



**MATHEMATICAL LITERACY: PAPER II**

Time: 3 hours

150 marks

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**PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY**

1. This question paper consists of:
  - A question paper of 13 pages
  - Five questions
  - An Answer Booklet of 4 pages (i – iv)
  - An Appendix Sheet of 2 pages

Please check that your question paper is complete.

2. Answer all the questions.
  3. It is strongly suggested that all working details be shown.
  4. Where necessary round off all answers to two decimal places.
  5. Approved non-programmable calculators may be used in all questions.
  6. It is in your own interest to write legibly and present your work neatly.
  7. Maps and diagrams are not necessarily drawn to scale, unless otherwise stated.
  8. Please hand in this question paper.
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**QUESTION 1**

1.1 The recommended retail price for the Blackberry Curve 9320, as shown below, is R3 000,00. This price includes 14% VAT.

Calculate the recommended retail price without the 14% VAT. (3)



1.2 Company A, a cellphone company, advertised the above phone on a 2-year contract at R199 per month. The contract price included R99 worth of airtime.

Although the customer pays R199,00 per month, the customer gets R99,00 worth of airtime. Show that the actual phone costs less than the recommended retail price of R3 000,00 after the two year period.

**BlackBerry™ Curve™ 9320 Smartphone**



Free Delivery, Free sim and Free connection

Only **R199** PM x 24

(3)

1.3 All calls are charged per second as illustrated below:

Domestic Calls	
Peak – Company A to Company A	4,5c per second
Peak – Company A to another service provider*	4,9c per second
Off-Peak – Company A to Company A	4c per second
Off-Peak – Company A to another service provider*	4,4c per second

\* another cellphone company other than Company A

Peak Time	7 a.m. – 7 p.m. on weekdays
Off-Peak Time	7 p.m. – 7 a.m. on weekdays Weekends Public holidays

Refer to page 1 of the Answer Booklet which shows the calls made during a particular month.

Complete the Answer Sheet, by writing in the missing values a to k, in order to determine the total amount due at the end of the month. (14)

1.4 Consider the set of axes in the Answer Booklet.

1.4.1 (a) Which type of call is illustrated by the graph on the set of axes? Choose the letter of the correct alternative. Ignore all free minutes.

- A Peak – Company A to Company A
- B Peak – Company A to another service provider
- C Off-Peak – Company A to Company A
- D Off-Peak – Company A to another service provider (2)

(b) Give a reason for your answer in Question 1.4.1 (a) above. (2)

1.4.2 On the same set of axes in your Answer Booklet, sketch a graph which illustrates the cost of a call made from Company A to Company A during off-peak time. (Ignore all free minutes.) (4)  
[28]

**QUESTION 2**

A teacher needed to travel from Johannesburg to Kokstad, KwaZulu Natal. As his wife needed to use his car, he decided to hire a car as shown below.

**Vehicle Description: Group C: Toyota Corolla 1.6l**  
**Sedan/hatch or similar**



<b>Passengers:</b> 4	<b>Seat Belts:</b> 4
<b>Mileage:</b> 650 kms	<b>Gearbox:</b> Manual
<b>Luggage:</b> 0 large, 1 medium, 1 small and 1 carry on	
<b>Aircon:</b> YES	<b>Power Steering:</b> YES
<b>Central Locking:</b> YES	<b>Air Bags:</b> YES
<b>ABS Brakes:</b> YES	<b>Radio:</b> YES
<b>CD Player:</b> YES	<b>Towbar:</b> NO
<b>Canopy:</b> NO	<b>Approx Tank Capacity:</b> 55 litres

- 2.1 The vehicle can travel 650 km on a full tank of petrol. Calculate, to the nearest cent, the cost of travelling 1 km, if petrol costs R10,85 per litre. (5)
- 2.2 A car uses more petrol when the doors and windows are left open. Thus it is estimated that the distance travelled on a full tank of petrol decreases by 20%. If this is the case, determine how far one could travel, using the car above, if the fuel tank is only 30% full. (5)

- 2.3 The maps on the Appendix show two possible routes that the teacher could follow from Johannesburg to Kokstad. Both routes leave Johannesburg and make their way to Howick, just before Pietermaritzburg.

ROUTE 1 – From Howick the route will take the teacher along a scenic drive past Underberg. The route is 720 km and the estimated time is 7 hours and 52 minutes without stopping.

ROUTE 2 – From Howick, the route follows past Pietermaritzburg, to Durban, then onto Port Shepstone, and then to Kokstad. Although this route is 855 km and the estimated time is 8 hours and 42 minutes without stops, the roads are much safer. The roads are mostly freeways all the way to Port Shepstone.

- 2.3.1 Determine the probability of the hired vehicle completing the trip from Johannesburg to Kokstad, using either route, without stopping. Justify your answer. (3)
- 2.3.2 The average speed using Route 1 is 91,53 km/hr. Show that one can average a faster speed using Route 2, despite the fact that both the distance and time is greater than Route 1. (3)

$$\text{Average Speed} = \frac{\text{Distance}}{\text{Time}}$$


- 2.3.3 Determine the time in hours and minutes it would take the teacher to travel from Johannesburg to Kokstad if he:
- uses Route 1
  - travels at an average speed of 100 km/hr
  - stops once for 32 minutes
- (5)
- 2.3.4 Using Route Map 1, determine the direct, straight line distance, (rounded to the nearest km) between Johannesburg (point A) and Kokstad (point B). Use the appropriate black dots (●) as reference points. (5)
- 2.3.5 Determine the scale of Map 1, showing Route 1. Write your answer in the form of 1:\_\_\_\_\_, rounding your answer to the nearest ten thousand. (5)
- 2.4 Using the Annual Deduction Table which appears on the Appendix, verify whether or not, the annual tax (SITE + PAYE) payable by the 45 year-old teacher is R26 450, if his monthly taxable salary is R19 728,00. Show all working. (4)

[35]

**QUESTION 3**

On the 22<sup>nd</sup> December 2012, the largest pizza was made.

**The World’s Largest Pizza Is Ginormous**  
 by Brittany High



Last week, five Italian chefs came together to create the World’s Biggest Pizza. The delicious monstrosity measured 131 feet in diameter, tipped the scales at over 51 000 pounds and contained 1 488 pounds of margarine, 19 800 pounds of flour, 10 000 pounds of tomato sauce, 8 800 pounds of mozzarella cheese, 551 pounds of salt and 55 pounds of vinegar.

[Adapted from: <<http://www.incrediblethings.com/food/the-worlds-largest-pizza-is-ginormous>>]

3.1 When asked how much the pizza weighed, rounded to the nearest kilogram, Jordan did the following calculation:

FACT : 1 pound = 450 g
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Jordan's working:

$$\begin{aligned}
 &51\,000 \text{ pounds} \div 450 \text{ g} \\
 &= 113,33333333 \text{ g} \times 100 \text{ kg} \\
 &= 11\,333 \text{ kg}
 \end{aligned}$$

3.1.1 Identify 3 errors that Jordan had made. (3)

3.1.2 Hence, correct Jordan's errors by finding the correct answer to the above question. (2)

3.2 Determine the area of the pizza, rounded to the nearest square metre (m<sup>2</sup>), if 1 foot = 30,3 cm. (5)

Area of a circle = $\pi \times r^2$ Let $\pi = 3,14$
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- 3.3 3.3.1 Jordan went on to calculate the smallest possible surface area of the square box needed in order to hold such a pizza. Ignoring all overlaps, his answer came to  $31\,685\,334,18\text{ cm}^2$ . Determine if Jordan is correct, bearing in mind that the pizza is 11 cm high and 131 feet in diameter. (6)



1 foot = 30,3 cm

- 3.3.2 Determine the cost of the material for the box if the required cardboard costs R3,25 per  $\text{m}^2$  and is sold per  $\text{m}^2$ . (4)  
[20]

**QUESTION 4**

4.1 Many people have a fear of flying. However, statistics show that the probability of being killed in a flight in the United States is 1 : 8 000 000. Or another way of looking at it is that if you were to board a random flight once a day, statistically it would take 21 000 years before you were killed on a plane. However, plane crashes do occur. Below is a list of commercial plane crashes that occurred world-wide in the last six months of 2012.

Date	Location	Number of passengers killed	Number of survivors	Total passengers in the plane
13 July	France	3	0	3
19 August	Sudan	32	0	32
22 August	Kenya	4	9	13
12 September	Russia	10	4	14
28 September	Nepal	10	9	19
27 November	Comoros	0	29	29
30 November	Congo	7	25	32
25 December	Myanmar	1	71	72
29 December	Russia	5	3	8

It is estimated that there were approximately 169 725 000 commercial planes that took off in the last half of 2012. Each of these flights carried a mean (average) of 70 passengers.

Thembi said she would never fly if the probability of being in a plane accident, in the last six months of 2012, was greater than 0,00006%. By means of calculations determine whether Thembi will choose to fly or not.

(5)

4.2 The following incomplete table, which also appears in your Answer Booklet, shows the details of the commercial plane accidents that occurred in the first half of 2012.

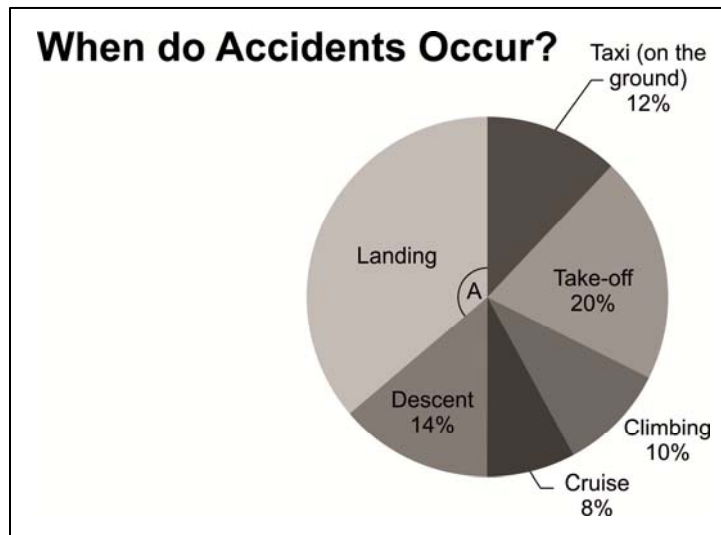
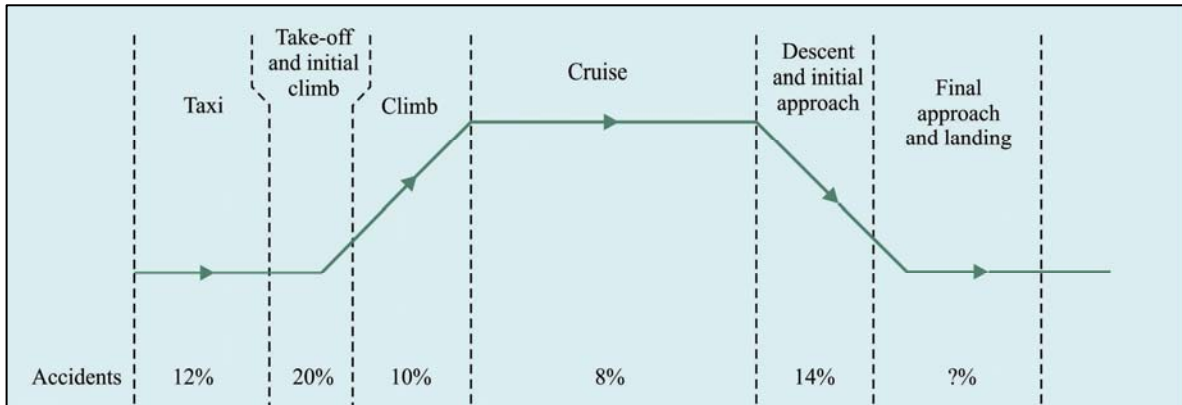
Fill in the missing values (a) to (g) in your Answer Booklet.

Date	Location	Number of passengers killed	Number of survivors	Total passengers
30 January	Congo	3	2	5
12 February	Congo	(b)	3	6
15 March	Puerto Rico	2	0	2
2 April	Russia	31	12	(f)
20 April	Pakistan	(a)	127	(c)
9 May	Indonesia	45	0	45
2 June	Ghana	0	(d)	16
3 June	Nigeria	153	16	169
<b>TOTALS</b>		(g)	(e)	<b>413</b>

(7)



4.3 The accidents that do occur happen at various stages of the flight. The diagram and pie chart below indicate the percentage of accidents that occur at various stages of a flight.



Collin was asked to calculate the number of accidents that occurred during 2012 during landing by 17 commercial planes. He performed the following calculation:

$$\frac{36}{100} \times 17 = 6,12 \text{ accidents}$$

4.3.1 Show how Collin got  $\frac{36}{100}$  as shown in his calculation above. (3)

4.3.2 Although Collin got the answer of '6,12 accidents', explain why his answer is not 100 percent correct. (2)

4.3.3 Calculate the size of the angle representing landing (Angle A) in the pie chart above to the nearest degree. (3)

4.4 Airports are very busy places catering for millions of passengers each year. Below is a list of the number of passengers that flew from the world's 10 busiest airports during 2012.

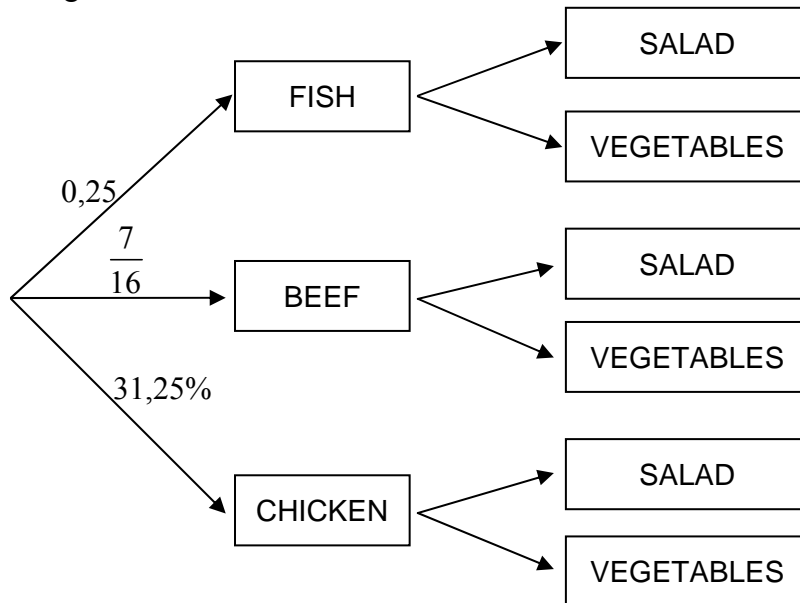
Rank	Airport	Location	Total passengers
1	Hartsfield-Jackson Atlanta International Airport	Atlanta, Georgia, United States	?
2	Beijing Capital International Airport	Chaoyang, Beijing, China	81 929 359
3	London Heathrow Airport	Hillingdon, London, United Kingdom	70 037 417
4	Tokyo International Airport	Ota, Tokyo, Japan	66 795 178
5	O'Hare International Airport	Chicago, Illinois, United States	66 633 503
6	Los Angeles International Airport	Los Angeles, California, United States	63 688 121
7	Paris Charles de Gaulle Airport	Roissy-en-France, Ile-de-France, France	61 611 934
8	Dallas-Fort Worth International Airport	Dallas-Fort Worth, Texas, United States	58 591 842
9	Soekarno-Hatta International Airport	Cengkareng, Tangerang, Banten, Indonesia	57 772 762
10	Dubai International Airport	Garhoud, Dubai, United Arab Emirates	57 684 550

4.4.1 Between these top 10 busiest airports, the mean (average) number of passengers passing through the gates were 68 020 753,3. Calculate how many passengers went through the boarding gates at Hatsfield-Jackson Atlanta International Airport. (6)

4.4.2 Johannesburg's (OR Tambo) airport does not rank in the top 10 busiest airports. In fact Dubai International Airport caters for 3,39 times the number of passengers compared to OR Tambo Airport. If there were on average 95 passengers on every aircraft, determine the approximate number of flights that took off from OR Tambo during 2012. (4)

4.5 Airline food does not always bring wonderful thoughts of a magnificent cuisine, especially when travelling economy class. The airline menu typically includes chicken, beef and fish with either a salad or vegetable combination with each meal.

See the tree-diagram below.



4.5.1 Show that there were 35 beef dishes, if the airline had only 80 meals (one meal per passenger). (2)

4.5.2 The question below appeared in a Grade 12 Mathematical Literacy Test. Following that are the responses of two learners, Bryce and Justin.

*What is the probability that a passenger would order the chicken and a salad, presuming there were the same number of salads and vegetables available?*

BRYCE'S answer:

$$(31,25\% \times 80) + \frac{40}{100}$$

$$= 25,4\%$$

JUSTIN'S answer:

$$\left( \frac{31,25}{100} \times 80 \right) \times \frac{1}{2}$$

$$= 50$$

(a) Which one of the following statements is correct? (2)

- A Both Bryce and Justin had the correct answers.
- B Both Bryce and Justin had incorrect answers.
- C Bryce had the correct answer whereas Justin had the incorrect answer.
- D Justin had the correct answer whereas Bryce had the incorrect answer.

(b) State the possible errors that you believe may have been made by Justin and/or Bryce. (3)

[37]

**QUESTION 5**

5.1 Matthew is turning 21 and he has asked his parents to arrange a party for him. The family decides on using a venue called, *The Fish Eagle* which offers the following three packages:

Package 1: R30 000 which includes a maximum of 200 people. There is an additional charge of R100 for every guest exceeding 200.

Package 2: R200 per person.

Package 3: R6 000 plus R150 per person.

5.1.1 Refer to the graphs drawn on the set of axes found in your Answer Booklet.

(a) Link each graph (A and B) to the correct package.  
Example: Graph C = Package 4 (2)

(b) Complete the table, found in the Answer Booklet, relating to the charges involved with Package 1. (7)

(c) On the same set of axes sketch the graph which represents Package 1. (5)

5.1.2 Matthew decides to invite 141 guests to his party. Show with calculations which is the most economical package for Matthew to choose. (6)

5.2 Matthew has a younger brother who also wants to have a 21<sup>st</sup> birthday party which will be in 3 years and 3 months time. Their parents decide to invest R35 000 in a bank which is offering 5,6% p.a. interest, compounded monthly.

5.2.1 With the use of the formula below, show that the parents will not have enough money in the bank to pay for the younger brother's party venue which is estimated to cost R50 000. (5)

$$A = P(1 + i)^n$$

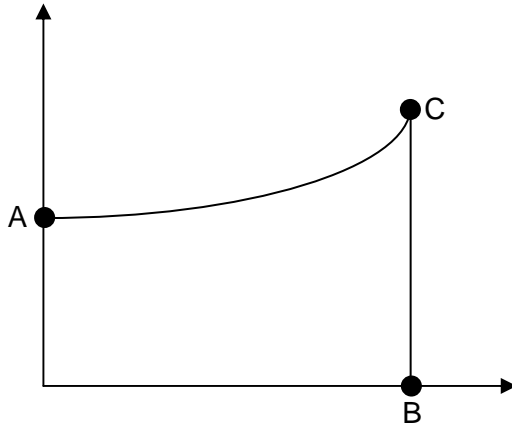
Where:  $A$  = amount in the bank, including the interest

$P$  = amount invested

$i$  = monthly interest rate

$n$  = number of times the interest is calculated

5.2.2 Refer to the graph below, which illustrates what happens to the R35 000 the parents are thinking of investing.



- (a) State the amount at point A on the graph. (1)
  - (b) Choose the correct alternative which represents Point B on the graph.
    - A R35 000
    - B 3,3 years
    - C 33 months
    - D 3,25 years
 (1)
  - (c) Identify what amount is represented by Point C on the graph. (1)
  - (d) Explain why the graph above is not a straight line graph. (2)
- [30]**

**Total: 150 marks**