higher education
& training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICAL LITERACY
(First Paper)
NQF LEVEL 3

(10401023)

1 November 2018 (X-Paper)
09:00–12:00

Calculators may be used.

This question paper consists of 9 pages and 2 answer sheets.

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┌─────────────────────────────────┐
│        TIME: 3 HOURS            │
│         MARKS: 150              │
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INSTRUCTIONS AND INFORMATION

1.   Answer ALL the questions.

2.   Read All the questions carefully.

3.   Number the answers according to the numbering system used in this question paper.

4.   Start EACH question on a NEW page.

5.   Show ALL calculations clearly.

6.   Round off your answers correctly according to the given context. In all other cases, where the context is not specific, round off your answers correctly to two decimal places.

7.   Indicate units of measurement, where applicable.

8.   Diagrams are not necessarily drawn to scale.

9.   Answer QUESTION 3.6 on ANSWER SHEET A and QUESTION 4.1.2 on ANSWER SHEET B. Write your examination number in the spaces provided on the ANSWER SHEETS and hand them in with your ANSWER BOOK.

QUESTION 1

1.1   Calculate the following **without** using a calculator. Show **ALL** working.

      1.1.1 $230 + 60 \div (-10)$ (2)

      1.1.2 $\sqrt{81} + (-5)^2$ (2)

      1.1.3 $\dfrac{27 + 74}{101} - 6\,(77 - 73)$ (3)

1.2   Sharon has R200, Nkosi has R700 and Mahesh has R300. What is the ratio of the amount of money Sharon has, to the amount of money Nkosi has and to the amount of money Mahesh has? Write the ratios in simplest form.   (4)

1.3   If the cost of labour for 25 m^2 of tiling is R750, calculate the cost of labour per square metre (m^2).

      (2)

1.4   Electricity is charged at a rate of R1,46/kWh. (rands/kilowatt-hour)

      1.4.1   How much will it cost to buy 441 kWh of electricity?   (2)

      1.4.2   How many kilowatt-hours (kWh) of electricity will you get for R567? Round off your answer correct to a whole kilowatt-hour.   (3)

1.5   If the price of a shirt after a discount of 10% is R412,50, what was the original price of the shirt?   (4)

1.6   Convert 350 000 grams to tonnes. Show all calculations.

      (1 000 grams = 1 kilogram and 1 000 kilograms = 1 tonne)   (4)

1.7   A train leaves on Tuesday at 8:45 pm and arrives at its destination on Saturday at 4:15 am. How long was the journey? Give your answer in days, hours and minutes.   (4)

      [30]

QUESTION 2

2.1   Choose a description from COLUMN B that matches a word / an item in COLUMN A. Write only the letter (A–F) next to the question number (2.1.1–2.1.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
2.1.1	Perimeter	A	A perfectly round 3-dimensional and circular shape
2.1.2	Sphere		
		B	a perfectly round flat shape
2.1.3	Volume		
		C	the space inside a 2-dimensional shape
2.1.4	Map		
2.1.5	Circle	D	the amount of space a 3-dimensional object has or occupies
		E	the distance around the outside of a shape
		F	a diagram of an area of land

(5×1) (5)

2.2   The floorplan, below has a scale of 1 cm : 2 m. Study the floorplan and answer the questions that follow:
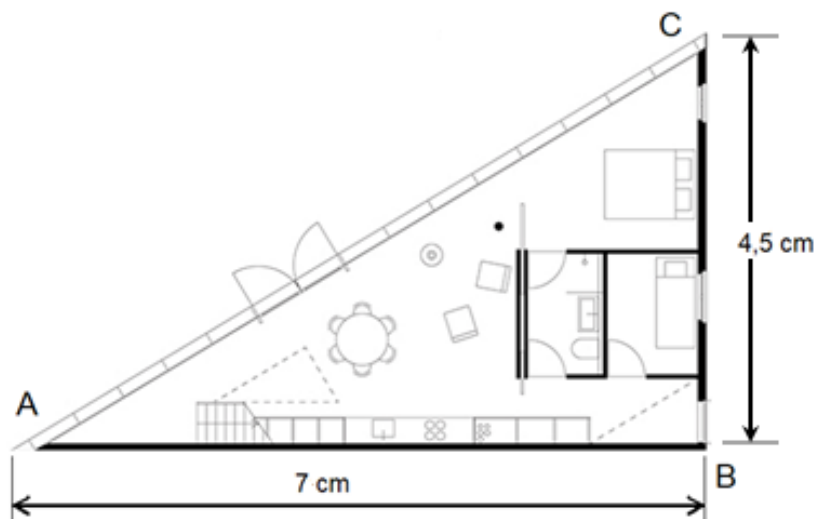

Scale 1 cm : 2 m

2.2.1   Determine the actual lengths AB and BC in metres.   (2)

2.2.2   Use Pythagoras theorem to calculate length AC in metres.

Formula: $AC = \sqrt{AB^2 + BC^2}$

(3)

2.3 A building contractor installed a circular window in the centre of a square wall, as shown in the diagram below. The diameter of the circular window is 144 cm and the length of each side of the square wall is 230 cm.

The shortest distance between the edge of the window and the edge of the wall is shown as "**k**" in the sketch.
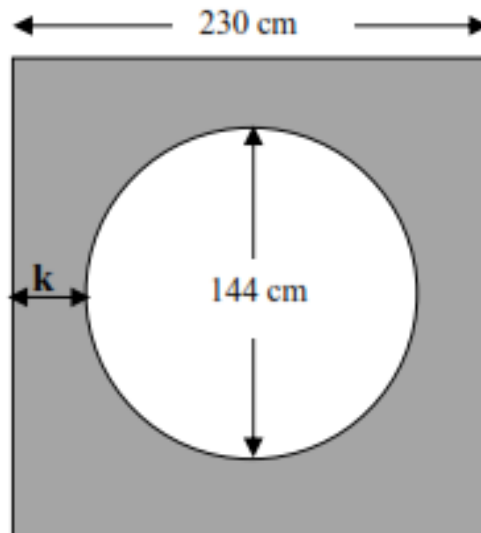
2.3.1 Determine the radius of the window in centimetres. (2)

2.3.2 Determine the value of distance **k** in centimetres. (3)

2.3.3 Calculate the circumference of the window.

Formula: Circumference = $\pi \times d$, where $\pi = 3{,}14$ (3)

2.3.4 The contractor plastered the remaining portion of the wall. Calculate the total area of the wall that was plastered.

Formulae: Area of a circle = πr^2, where $\pi = 3{,}14$

          Area of a square = $(\text{side})^2$ (7)

2.3.5 The contractor painted the wall with 2 coats of paint. The paint had a spread rate of 5 m^2 per litre. How many litres of paint did the contractor use?

Hint: 1 m^2 = 10 000 cm^2 (5)

[30]

QUESTION 3

The table given below shows the annual average price of fuel per litre from 2011 to 2015. Study the information in the table and answer the questions that follow:

| ITEM	2011	2012	2013	2014	2015
Cost of petrol/litre in Rand	8,73	10,61	11,86	13,57	11,24
The cost of diesel/litre in Rand	7,89	10,33	11,16	12,91	10,33

[*http://www.fastmoving.co.za/*]

3.1   Use the information provided to calculate the following:

    3.1.1   The increase per litre in the average petrol price between 2013 and 2014.   (2)

    3.1.2   The percentage decrease per litre in the average diesel price between 2014 and 2015.   (4)

    3.1.3   The difference in the average amount per litre a motorist had to pay for diesel in 2015 when compared to 2011.   (2)

3.2   What was the average cost of 45 litres of petrol in 2015?   (2)

3.3   How many litres of diesel could one buy, on average, with R200 in 2011. Round off your answer correct to two decimal places.   (3)

3.4   Explain how the rand exchange rate affects the fuel price.   (3)

3.5   The tax or fuel levy collected on every litre of fuel sold was R2,55 in 2015.

Determine the average price of petrol per litre without the fuel levy in 2015.   (2)

3.6   Use the above table that shows the annual average price of fuel per litre from 2011 to 2014 to draw two line graphs on the grid found on the ANSWER SHEET A (attached). Use the legend for the graphs. Label the horizontal and vertical axes and provide a suitable heading for the graphs.   (12)

[30]

QUESTION 4

4.1 A fuel tanker with a capacity of 5 000 litres is offloading fuel at a local filling station.

Tanker off loading fuel to under ground storage   SafeRack
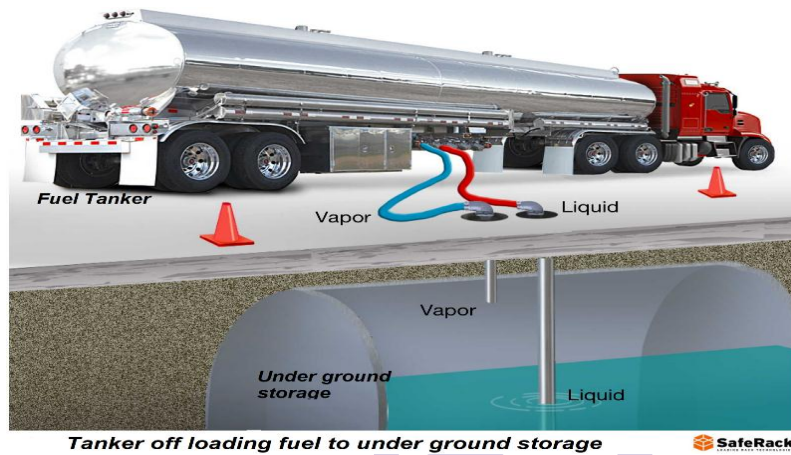
The table given below shows the relationship between litres of fuel remaining in the tanker versus time taken to offload it.

Study the table and answer the questions that follow.

Time taken (in minutes)	0	25	50	75	**A**	125
Litres of fuel in the tanker	5 000	4 000	3 000	2 000	1 000	**B**

4.1.1 Use any method to determine the missing values: A and B. (4)

4.1.2 Use the above table to draw a line graph on the grid found on the ANSWER SHEET B (attached). Label the horizontal and vertical axes and provide a suitable heading for the graph. (8)

4.1.3 Name the dependent variable. (1)

4.1.4 Is the above graph an example of an increasing or decreasing relationship? Give a suitable reason for your answer. (3)

4.2 An executive taxi company charges the following taxi fare for a single trip:

- A minimum call-out fee of R50 per trip

- Thereafter, R12,00 for each kilometre or part thereof.

Formulae: Taxi fare = Callout Fee + $(12 \times \text{Distance})$

Formula: Distance = $\dfrac{\text{Taxi fare - Callout Fee}}{12}$

Please turn over

4.2.1   How much will the taxi fare be to travel a total distance of 37 kilometres?   (3)

4.2.2   A client pays R1 214 for a single trip.

   (a)   This amount of R1 214 is VAT inclusive. VAT was charged at 15%.

        Calculate the taxi fare before VAT.   (4)

   (b)   Now, determine the distance travelled during this trip. Round off your answer to the nearest kilometre.   (4)

4.2.3   Mrs Mbhele hired an executive taxi to take her to a meeting venue 5 km away from her home. The meeting was scheduled to take exactly 30 minutes so she requested that the driver wait for her and take her back home.

        The driver charges an extra waiting fee of R100,00.

        Calculate the total amount she paid for this trip.   (3)

        [30]

QUESTION 5

5.1   Ashton, an insurance agent studied a table that shows the South African population (**in thousands**) during 2009 and 2010 according to race and gender.

RACE	MALES		FEMALES		TOTAL	
	2009	**2010**	**2009**	**2010**	**2009**	**2010**
Black	18 901,0	19 314,5	20 235,2	20 368,1	39 136,2	39 682,6
Coloured	2 137,3	**A**	2 295,8	2 299,2	4 433,1	4 424,1
Asian	635,7	646,6	643,4	653,3	1 279,1	1 299,9
White	2 194,7	2 243,0	2 277,4	2 341,7	4 472,1	4 584,7
TOTAL	**23 868,7**	**24 329,0**	**25 451,8**	**25 662,3**	**49 320,5**	**B**

[*SA YEAR BOOK 2009/2010, 2010/2011*]

Study the above table to answer the questions that follow:

5.1.1   Write down the population of the following:

   (a)   Coloureds in 2010

   (b)   White females in 2009

        (2×2) (4)

5.1.2   Calculate the values of A and B.   (4)

5.1.3   Calculate the difference in the number of black males between 2009 and 2010.   (2)

5.1.4 Calculate the number of Asian females as a percentage of the total number of females in 2010. (3)

5.1.5 Which gender, males or females, had the higher increase between 2009 and 2010? Show ALL calculations. (4)

5.2 Mrs Thwala conducted a survey to determine the approximate number of minutes that her Level 2 and Level 3 students watched television in a week.

LEVEL 2

120	45	150	95	60	90	120	95
30	120	60	120	150	60	180	

LEVEL 3

45	30	150	30	180	60	45	50
60	60	0	60	30	150	60	40

5.2.1 Determine the sample size of the survey. (2)

5.2.2 How many students did not watch television during the week? (1)

5.2.3 Calculate the range of the time spent by the Level 2 students who watch television. (2)

5.2.4 Write down the modal time the Level 2 students spent watching television. (2)

5.2.5 Determine the median time the Level 2 students spent watching television. (3)

5.2.6 Calculate the average (mean) time the Level 3 students spent watching television. (3)
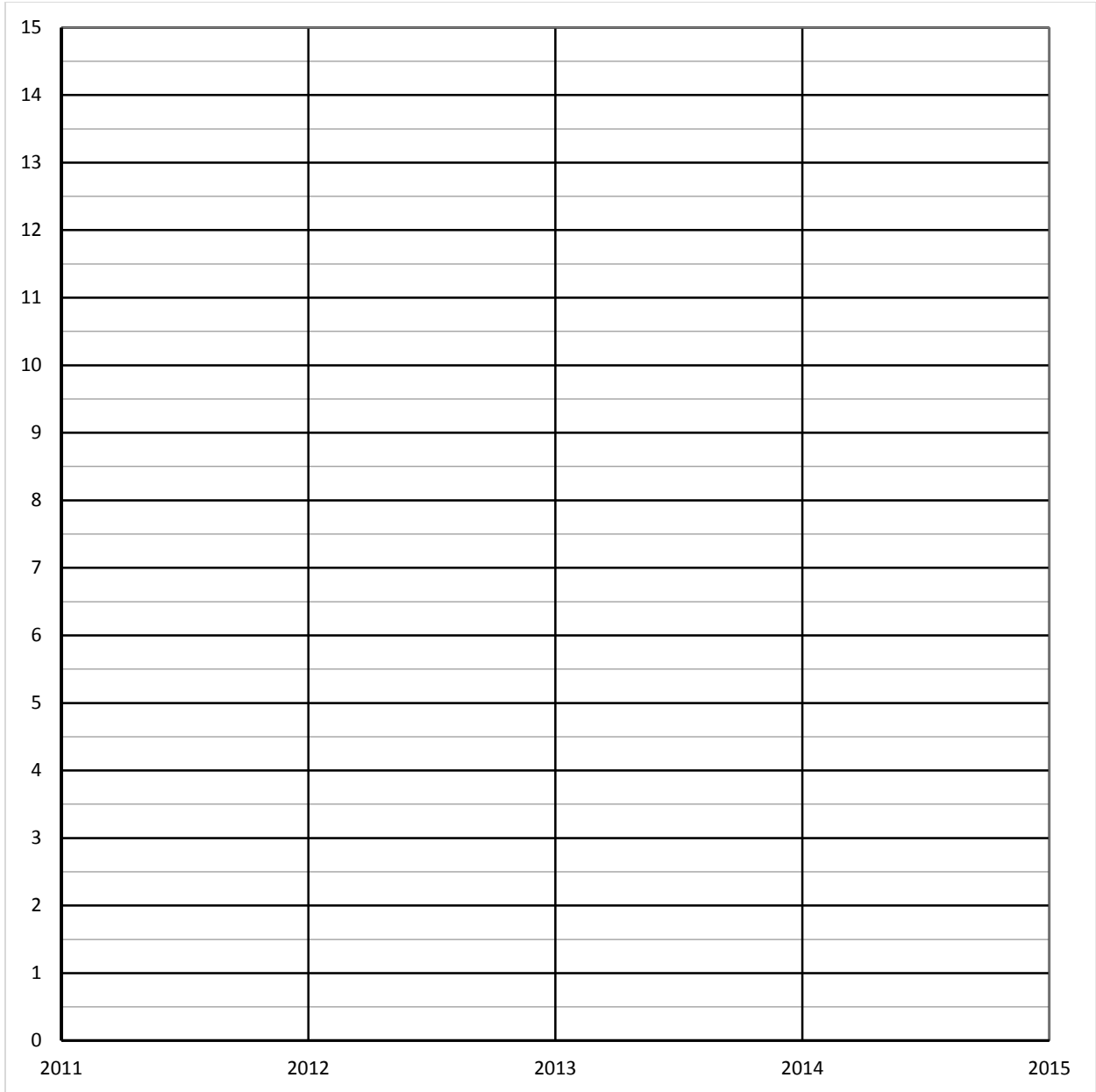
[30]

TOTAL: **150**

ANSWER SHEET A   **EXAMINATION NUMBER:**

QUESTION 3.6

———●— Cost of petrol/litre in Rand   — ● — The cost of diesel/litre in Rand

ANSWER SHEET B   **EXAMINATION NUMBER:**

QUESTION 4.1.2