higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICAL LITERACY
(First Paper**)**
NQF LEVEL 3

(10401023)

20 February 2018 (X-Paper)
09:00–12:00

Calculators may be used, unless stated otherwise.

This question paper consists of 11 pages and 2 addenda.

NCV

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TIME: 3 HOURS
MARKS: 150

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. You may use an approved calculator (nonprogrammable and nongraphic), unless stated otherwise.
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. Maps and diagrams are NOT necessarily drawn to scale, unless stated otherwise.
9. Answer QUESTION 4.1.2 on the attached ADDENDUM A and QUESTION 5.2.5 on ADDENDUM B. Write your EXAMINATION NUMBER in the spaces provided and hand in the ADDENDA with your ANSWER BOOK.
10. Write neatly and legibly.

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QUESTION 1

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

1.1.1 $32 - 7 \times 3$ (2)

1.1.2 $\frac{1}{2}\left(\frac{58}{2} - 5\right)$ (3)

1.1.3 50% of 90 − 22 (3)

1.2 Kate, Phil and Eddy shared R1 200,00 among themselves in the ratio of 3:2:1.

Calculate the amount in rands that Phil received. (3)

1.3 The price of a washing machine, after a 10% discount is R3 420,00. Calculate the original price of the washing machine. (4)

1.4 A student took 33 minutes to walk from home to college. If he left home at 6:38, at what time did he reach college? (2)

1.5 The maximum weather temperature reading is 68 °F. Use the formula below to convert the temperature reading to °C.

Formula: °C = (°F − 32°) ÷ 1,8 (3)

1.6 Petrol price increased from R12,50 to R13,10 per litre. Calculate the percentage petrol price increase. (4)

1.7 The table below shows two options of purchasing data bundles in Megabytes (MB):

	Data Bundle	Price
Option A	250 MB	R59,00
Option B	500 MB	R99,00

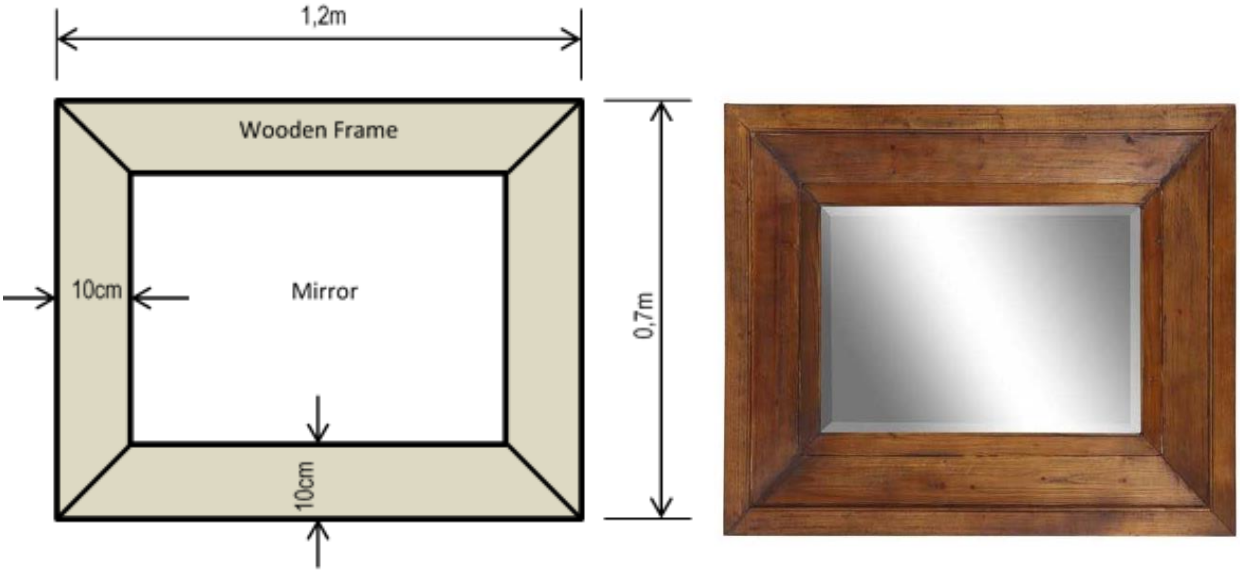
Which is the cheaper option? Show all calculations to support your answer. (4)

1.8 Convert 10 cm^2 to mm^2. (2)

1 cm^2 = 100 mm^2 **[30]**

QUESTION 2

2.1 A rectangular framed mirror has a length of 1,2 metres and a breadth of 0,7 metres. The width of the wooden frame is 10 cm. Study the sketch and answer the questions.



2.1.1 Convert 10 centimetres to metres. (1)

2.1.2 Determine the perimeter of the outer edge of the wooden frame in metres.

Formula: P = 2 (Length + Breadth) (3)

2.1.3 Determine the length of the part of the mirror that is visible. Give your answer in metres. (2)

2.1.4 Calculate the area of the wooden part of the frame only.

Formula: A = L × B (4)

2.2 Below is a map of the Western Cape Province in South Africa. Study the map to answer the questions.

2.2.1 What is the compass direction of Saldanha from Hermanus? (1)

2.2.2 Use the scale on the map to determine the actual straight-line distance between Worcester and Laingsburg in kilometres. (5)

2.2.3 The distance from Worcester to Beaufort West is 357 km. Calculate the average speed required in km/h to get to Beaufort West in 4 hours.

Average Speed = distance ÷ time (3)

2.3 A petrol tank has a diameter of 2 metres and length of 4 metres.

The formula to calculate the volume of the tank = $\pi \times r^2 \times h$ where $\pi = 3,14$.

Use the information to answer the questions that follow:

2.3.1 Determine the radius of the tank in metres. (1)

2.3.2 What is the dimension of the height of the tank? (1)

2.3.3 Calculate the volume of the tank. Round off your answer to the nearest cubic metre. (4)

2.3.4 Convert the answer in QUESTION 2.3.3 to litres if $1m^3 = 1\ 000$ litres. (2)

2.3.5 How long will it take to fill up the tank if the petrol flows at a rate of 100 litres per minute? Give your answer in hours and minutes. (3)

[30]

QUESTION 3

3.1 Choose a description from COLUMN B that matches the term in COLUMN A. Write only the letter (A–E) next to the question number (3.1.1–3.1.5) in the ANSWER BOOK.

COLUMN A	COLUMN B
3.1.1 Cost Price	A plan that shows how much money a business expects to receive in, and pay out, over a given period.
3.1.2 Variance	B charge by the government on the annual income of a person or business.
3.1.3 Cash Flow Projection	C total revenue received before any deductions.
3.1.4 Income Tax	D price at which goods are bought by a shop owner.
3.1.5 Gross Income	E difference between an expected and actual result.

(5 × 1) (5)

3.2 Ayanda runs a small delivery business and sells cool drinks at her premises. She expects her business to generate an income of R24 000,00 per month. Ayanda's projected budget for the month of April 2018 is shown below. Use the budget to answer the questions.

Budget for April 2018

MONTHLY INCOME		MONTHLY EXPENDITURE	
Income from deliveries	R21 400,00	Electricity	R540,00
Cooldrink sales	R2 600,00	Vehicle Instalment	R3 110,00
		Water Account	R377,00
		Petrol	R2 000,00
		Driver's Salary	R5 300,00
		Municipal Rates	R572,00
		Entertainment ***(15% of Total Monthly Income)***	**A**
		Cell Phones + 3G Wi-Fi	R1 000,00
		Cost of cooldrinks	R3 160,00
		Petty Cash	R450,00
TOTAL	R 24 000,00	TOTAL	**B**
		Surplus/Deficit	**C**

3.2.1 Name one fixed expense in the budget. (1)

3.2.2 Name one variable expense in the budget. (1)

3.2.3 Ayanda plans to use 15% of her income on entertaining her clients. Calculate the value of **A,** the entertainment expense. (2)

3.2.4 Calculate the value of **B,** the total expenses. (2)

3.2.5 Calculate the balance **C** after all expenses. Indicate whether the balance is a surplus or a deficit. (3)

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3.3 Ayanda purchased stationery and equipment for her business in February 2018. She received the following invoice on her purchases:

Adam's Stationers
Stand No. 632
PRETORIA
Tel: 012 312 1***

Invoice 26564
Date: 1 February 18
Due date 01 March 18

Item	Quantity	Unit Price	Total
Printer cartridges	20	R350,00	R7 000,00
Printing paper	5 boxes	R50,00 per box *Less 10% discount*	R225,00
Cable straps (100 per bag)	7 bags	R59,00	**A**
Plastic bags (1 000 per box)	11 boxes	**B**	R990,00
		Total Amount	R8 628,00
		14% VAT	**C**
		Total Amount Due	**D**

3.3.1 Calculate the values of **A** and **B.** (4)

3.3.2 Calculate the value **C**, the VAT amount. (2)

3.3.3 Calculate the value **D**, the total amount due. (2)

3.3.4 Show, by means of calculations how the cost of R225,00 for printing paper was calculated. (2)

3.4 Ayanda pays her driver a monthly salary of R5 300,00. She decides to increase the driver's salary by 12,5%.

3.4.1 Calculate the driver's new monthly salary. (2)

3.4.2 Calculate the amount of the driver's new annual UIF contribution if it is charged at a rate of 1% per annum. (4)

[30]

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QUESTION 4

4.1 A conference venue caters for a maximum of 100 delegates and charges a flat rate of R15 000,00 per day.

The table below shows the cost per delegate based on the number of delegates attending a conference per day.

Number of delegates	10	20	**A**	40	50	100
Cost per delegate	R1 500,00	R750,00	R500,00	R370,00	**B**	R150,00

Use the information provided to answer the following questions:

4.1.1 Calculate the values of **A** and **B**. (4)

4.1.2 Use the information in the above table to draw and label a line graph on the grid found in ADDENDUM A (attached). Label the horizontal and vertical axes and provide a suitable heading for the graph. (5)

4.1.3 Use the graph in QUESTION 4.1.2 to determine the cost per delegate if 60 delegates attend a one-day conference. (2)

4.1.4 Derive a formula that represents the information in the above table. (3)

4.1.5 What type of proportion does the graph represent? (1)

4.2 The conference venue offers two rate options for hiring a Programme Director:

Option A: An upfront amount of R900,00 and a further R100,00 per hour.

Option B: A flat rate of R400,00 per hour.

Duration of the conference in hours	0	1	2	5
Cost of Option A	R900,00	R1 000,00	R1 100,00	**A**
Cost of Option B	R0	R400,00	R800,00	R2 000,00

Study the given information and answer the following questions:

4.2.1 Derive a formula to calculate the cost of **Option A**. (3)

4.2.2 Use the formula to calculate the missing value of **A** in the table. (2)

4.2.3 Is the pattern in **Option A** an example of a constant difference pattern or a constant ratio pattern? Substantiate your answer by calculating the common difference or the constant ratio. (3)

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4.2.4 Is the pattern in **Option B** an example of a direct proportion or an indirect proportion? Give a reason to support your answer. (3)

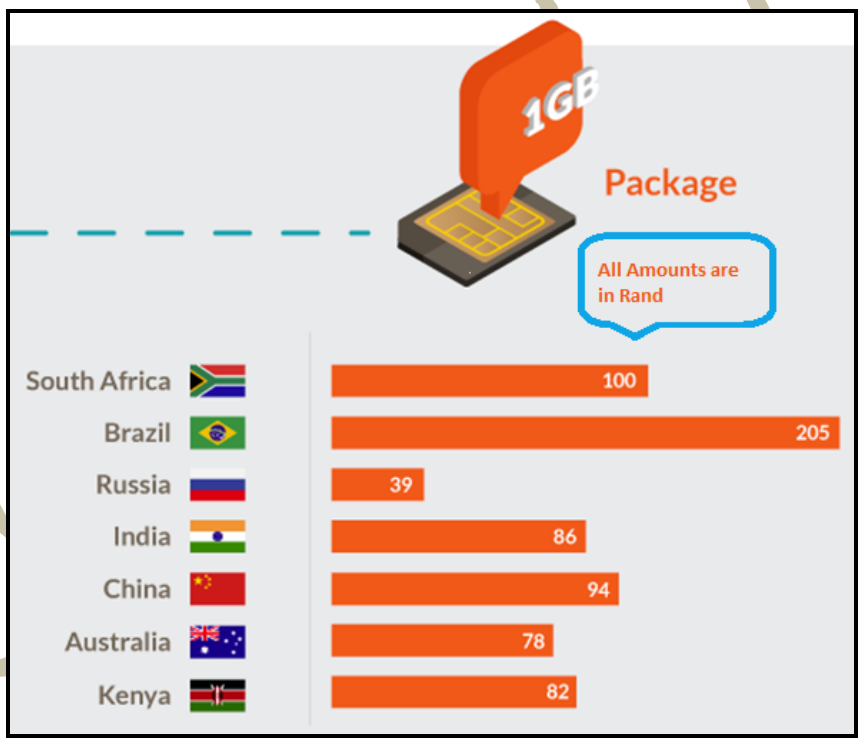
4.2.5 If the conference is expected to be completed within 4 hours, determine which option will be cheaper? Calculate the difference in cost between the options to substantiate your answer. (4)

[30]

QUESTION 5

5.1 A research company compared the average prices of "data only" packages between the BRICS-member countries. Kenya and Australia were also included in the comparison.

The graph below shows the average cost of 1 Gigabyte (GB) of data in each of the countries.



[Source: http://www.fin24.com/Tech/Multimedia/data-prices-how-sa-compares-to-the-rest-of-the-world-20160930]

Study the graph and the given information to answer the following questions:

5.1.1 In which country does 1 GB of data cost the most? (1)

5.1.2 In which country does 1 GB of data cost the least? (1)

5.1.3 Determine the median of the average cost of 1 GB of data. Also name the country that charges the median amount for 1 GB of data. (3)

5.1.4 Determine the range of the average cost of 1 GB of data. (2)

5.1.5 Calculate the mean of the average cost of 1 GB of data amongst the countries in the comparison. (3)

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5.2 A campus management team analyses its students' ICASS mark in vocational subjects. Students who do not obtain a minimum mark of 50% for a vocational subject do not qualify to write the final examination in that subject.

The table below shows the grouped data of the NC(V) Level 3 students' marks, for one of the vocational subjects, according to gender.

% ICASS mark by gender							
	30 – 39	40 – 49	50 – 59	60 – 69	70 – 79	80 – 89	TOTAL
Female	3	4	15	5	4	5	36
Male	7	5	13	6	3	4	**A**
TOTAL	10	9	**B**	11	7	9	

Study the above table to answer the following questions:

5.2.1 Calculate the missing values of A and B. (4)

5.2.2 What is the size of the population in this vocational subject? (3)

5.2.3 Determine the number of NC(V) L3 students who do not qualify to write the final examination in this subject. (3)

5.2.4 Determine the percentage of NC(V) L3 students who do not qualify to write the final examination in this subject. (3)

5.2.5 Draw and label a double bar graph of the performance of the female and male NC(V) L3 students on the grid found in ADDENDUM B (attached). Provide a suitable heading and legend for the graph and label the vertical axis. (7) **[30]**

TOTAL 150

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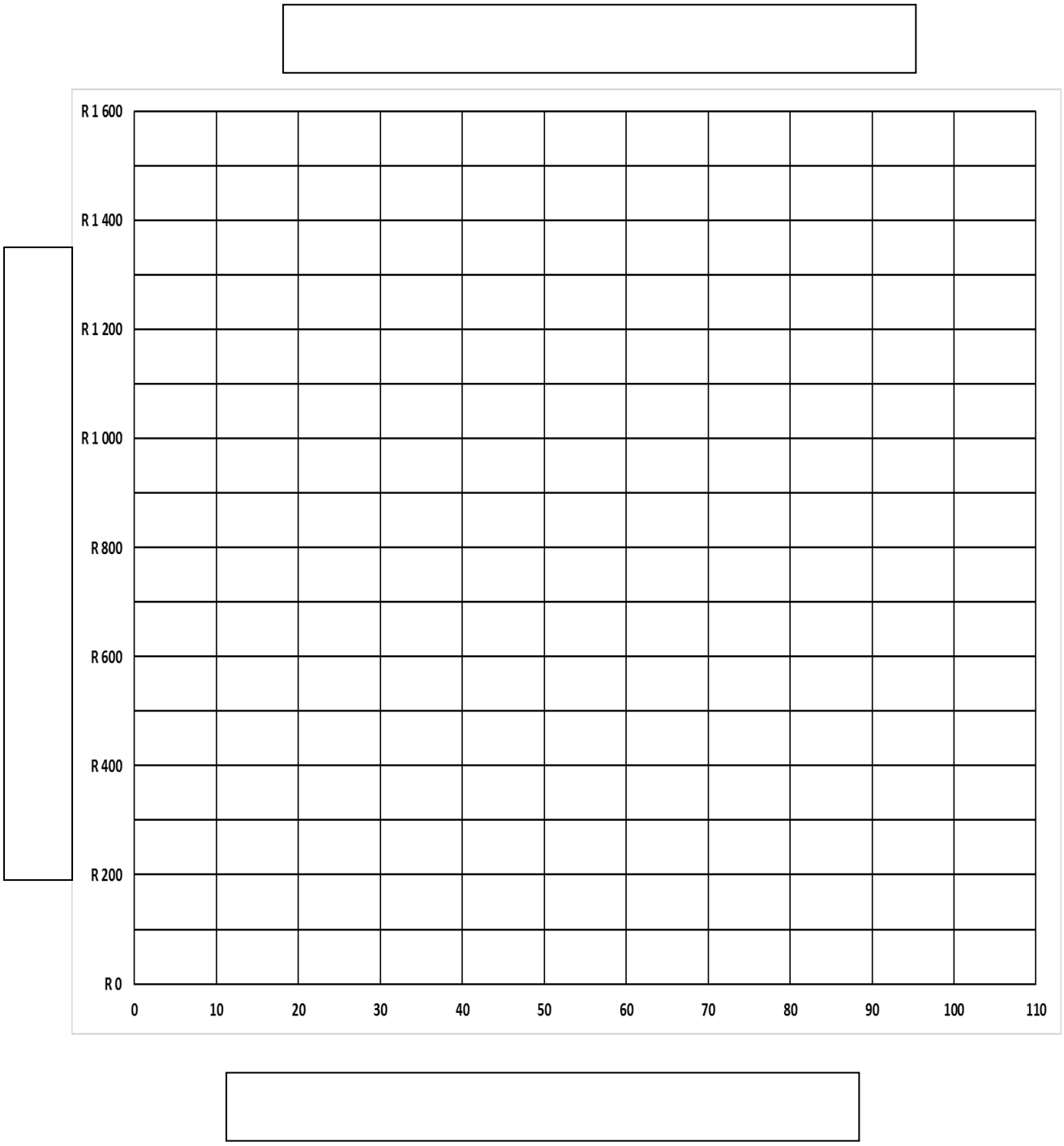
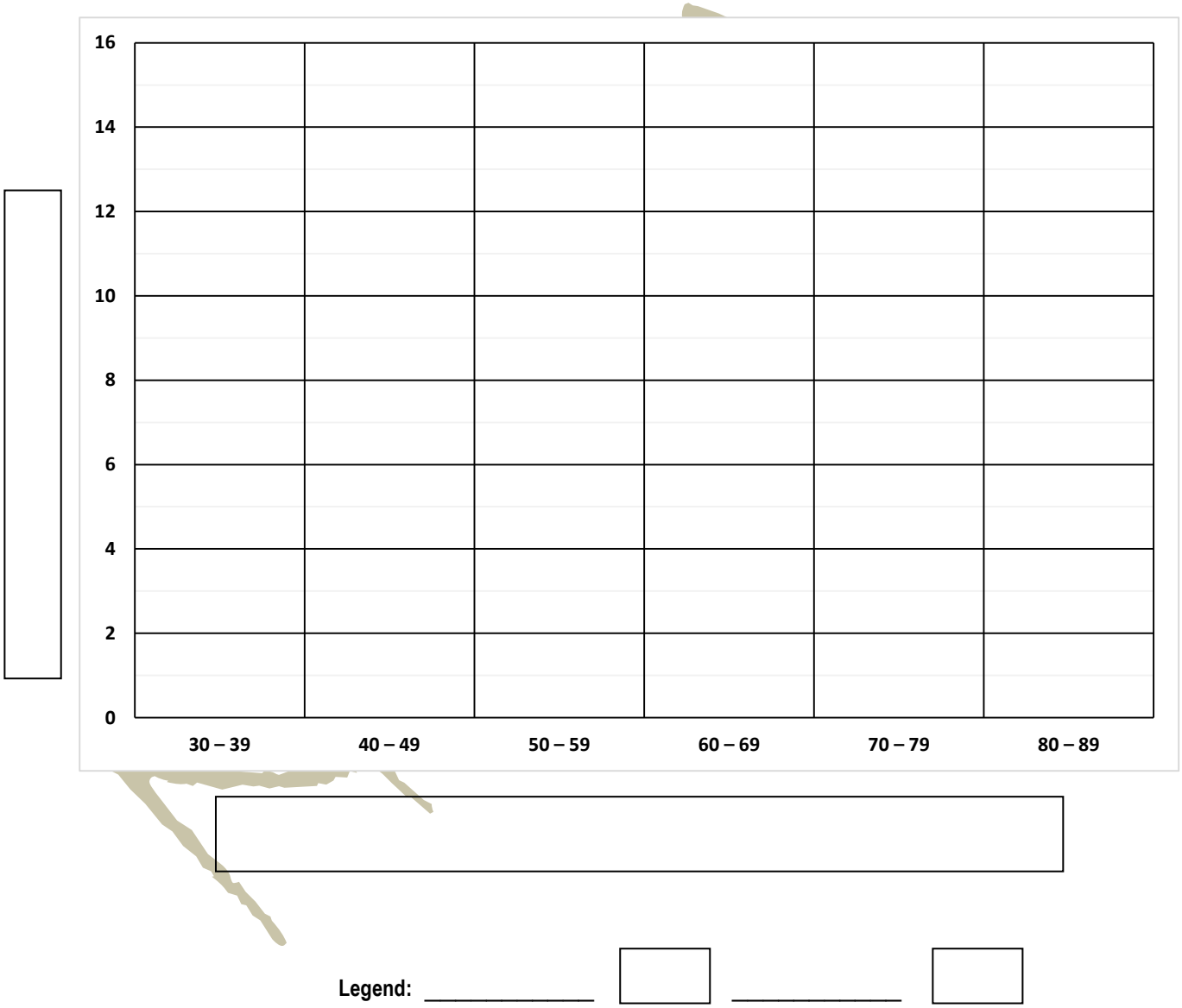
ADDENDUM A **EXAMINATION NUMBER:**

QUESTION 4.1.2



ADDENDUM B **EXAMINATION NUMBER:**

QUESTION 5.2.5



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