1,951 to 2,150 | 111,9 | 397,5 |
| 2,151 to 2,500 | 130,3 | 467,0 |
| 2,501 to 3,500 | 137,1 | 578,6 |
| Greater than 3,500 | 160,6 | 660,8 |

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

- 1.1.1 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 Rands) = (2)

The comparison of the monthly maintenance and petrol costs per vehicle, is summarised in the table below:

| Engine capacity | Maintenance | | | Petrol (R / km) |
|-----------------|------------------|----------------|---------------|-----------------|
| | Service (c / km) | Tyres (c / km) | Insurance (R) | |
| 1,5 l | 29,17 | 25,20 | 500 | 1,013 |
| 2,3 l | 35,80 | 31,70 | 800 | 1,317 |

- 1.1.2 Calculate Rodney's total petrol cost for a month if he uses his 2,3 l vehicle. (2)
- 1.1.3 Calculate Rodney's total cost (all inclusive) for a month whilst using his 2,3 l vehicle. (5)
- 1.1.4 If Rodney is given the above table expanded to compare a number of different engine capacity vehicles, would it always be necessary to do calculations in order to determine which vehicle is the cheapest to run? Justify your answer. (2)
- 1.1.5 In November 2015, Rodney, using **Scheme B**, claimed an amount of R7 600,00 for travelling 1 650 km using his 2,3 l vehicle while performing official duties. Verify, showing ALL calculations, whether Rodney claimed the correct amount. (3)
- 1.1.6 Determine the percentage of Rodney's travel claim that is left after he covers the cost of his vehicle's maintenance and petrol. (3)
- 1.1.7 Comparing Scheme A and Scheme B, why has the government offered a higher rate per kilometre for reimbursement on Scheme B? (2)
- 1.1.8 Taking into consideration there is portion of Rodney's claim that is not used towards the vehicle's maintenance and petrol, what, in your opinion, is the intention for the extra money? In other words, what would this money be allocated towards? (2)

- 1.2 The cost of electricity has increased dramatically over the past two years. Individual households are charged according to the number of kilowatt-hours (kWh) of electricity used. Households using more electricity are charged at a higher rate per kWh than those using less electricity.

Use the table below to answer the questions that follow:

**The average monthly increase in the cost of electricity (excluding VAT)
between 2014 and 2015**

| | Average monthly usage (kWh) | | | | |
|---|-----------------------------|--------|----------|----------|-----------|
| | 50 | 150 | 600 | 1 000 | 1 500 |
| Amount payable in 2014 | R27,35 | R85,83 | R393,67 | R728,63 | R1 147,33 |
| Amount payable in 2015 | R28,83 | R94,99 | R467,43 | R888,83 | C |
| Increase between 2014 and 2015 | R1,48 | R9,16 | A | | |
| Percentage increase between 2014 and 2015 | 5,39% | 10,67% | 18,74% | B | 23,38% |

- 1.2.1 During 2015 the Ngubane family used an average of 600 kWh per month while the Khembo family used an average of 150 kWh per month. Use the table to calculate the difference in cost per kWh that the Ngubane and Khembo families had to pay. (5)
- 1.2.2 The difference in the cost of electricity can be viewed by some consumers as fair and by others as unfair. Give a suitable reason for each of these views. (2)
- 1.2.3 Calculate the missing values, **A – C** from the table showing all working out. (6)
- 1.2.4 Mrs Khan used an average of 1 000 kWh of electricity per month. Calculate the total annual increase, including VAT, of her electricity bill between 2014 and 2015. (4)

- 1.3 Sibusiso has saved up enough money to buy himself a popular PC Game. He looks on the internet to research where he can download the game and how much it will cost to download. He finds four websites and summarises the information he needs as follows:

| Country | Currency | Cost (in local currency) | Exchange rate (ZAR) |
|-------------|----------|--------------------------|---------------------|
| America | \$ | 49,99 | 15,5656 |
| England | £ | 35,99 | 23,1397 |
| Germany | € | 59,95 | 17,8627 |
| South Korea | ₩ (Won) | 49 950,00 | 0,0134 |

- 1.3.1 Which country's currency is the strongest against the Rand? Justify your answer. (2)
- 1.3.2 By just looking at the exchange rate, where does the PC game appear to be the cheapest? Justify your answer. (2)
- 1.3.3 How much will he pay, in Rand, if he buys and downloads the game from the American site? (2)
- 1.3.4 The average inflation rate has been 5,8% for a number of years. What can Sibusiso expect to pay for this type of game in two years' time if he buys the game from the same American site. (4)
- 1.3.5 Sibusiso is curious about the exchange rate between the Euro (€) and the Pound (£). He uses the information in the table above to calculate the exchange rate to be 1€ : £0,800.
Verify, showing ALL calculations, whether he is correct. Furthermore, state what error he has made. (4)

QUESTION 2

Peggy is the owner of the Tasty Sandwich Company. She supplies the following information pamphlet to her packers as shown in Annexure 1.

The dimensions of the sandwich container are 5% greater than the dimensions of the sandwich.

- 2.1 Calculate the length of the diagonal side of the sandwich **container** using the Theorem of Pythagoras. Round to the nearest centimetre. (5)

$$\text{Hypotenuse}^2 = (\text{side 1})^2 + (\text{side 2})^2$$

- 2.2 The ratio of the length of the company logo sticker to the length of the diagonal side of the container is 2 : 3. Calculate the length of the sticker (in cm), using the rounded value from Question 2.1. (2)

- 2.3 Peggy is having a debate with her son Mike about the method for calculating the volume of the sandwich container. Mike says that the volume of the container can be determined by calculating the volume of the sandwich and then increasing this answer by 5%. Peggy disagrees and calculates the volume (using her own method) to be 420 cm^3 , rounded to the nearest cm^3 .

- 2.3.1 Use Mike's method to determine his answer for the volume of the container. Show all calculations. (4)

$$\text{Volume} = \text{area of base} \times \text{height}$$

(Hint: the height must be the same from every vertex)

- 2.3.2 Do Peggy and Mike arrive at the same answer. Provide a reason for your observations. (2)

- 2.4 The sandwich containers need to be packed into a rectangular carton which is $94,6 \text{ cm}$ by 58 cm by 36 cm . The sandwiches will be packed upright, as indicated in Peggy's instructions above.

- 2.4.1 Determine the maximum number of sandwich containers that can be packed into **one** carton. Clearly show **all** working out.

Note: remember the dimensions of the sandwich **container** (10)

2.5 In order to make the carton, the manufacturer buys cardboard at R0,40 per m^2 .

2.5.1 How much cardboard, **to the nearest cm^2** , is needed to make one carton? (4)

2.5.2 What does it cost to manufacture one carton? (3)

The Den Coffee Shop orders cartons of sandwiches from Peggy with the following criteria:

Type of bread: 70% low GI; 5% white bread; 25% brown bread

Filling: 40% chicken mayonnaise; 50% cheese and tomato;
10% ham and tomato

2.6 Draw a fully labelled complete tree diagram to show all the types of sandwiches available for The Den Coffee Shop. (6)

Use your tree diagram to answer the following two questions:

2.7 When Peggy opens the carton of sandwiches to unpack them, what is the probability that the first container she picks up is a sandwich that is:

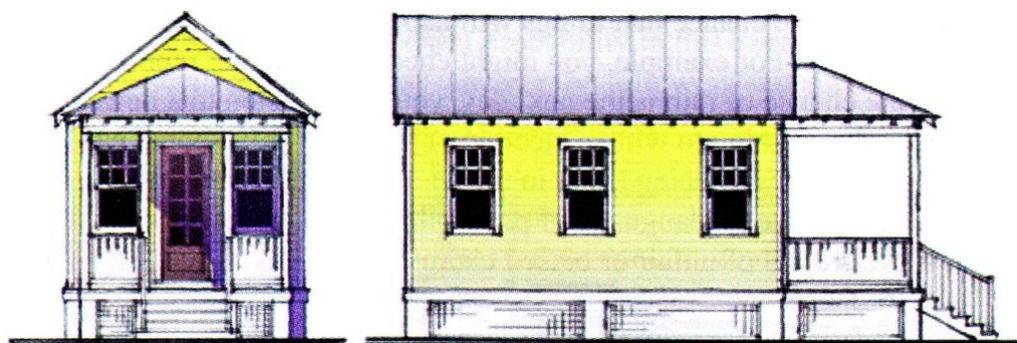
2.7.1 made from brown bread? Write your answer as a fraction (2)

2.7.2 made from low GI bread with tomato in the filling? (3)

[41]

QUESTION 3

Study the elevation and layout plans for this house.



KEY (eg)
 5' = 5 foot =ft
 5'' = 5 inch(es) = in

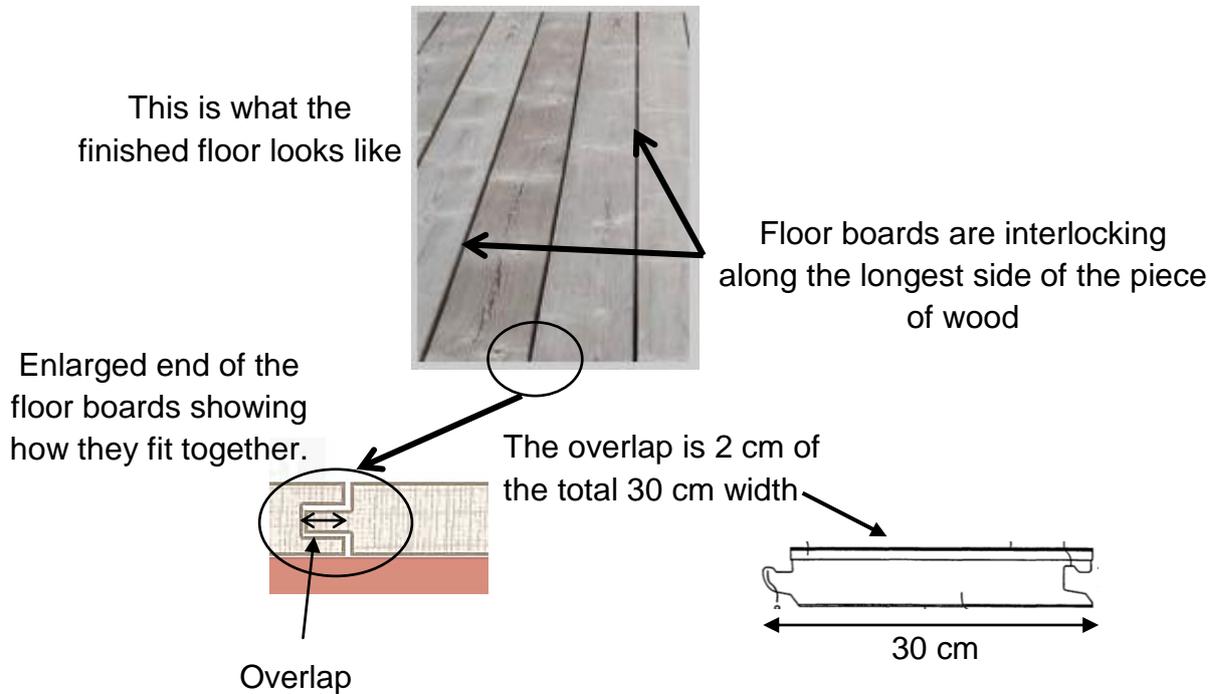
- 3.1 In your opinion, what size family lives in this house? Justify your answer. (2)
- 3.2 How thick (in feet) are the walls of this house? Explain or show by calculation how you arrived at your answer. (3)
- 3.3 Show that the length of the house, including the porch is 28'11" (28 ft 11 in) (2)
- 3.4 The length of the porch is 8' (feet) which is equivalent to 2,4 m. Use the factor table shown below, to convert the breadth of the porch to metres. Round your answer off to 2 decimal places. (5)

Table 1.1: A factor table to convert Imperial units to metric units

| US – Metric Conversions | | |
|-------------------------|-------------|--------------|
| From: | To: | Multiply by: |
| Inches | Centimetres | 2.540 |
| Feet | Metres | 0.304 |
| Miles | Kilometres | 1.609 |
| Yards | Metres | 0.914 |

3.5 The wooden floor boards in the entire house as well as the porch are to be replaced with new ones. Each floor board is 30 cm wide by 2 m long. The owner wants to begin by redoing the porch (measurements as per Question 3.4)

The floor boards are interlocking when put in – as seen below:



3.5.1 The owner wants to know which way he should lay the floor boards in the porch in order to minimise wastage. The two options are illustrated below:



Option 1: vertically along length



Option 2: horizontally along length

Without taking the overlap into consideration, help the owner decide on which option to use. Show **ALL** your working. (8)

3.5.2 The owner realises he must account for the overlap of floor boards. Calculate how many more floor boards he would need to buy (in comparison to Question 3.5.1) if he makes use of Option 1. (4)

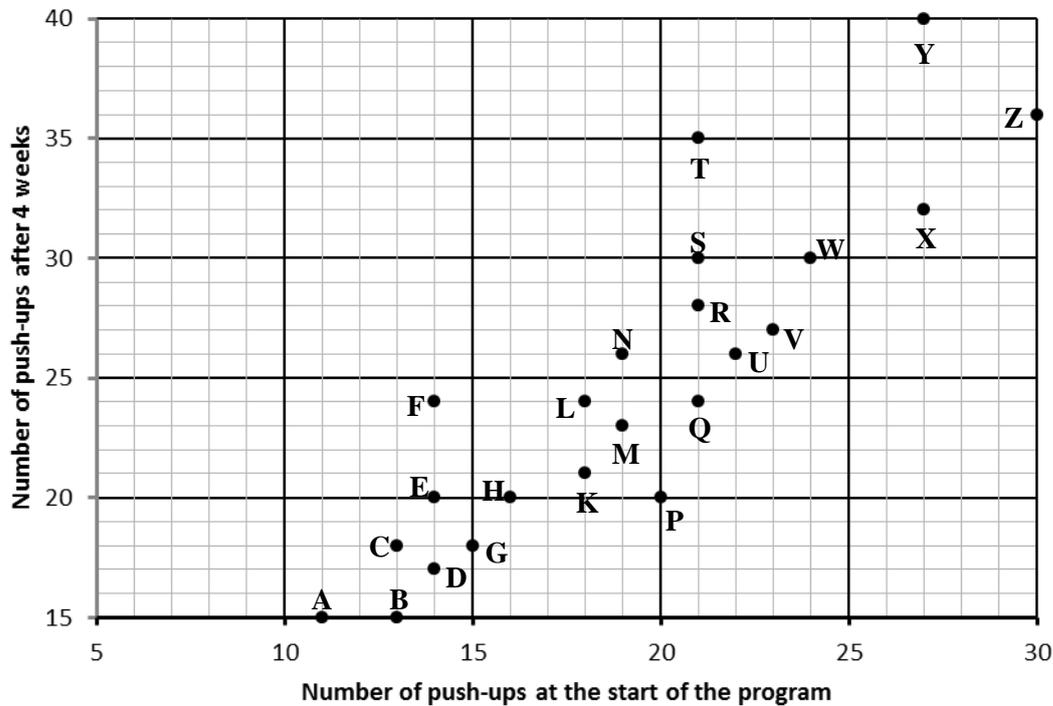
QUESTION 4

4.1 A fitness trainer introduces a new fitness programme at a school. Part of the program involved doing as many push-ups as possible in 30 seconds. The data collected from a group of learners is organised in the following frequency table:

| Number of push-ups | Frequency |
|---------------------------|------------------|
| 10 – 12 | 1 |
| 13 – 15 | 6 |
| 16 – 18 | 3 |
| 19 – 21 | 7 |
| 22 – 24 | 3 |
| 25 – 27 | 2 |
| 28 – 30 | 1 |
| Total | 23 |

- 4.1.1 Represent the grouped data in a suitable graph on the **ANSWER SHEET** provided. (6)
- 4.1.2 Explain why it is not possible to calculate the mean, mode or median. (2)
- 4.1.3 What is the modal class for this set of data and what does it mean? (2)
- 4.1.4 What percentage of the group of learners managed more than 21 push-ups in 30 seconds? (4)

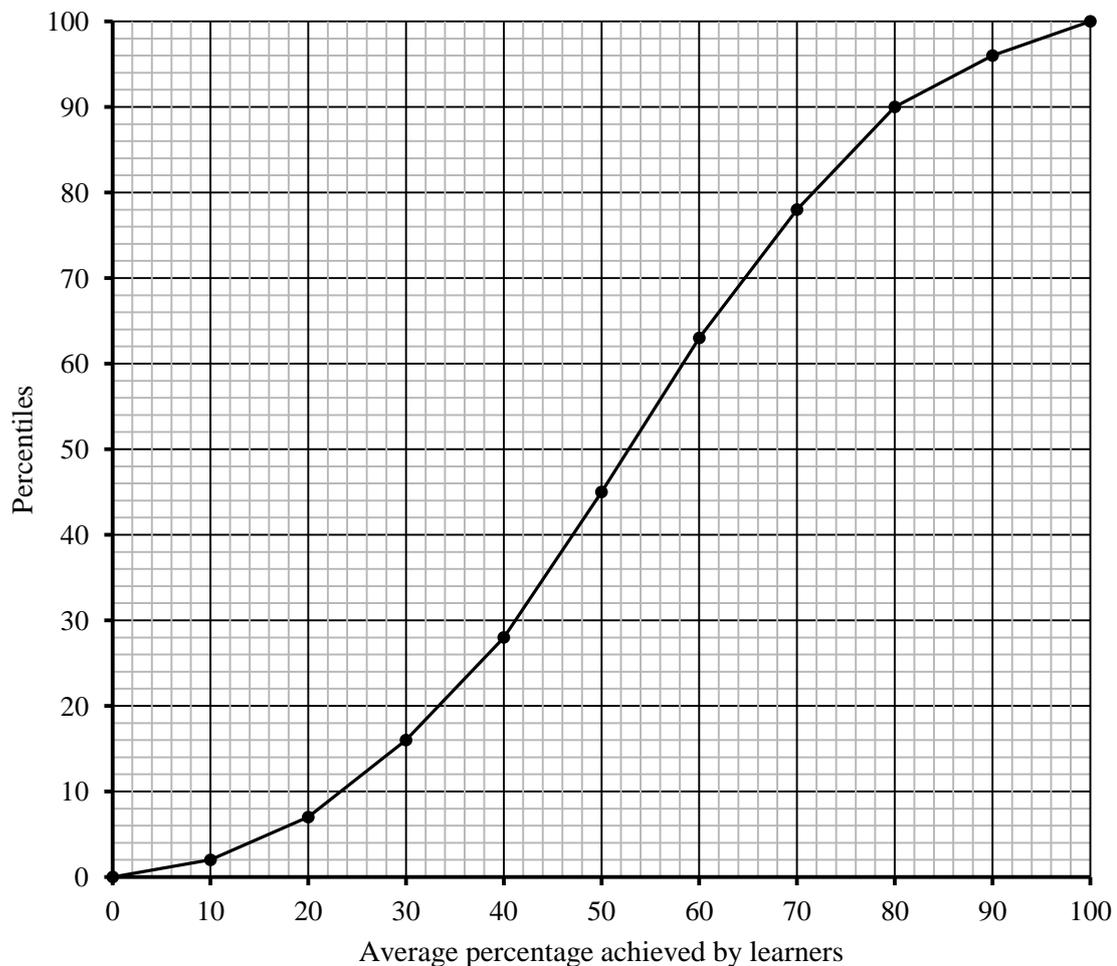
This group of learners followed the fitness programme for 4 weeks. The scatter plot graph alongside shows the progress made by each learner from the start of the program.



- 4.1.5 Discuss the trend shown by this set of data. Choose a person (A to Z) as an example to illustrate your trend. (3)
- 4.1.6 Identify and discuss the learner who made the most progress and the learner who made the least progress during the four week program. (4)

4.2 There are 600 learners in a school. The Academic Head summarises their average, in percentages, for the June Examination results in the graph below.

The graph shows the learner results against the percentiles on the vertical axis.



The achievements of these learners is summarised in the table below.

| | | | |
|--------------------------------------|--------------|--------------------------------------|--------------|
| $Q_1 = 38\%$ | $Q_2 = 53\%$ | $Q_3 = 68\%$ | $IQR = 30\%$ |
| 90^{th} percentile = 80% | | 40^{th} percentile = 47% | |

4.2.1 Use this information to fill in the information in the sentences that follow.

Only write the letter and the missing information in your Answer Booklet.

(9)

- The **A** for the June Examination is 53% meaning that **B** pupils scored less than 53% and **C** pupils scored more than 53%.
- The bottom **D** of the learners scored less than 38% i.e. **E** learners.
- The bottom 75% of learners scored **F** or less.
- The middle 50% of the learners' marks ranged between **G** and **H**
- Ninety percent of the learners achieved marks less than **I** i.e. there were **J** of learners who achieved marks ranging from 80% to 100%.
- **K** learners i.e. 40% of the learners scored marks lower than **L**

Use the graph to determine the following:

4.2.2 If 0% - 29% is classified as a fail, how many learners failed the June Examination? (3)

[33]

[TOTAL 150]
END OF EXAMINATION