



**higher education  
& training**

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL CERTIFICATE (VOCATIONAL)**

**MATHEMATICAL LITERACY**

(First Paper)

**NQF LEVEL 4**

(10401034)

**21 February 2018 (Y-Paper)**

**13:00–16:00**

**Nonprogrammable calculators may be used.**

**This question paper consists of 10 pages and 2 addenda.**

<p><b>TIME: 3 HOURS</b> <b>MARKS: 150</b></p>
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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. Clearly show ALL calculations, diagrams, graphs, et cetera used in determining the answers.
  5. Approved calculators may be used, unless otherwise stated.
  6. Round off the answers to TWO decimal places, unless otherwise stated.
  7. Use  $\pi = 3,14$ . Learners will be penalised if any other value is used.
  8. Drawing instruments including rulers, pairs of compasses and protractors may be used.
  9. Answer QUESTION 4.1.4 on ADDENDUM A and QUESTION 5.1.6 on ADDENDUM B.
  10. Diagrams are not necessarily drawn to scale.
  11. Work neatly.
  12. Start each question on a NEW page.
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**QUESTION 1**

- 1.1 Calculate the following without using a calculator. Show ALL steps used to calculate the answer. Leave the answer as a mixed fraction.

$$\frac{4^2 + \sqrt[3]{27} + \sqrt{144}}{26 + 3(5 + 2)} \quad (4)$$

- 1.2 Rearrange the following integers in descending order:

-8; 0; -35; 5 (2)

- 1.3 Convert 600 000 mℓ to kilolitres.

(1 000 mℓ = 1 litre and 1 000 litres = 1 kℓ) (4)

- 1.4 The temperature in Cape Town is  $-2^{\circ}\text{C}$  in the morning. During midday the temperature rises by  $17^{\circ}\text{C}$ .

Determine the midday temperature. (2)

- 1.5 Petrol is sold at 1286 cents per litre. How much (in rands) will it cost to fill up a car that has a 60 litre tank? (4)

- 1.6 Megan is in India. Sipho phones her at 13:47 South African time. India time is 3 hours and 30 minutes ahead of South Africa.

What time is it in India when Sipho calls her? (2)

- 1.7 The price of a loaf of bread after a 6% increase is R12,59.

Calculate the price of the bread before the increase. (3)

- 1.8 Convert R 956 to the Japanese Yen (¥) if the exchange rate is R1 = ¥ 8,37. (2)

- 1.9 Austin rides a speedboat to get to a fishing spot that is 48 km away. The boat travels at an average speed of 120 km/h. How long (in minutes) will it take him to reach the fishing spot?

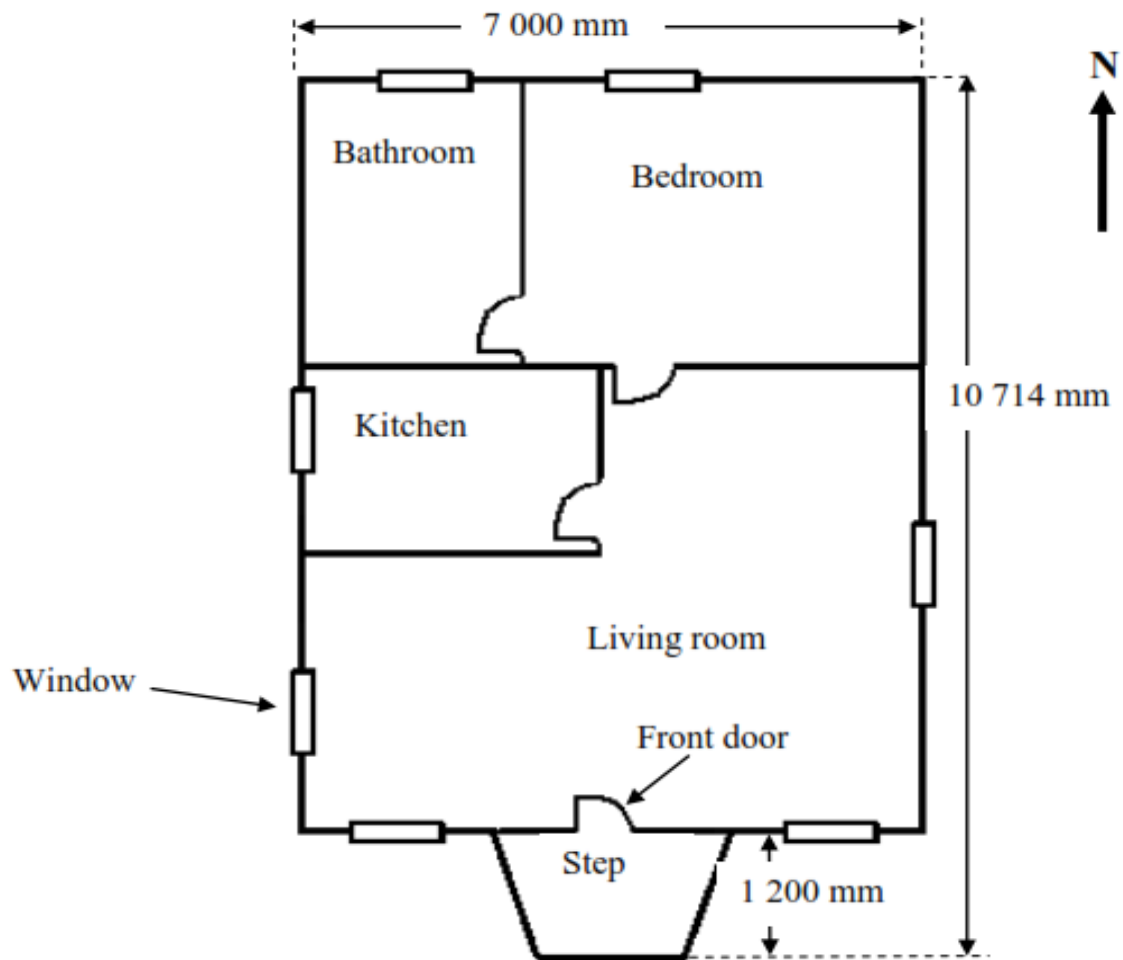
Note: Distance = speed  $\times$  time (3)

- 1.10 The ratio of male to female students at a campus is 4 : 3.

Determine the total number of students at the campus if there are 180 male students. (4)  
**[30]**

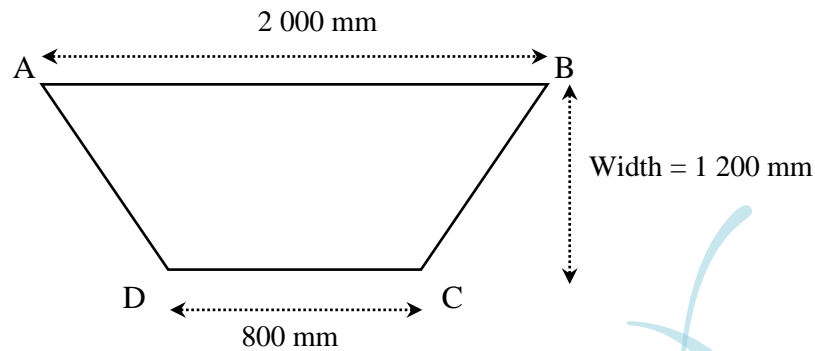
**QUESTION 2**

2.1 Given below is a floor plan of a house in Glencoe.



- 2.1.1 How many windows does the house have? (1)
- 2.1.2 Which rooms have doors that are facing south? (2)
- 2.1.3 The total length of the house, including the step, is 10 714 mm.  
Calculate the length of the house, excluding the step, in metres. (2)
- 2.1.4 Calculate the area of the house, excluding the step, in square metres.  
Formula:  $\text{Area} = l \times b$  (4)

- 2.1.5 The dimensions of the step is in the shape of a trapezium as shown below.



Calculate the area of the step in square metres.

$$\text{Formula: } = \frac{1}{2} \times (AB + CD) \times \text{width}$$

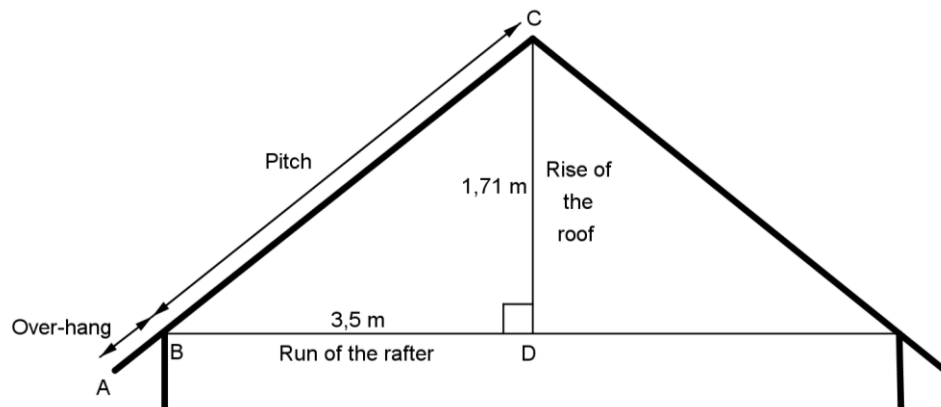
(5)

- 2.1.6 The owner was charged R3 999 per square metre to build the house and R890 per square metre to build the step.

Determine the total cost to build the house.

(3)

- 2.1.7 The drawing below represents the roof of the house. AB is the over-hang, BC is the pitch and AC represents the length of the left rafter.



The run of the bottom rafter measures 3,5 metres.

The rise of the roof measures 1,71 metres.

The overhang measures 0,35 metres.

The length of the left rafter = pitch + overhang

Use the above formula and the theorem of Pythagoras to determine the length of the left rafter.

(5)

2.2 The municipality has two maps of the suburb where the house is being built.

2.2.1 The scale on the first map is 1: 26 000.

Determine the actual distance in kilometres (km) if 20 mm is measured between TWO points on the map.

(4)

2.2.2 The scale on the second map is 1: 250 000.

The actual distance between the house and the nearest shopping mall is 9,5 km.

Determine the map distance for this in millimetres (mm).

(4)  
[30]

### QUESTION 3

3.1 Choose a definition from COLUMN B that matches a financial term in COLUMN A. Write only the letter (A–F) next to the question number (3.1.1–3.1.5) in the ANSWER BOOK, for example 3.1.6 A.

COLUMN A		COLUMN B	
3.1.1	Inflation	A	deficit in bank account caused by withdrawing more money than the account holds
3.1.2	Commission	B	value of a currency for the purpose of conversion to another
3.1.3	Taxable income	C	money received, especially on a regular basis, for work or through sales or investments
3.1.4	Overdraft	D	general increase in prices and fall in the purchasing value of money
3.1.5	Exchange rate	E	fee paid to an agent or employee for transacting a piece of business or performing a service
		F	amount of income used to calculate an individual's or a company's income tax

(5)

3.2 Yappie, a car salesman, earns a basic salary plus commission on cars sold per month.

Use the payslip below to answer the questions.

Zahra Auto Sales: Salary advice: Yappie van der Merwe	
Banking details: First Bank Account number: 542 600 674 26	
Date: 31/03/2017	
Income in rands	Deductions in rands
Basic Salary: R10 400	UIF: <b>3.2.3</b>
Commission: <b>3.2.1</b>	Medical aid: R1 738
	PAYE: <b>3.2.4</b>
	Provident fund: R1 248
<b>Total income: 3.2.2</b>	<b>Total deductions: 3.2.5</b>
	<b>Net salary: 3.2.6</b>

3.2.1 Yappie receives 8% commission on the total profit of the cars he sells every month. During March 2017 the total profit was R257 500.

Calculate Yappie's total commission for March 2017. (2)

3.2.2 Calculate Yappie's total income. (3)

3.2.3 UIF is calculated at 1% of the basic salary.

Calculate the amount deducted for UIF for March 2017. (2)

3.2.4 PAYE is calculated at 45% of the commission earned per month.

Calculate the amount deducted for PAYE for March 2017. (3)

3.2.5 Calculate the total deductions for March 2017. (3)

3.2.6 Calculate Yappie's net salary for March 2017. (3)

3.3 Use the table below representing the South African vehicle industry sales from 2010 to 2015 to answer the questions.

Sector	2010	2011	2012	2013	2014	2015	2015/2014 % Change
Cars	337 130	396 292	442 604	450 296	438 942	412 826	<b>A</b>
Light Commercials	133 756	149 301	160 174	167 996	173 759	174 490	+0,4%
Medium Commercials	7 557	9 218	10 104	<b>B</b>	11 024	10 488	- 4,9%
Heavy , Extra Heavy Commercials, Buses	14 464	17 438	17 737	19 340	20 534	20 123	- 2,0%
Total Vehicles	492 907	572 249	630 619	649 216	644 259	617 927	- 4,1%

[Source: <http://www.wheels24.co.za/News/drop-in-sa-car-sales-outlook-for-2016-is-uninspiring20160108>]

- 3.3.1 In which year was the first decline in the number of cars sold? (1)
- 3.3.2 Calculate the value of **A**, the percentage change in cars sold between 2015 and 2014. (4)
- 3.3.3 The highest vehicle sales were recorded in 2013. Determine the number of medium commercials vehicles sold (the value of **B**). (2)
- 3.3.4 Give TWO reason for the year-on-year drop in the total number of vehicles sold between 2014 and 2015 in South Africa. (2)
- [30]**

#### QUESTION 4

- 4.1 Faizal laminates posters and certificates at a weekend flea market. He pays R1 000 a month to rent the stall and each poster or certificate costs him R5 to laminate. Faizal charges R25 per lamination.

Number of laminations	0	15	30	45	60	75	90
Total expenses in rands (includes rent)	<b>A</b>	1 075	1 150	1 225	1 300	1 375	1 450
Income in rands	0	375	750	1 125	1 500	<b>B</b>	2 250

- 4.1.1 Use the information and the table to extend the numerical patterns by completing the missing values **A** and **B**. Write only the answer next to the letter (**A–B**) in the ANSWER BOOK. (2)
- 4.1.2 Derive a formula to calculate Faizal's total expenses. (3)
- 4.1.3 Use the formula in QUESTION 4.1.2 to calculate the number of laminations made if the expense is R1 505. (4)



4.1.4 Use the table to draw and label TWO line graphs (on ADDENDUM A) showing Faizal's income and his expenses). Label each line, label the horizontal and vertical axes and give the graph a suitable heading. (8)

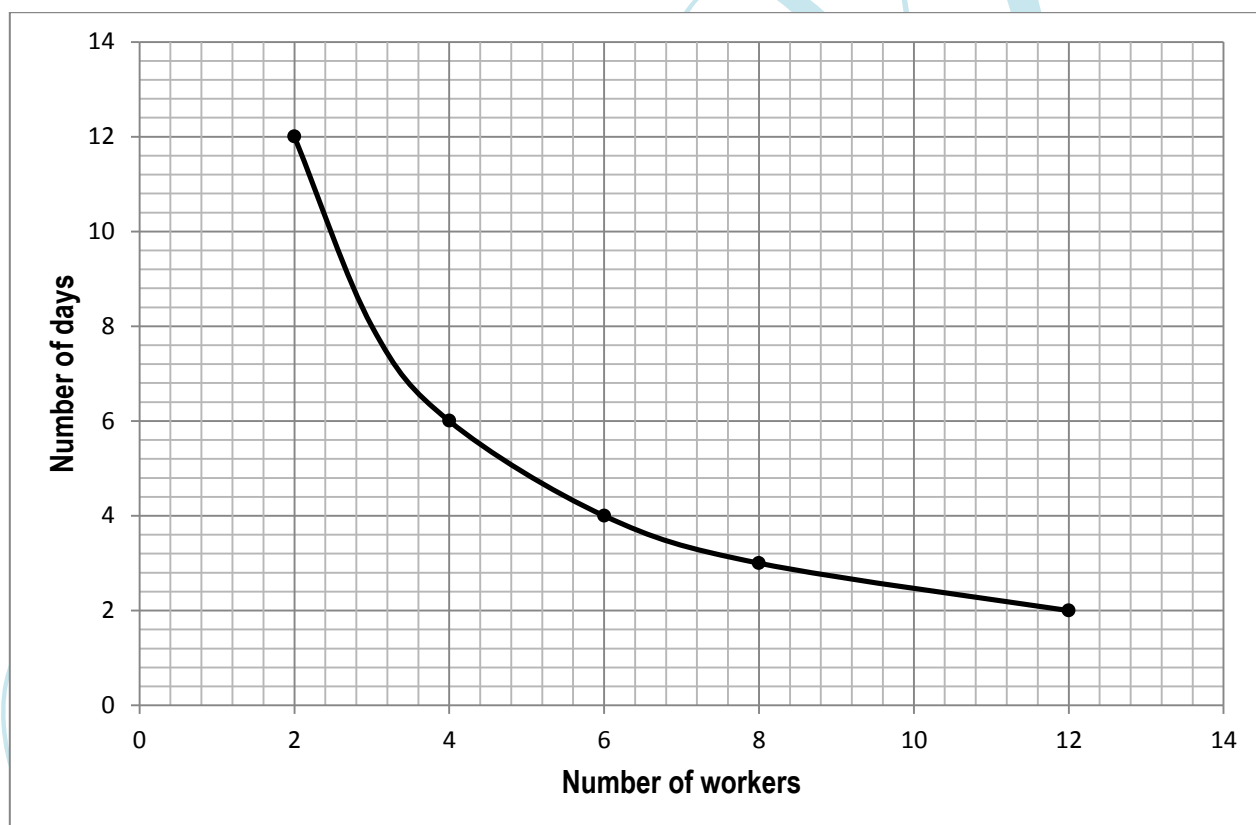
4.1.5 Name the dependent variable. (1)

4.1.6 Is the income or the expense graph in QUESTION 4.1.5 an example of a direct relationship?

Give a reason for your answer. (2)

4.1.7 Use the graph to determine the number of posters and certificates that Faizal must laminate to make a profit. (2)

4.2 The line graph given below shows the relationship between the number of workers required and the number of days needed to reap a field.



4.2.1 How many workers are required to reap the field in 8 days?

4.2.2 How many days will it take ONE worker to reap the field?

4.2.3 What type of proportion does the graph represent?

Give a suitable reason for the answer.

4.2.4 Derive a formula to calculate the number of days needed to complete the reaping.

(4 × 2) (8)

[30]

## QUESTION 5

The table below shows the price changes of fuel per litre year-on-year between August 2006 and August 2016:

YEAR	PETROL	DIESEL
2006	R7,04	R6,54
2007	R7,01	R6,51
2008	R10,40	R11,27
2009	R7,69	R6,65
2010	R8,17	R7,38
2011	R10,40	R9,30
2012	R11,04	R10,25
2013	R13,55	R12,48
2014	R14,33	R12,84
2015	R13,26	R10,94
2016	R12,35	R10,96



[Adapted from: [businesstech.co.za/news/energy/134400/petrol-vs-diesel-prices-in-south-africa-2006-2016/](http://businesstech.co.za/news/energy/134400/petrol-vs-diesel-prices-in-south-africa-2006-2016/)]

- 5.1 Determine the mode of the price of petrol between August 2006 and August 2016. (2)
- 5.2 Calculate the mean (average) price of petrol between August 2006 and August 2016. (3)
- 5.3 The price of fuel was reduced between 2014 and 2015.  
Determine whether petrol or diesel showed a greater reduction in price. (3)
- 5.4 Calculate the difference between the range of the price of petrol and the range of the price of diesel. (6)
- 5.5 Calculate the difference between the median of the price of petrol and the median of the price of diesel. (6)
- 5.6 Draw and label a compound bar graph for the price of petrol and diesel from 2013 to 2016 on the grid in ADDENDUM B (attached).  
Give a suitable heading and legend for the graph and also label the vertical axis. (8)
- 5.7 Give a reason why the graph in QUESTION 5.1.6 can be misleading. (2)

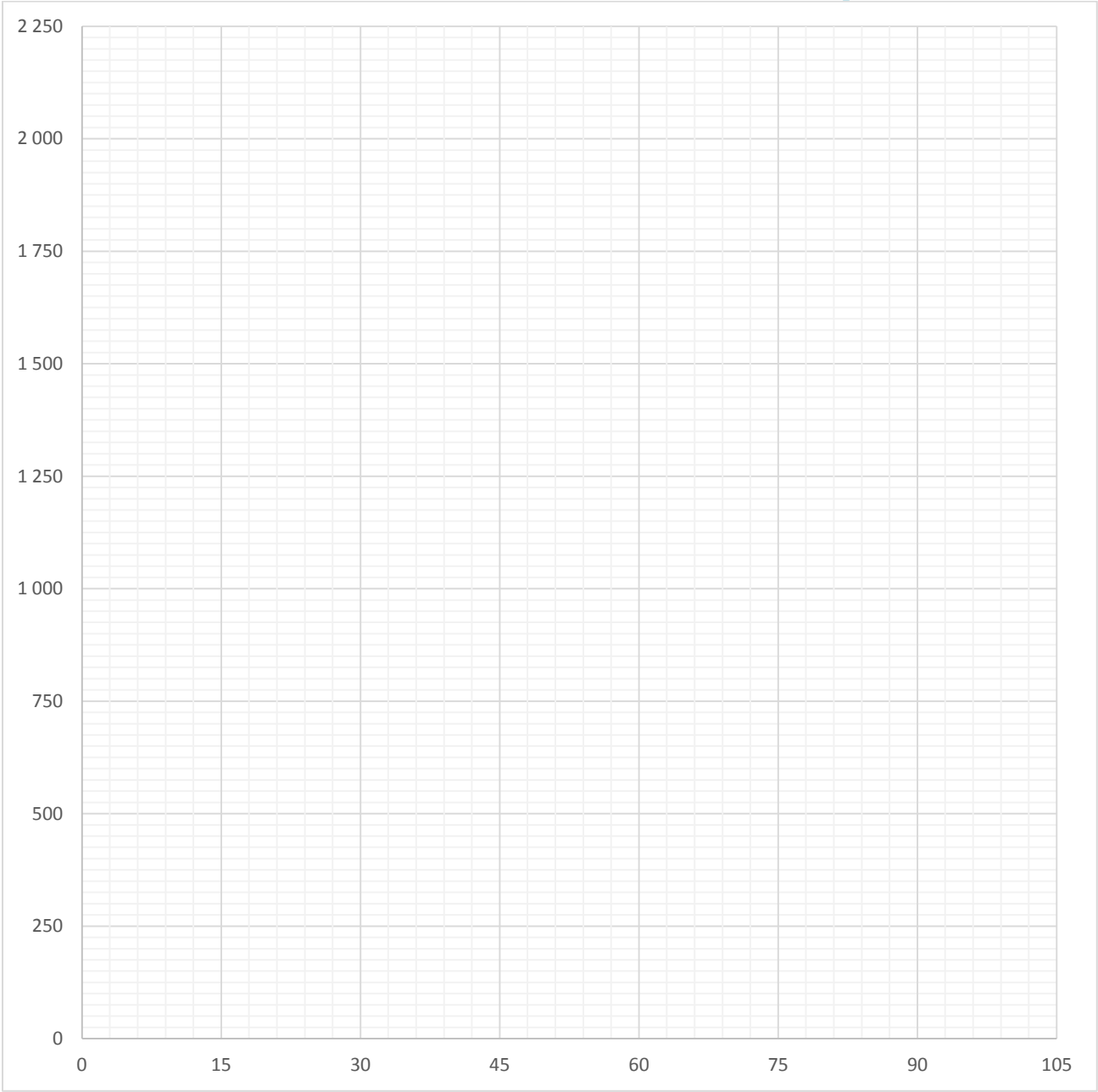
[30]

**TOTAL: 150**

ADDENDUM A      EXAMINATION NUMBER:

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QUESTION 4.1.4



**ADDENDUM B      EXAMINATION NUMBER:**

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**QUESTION 5.1.6**



**Legend:**