NATIONAL SENIOR CERTIFICATE

GRADE 12: MATHEMATICS LITERACY P2

FEBRUARY/MARCH 2011

MARKS: 150
TIME: 3 hours

This question paper consists of 11 pages and 2 annexures.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE questions. Answer ALL the questions.
2. Answer QUESTIONS 1.1.3 and 2.1.2 on the attached ANNEXURES. Write your centre number and examination number in the spaces provided on the ANNEXURES and hand in the ANNEXURES with your ANSWER BOOK.
3. Number the answers exactly as they are numbered in the 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. Indicate units of measurement, where applicable.
9. Write legibly and present your work neatly.

QUESTION 1

Mrs James, the principal of Vuka High School, conducted a survey amongst all the learners at her school.

1.1 In one of the questions all the learners were asked the time (to the nearest minute) that they usually took to travel to school each day.

The responses to this question are shown in the table below:

TABLE 1: Time usually taken by all the learners of Vuka High School to travel to school each day

Time taken in minutes	0 to less than 10	10 to less than 20	20 to less than 30	30 to less than 40	40 to less than 50	50 to less than 60	60 to less than 70	70 to less than 80
Number of learners	195	340	185	280	90	30	75	**B**
% of learners	15,6	27,2	**A**	22,4	7,2	2,4	6,0	4,4

1.1.1 Calculate the missing values:

(a) **A** (2)
(b) **B** (3)

1.1.2 What percentage of the learners take 40 minutes or more to travel to school? (2)

1.1.3 Draw a histogram on the grid on ANNEXURE A to represent the relationship between the number of learners and the time taken, as given in TABLE 1. (6)

1.2 Mrs James's survey further indicated that 9,9% of the learners travelled a distance of 11 km or more to get to school.

1.2.1 Thabit, one of the learners, travelled a distance of 12 km in 60 minutes to get to school.

(a) Calculate Thabit's average speed in metres per minute.

The following formula may be used:

Distance = average speed time (4)

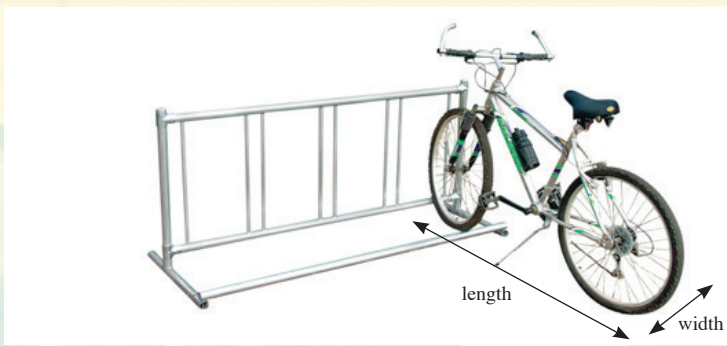
(b) Use Thabit's average speed to determine whether he was walking or using any other mode of transport. Give a reason for your answer. (3)

1.2.2 Mrs James provided the results of her survey to a local newspaper. The newspaper published an article in which they stated that 10% of South African learners travel 11 km or more daily to get to school.

Is the newspaper's statement correct? Give a reason for your answer. (3)

1.3 The newspaper article resulted in a company donating 124 bicycles to Vuka High School, specifically for learners who take longer than 60 minutes each day to walk to school.

A second company provided bicycle stands for the 124 bicycles.



The rectangular floor area required for the parking of the bicycles is determined by considering the following:

- Each bicycle is 180 cm long and 45 cm wide.
- An additional space of per bicycle is required for free movement around the stands.

Determine the total floor area (in m^2) required for the 124 bicycles.

The following formula may be useful:

Area of rectangle = length x breadth (7)

1.4 Another question in the survey required the learners to indicate the number of people living in their household.

The data below represents the number of people living in a household and is based on a random selection of 16 responses to the survey.

2	4	6	3	4	5	6	5
7	5	16	9	5	**C**	17	9

1.4.1 Determine the missing value **C** if the mean (average) for the sample is 7. (4)

1.4.2 Hence, determine the median number of people living in each household for this sample. (3)

1.4.3 Which ONE of the two measures of central tendency referred to in QUESTION 1.4.1 and QUESTION 1.4.2 would best represent the data?

Give a reason for your answer. (3)
[40]

QUESTION 2

Mr Ntwethu started a business making and selling traditional sandals of different types. He employs a number of workers to help him make the sandals.

TYPE A

TYPE B

They make two types of sandals (TYPE A and TYPE B), as shown above. They cut up old car tyres to make the sandals and decorate them by carving patterns into the strips of tyre.

2.1 One worker takes 4 hours to make one pair of TYPE A sandals and 5 hours to make one pair of TYPE B sandals.

TABLE 2: Time taken to complete one pair of sandals for different numbers of workers working together

Number of workers	1	2	4	**Q**	8
Time taken (in hours) for TYPE A	4	**P**	1	0,8	0,5

2.1.1 Use TABLE 2 to calculate the missing values:

(a) **P** (2)
(b) **Q** (2)

2.1.2 Use TABLE 2 to draw TWO curves on the grid provided on ANNEXURE B. Clearly label the two curves. (8)

2.1.3 Identify the type of proportion represented by the curves in QUESTION 2.1.2. (2)

2.2 Mr Ntwethu employs four workers in his business. Jabu, who is the supervisor, is paid R11,25 an hour. The rest of the workers receive 80% of Jabu's hourly rate. Workers work 40 hours per week.

Mr Ntwethu allows his workers to work overtime. Overtime is paid at a rate of time and a half.

2.2.1 Determine how much Mr Ntwethu would pay in total for wages for a normal 40-hour week. (6)

2.2.2 Jabu worked 48 hours in one week. Calculate how much he earned. (5)

2.3 Mr Ntwethu kept a record of the number of pairs of each type of sandal sold over a 12-day period.

TYPE A:	2	2	2	3	4	4	5	5	5	6	6	7
TYPE B:	1	4	11	2	8	12	4	4	1	3	1	3

2.3.1 He calculated the lower quartile, upper quartile and median for each set of data, and recorded them as follows:

TABLE 3: Lower quartiles, medians and upper quartiles of sandals sold

TYPES OF SANDALS	LOWER QUARTILE	MEDIAN	UPPER QUARTILE
A	2,5	4,5	5,5
B	1,5	3,5	6

Use TABLE 3 to determine the percentage of the days when the following happens:

(a) Less than 2,5 pairs of Type A sandals were sold (2)
(b) Between 1,5 pairs and 6 pairs of the Type B sandals were sold (2)

2.3.2 If one of the 12 days is selected at random, calculate the probability that Mr Ntwethu on that day will sell thefollowing:

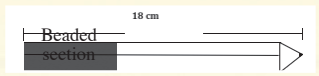
(a) Only three pairs of Type B sandals (2)
(b) More than four pairs of Type A sandals (2)
[33]

QUESTION 3

3.1

Finky Stores makes and sells pencils decorated with small spherical beads which are glued to the unsharpened end of the pencil. The beaded section is one third of the pencil, as shown in the diagram below.

The pencil is 18 cm long and its cross section is a regular hexagon of side 3 mm.



Side view of the beaded pencil

Cross section of pencil

3.1.1 Calculate the surface area (in mm^2) of the pencil that is covered by beads.

The following formula may be used: **Area of rectangle = length x breadth** (6)

3.1.2 The spherical beads have a diameter of 1,5 mm.

Determine the number of beads needed for each pencil. (6)

3.2
- A packet containing 1 000 beads cost R8,00.
- It takes 5 minutes to glue the beads onto one pencil.
- The workers are paid R15,50 per hour to glue the beads onto the pencils.
- The pencils they use cost R30,00 per box of 12.

3.2.1 Calculate the selling price per beaded pencil if there is a mark-up of 35% on the total cost price per decorated pencil. (9)

3.2.2 A soccer fan from Argentina bought some decorated pencils as souvenirs.

Calculate how many decorated pencils can be bought for 100 Argentinean pesos (ARS) given the exchange rate below.

Exchange rate
R1,00 = 0,54895 ARS

(4)
[25]

QUESTION 4

4.1 Mr Ravi, a teacher, wants to buy his first car from a local car dealer. The car was advertised as follows:

Juju's Car Dealer

The salesperson informed Mr Ravi that he will also need to pay the following additional costs:

- 14% value-added tax (VAT) on the cash price after the discount
- 0,75% pre-delivery cost calculated on the cash price, including VAT, and after the discount
- R1 400 (inclusive of VAT) for the licensing, registering and for the roadworthy test of the car
- R4 950 (inclusive of VAT) for a two-year maintenance contract

NOTE: The **pre-delivery** cost is a percentage of the selling price of a vehicle that is charged by the car dealer for administration and marketing.

4.1.1 Calculate the final cash price of the car, which includes the discount and the additional costs. (8)

4.1.2 Mr Ravi does not have enough money to pay the final cash price of the car. He applies for financial assistance from the car dealer.

Regulations specify that the deposit of 20% of the final cash price of the car cannot be financed and must be paid for by the buyer.

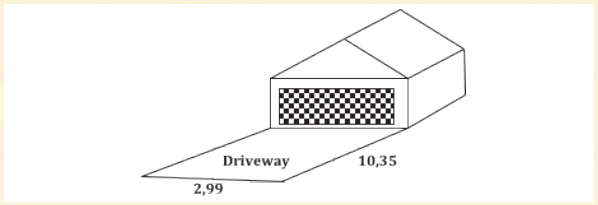
The car dealer charges interest of 12% per annum on the amount to be financed.

Verify (showing ALL calculations) whether or not the monthly instalment quoted in the advertisement is correct.

The following formula may be useful:

A = P(1 + *i n*), where:
A = the amount to be repaid
P = the amount to be financed
i = the annual interest rate
n = the number of years that the loan is taken for (9)

4.2 Mr Ravi decided to pave the rectangular driveway in front of his garage. The length of the driveway is 10,35 m and the width is 2,99 m.



A rectangular paving brick has a length of 23 cm and a width of 11,5 cm. Paving bricks are sold in pallets of 354.

A paving brick

A worker paving the driveway

A pallet of bricks

Calculate the minimum number of pallets that must be purchased in order to pave the driveway.

The following formula may be used:

Area of rectangle = length x breadth (9)

4.3 Mr Ravi has to hire a truck to deliver the pallets of bricks. ABC Transport charges a set fee of R95,00 plus an additional charge of R5,45 per kilometre if the distance is more than 10 km.

4.3.1 Write down the equation that ABC Transport uses to calculate the delivery charge of the bricks in the form:

Delivery charge = … (3)

4.3.2 Mr Ravi lives 35 km from the brick yard. His friend offers to deliver the pallets of bricks at a cost of R250,00.

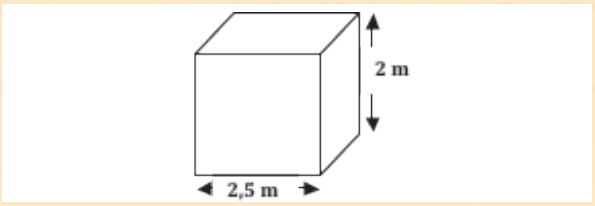
Indicate, showing ALL the necessary calculations, whether he should use ABC Transport or take up his friend's offer.

(5)
[34]

QUESTION 5

5.1 Mr Coetzee is a cattle farmer. He needs a steady supply of water for his cattle throughout the year. He drills a borehole and pumps water out of the borehole into a storage tank with a square base.

The side of the base of the tank is 2,5 m and the height of the tank is 2 m. The output rate of the borehole pump is 3,6 kilolitres per hour.



The following may be useful:

Volume of a square-based prism = (side)² height

Volume of a cylinder = π x (radius)² x height, using π = 3,14

1 m³ = 1 k*l*

5.1.1 Calculate the capacity (volume) of the storage tank in kilolitres. (3)

5.1.2 Determine how long it would take the pump to fill the storage tank to 65% of its capacity if the pump operates at of its output rate. Give the time in hours and minutes. (6)

5.2 The table below shows the average daily water requirements per animal.

TABLE 4: Average daily water requirements per animal

TYPE OF LIVESTOCK	LITRES
Cattle	90
Sheep and goats	50
Chickens and ducks	5

Mr Coetzee has 40 cattle, 20 sheep, 30 goats and 50 chickens.

5.2.1 Calculate the total average daily water requirements, in kilolitres, of ALL the livestock. (4)

5.2.2 Mr Coetzee wants to build a new cylindrical tank that is big enough to hold 10 days supply of water for his livestock.

Determine the radius of the new storage tank if the height is 2 m. (5)
[18]
TOTAL: 150

CENTRE NUMBER:

EXAMINATION NUMBER:

ANNEXURE A

QUESTION 1.1.3

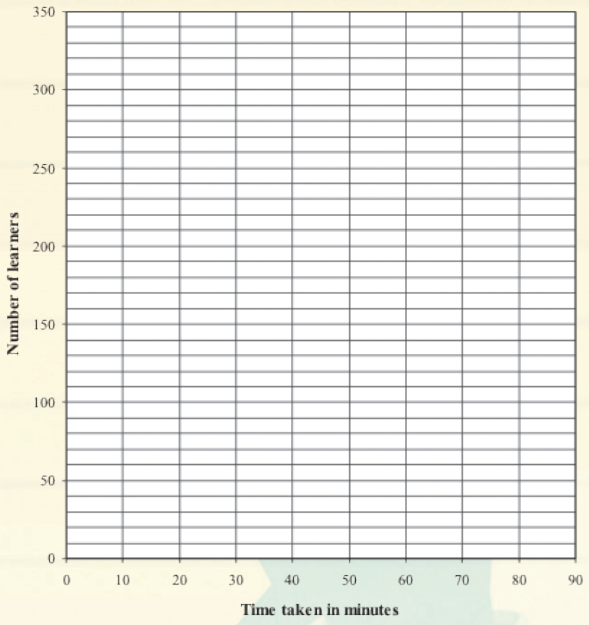
TABLE 1: Time usually taken by all the learners of Vuka High School to travel to school each day

Time taken in minutes	0 to less than 10	10 to less than 20	20 to less than 30	30 to less than 40	40 to less than 50	50 to less than 60	60 to less than 70	70 to less than 80
Number of learners	195	340	185	280	90	30	75	**B**

CENTRE NUMBER:

EXAMINATION NUMBER:

RELATIONSHIP BETWEEN NUMBER OF LEARNERS AND TIME TAKEN TO TRAVEL TO SCHOOL



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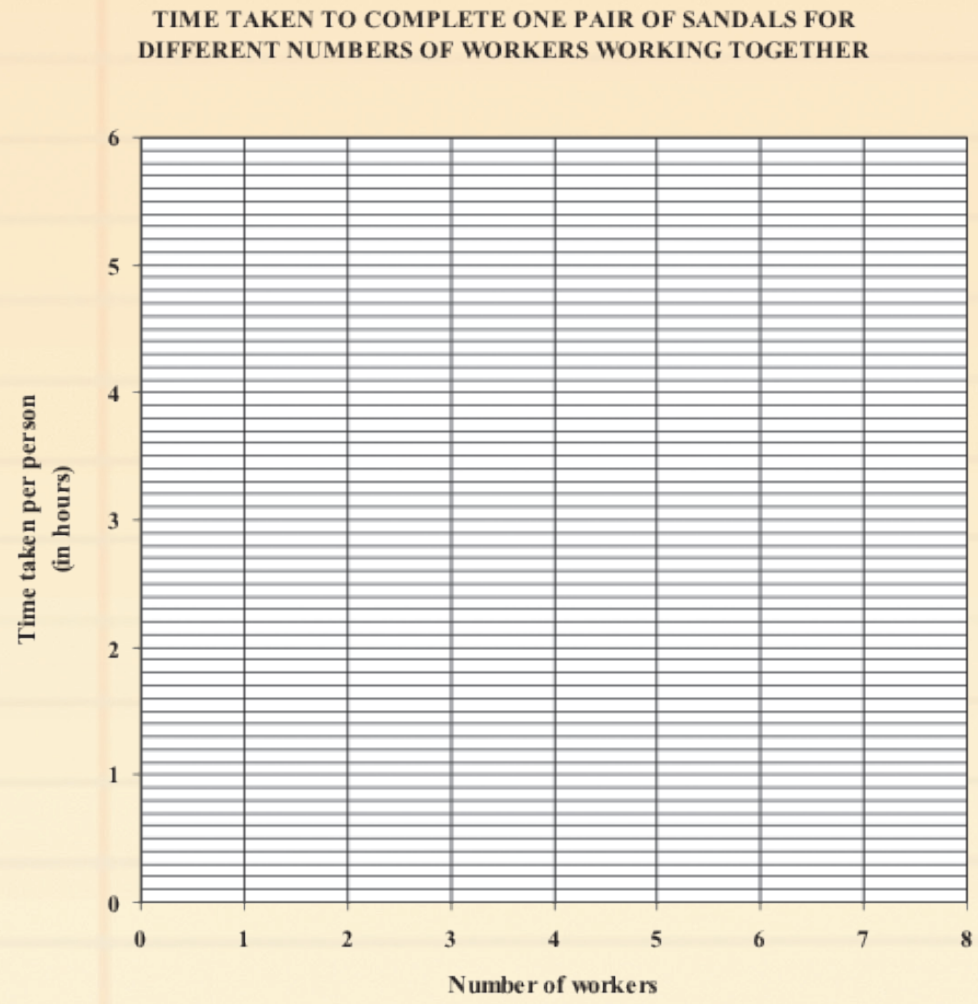
EXAMINATION NUMBER:

ANNEXURE B

QUESTION 2.1.2

TABLE 2: Time taken to complete one pair of sandals for different numbers of workers working together

Number of workers	1	2	4	Q	8
Time taken (in hours) for TYPE A	4	P	1	0,8	0,5
Time taken (in hours) for TYPE B	5	2,5	1,25	1	0,625