

STUDENT EDUCATION NUMBER									

Samoa National Junior Secondary Certificate

MATHEMATICS 2024

QUESTION and ANSWER BOOKLET

Time allowed: 3 Hours & 10 minutes

INSTRUCTIONS

- 1. You have 10 minutes to read **before** you start the exam.
- 2. Write your **Student Education Number (SEN)** in the space provided on the top right-hand corner of this page.
- 3. Answer ALL QUESTIONS. Write your answers in the spaces provided in this booklet.
- If you need more paper to write your answers, ask the Supervisor for extra paper. Write your SEN on all extra sheets used and clearly number the questions. Attach the extra sheets to the appropriate places in this booklet.

STRANDS			Time (min)	Weighting
STRAND 1	NUMBERS & OPERATIONS	2	12	7
STRAND 2	ALGEBRA	3-7	40	22
STRAND 3	STATISTICS & PROBABILITY	8-11	25	14
STRAND 4	MEASUREMENTS	12-15	32	17
STRAND 5	GEOMETRY	16-18	25	14
STRAND 6	TRIGNOMETRY	19-20	12	7
STRAND 7	RATES OF CHANGE	21-24	34	19
	180	100		

Check that this booklet contains pages 2-25 in the correct order and that none of these pages are blank. HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

STRAND 1

3.

NUMBERS & OPERATIONS

A pastry recipe has three ingredients, flour, butter and water mixed in the ratio:

If Siera follows the recipe and uses 3 cups of flour, how many cups of butter should she use?

- For Question 1, choose and write the LETTER of the correct answer in the box provided.
 - 1. Convert the number below into scientific notation.

0.000089

- A. 8.9×10^{-4}
- B. 8.9×10^{-5}
- C. 8.9×10^{-6}
- D. 8.9×10^5
- 2. Find the value of the multiplication given below. Show your working.

 $25^{1/2} imes 27^{1/3}$

24:8:3 If Siera follows the recipe and uses 3 cups of flour, how many cups of butter should

SL 4





For Questions 4 and 5, choose and write the LETTER of the correct answer in the box provided.

- 4. Expand (x 1)(x + 1).
 - A. $1 x^2$
 - B. $x^2 1$
 - C. $x^2 2x 1$
 - D. $x^2 + 1$
- 5. Which gradient rule below indicates that two lines are perpendicular if the gradient of the first line is m_1 and gradient of the second line is m_2 ?
 - A. $m_1 = m_2$
 - B. $m_1 \times m_2 = 1$
 - C. $m_1 = -\frac{1}{m_2}$
 - D. $m_1 \neq m_2$
- 6. Expand and simplify the expression below:
 - $(3-a)^2$



SL 1





- -2 1 1 2 3 0 -3 X y = -2-2 -2 3 2 1 -4 -3 -2 0 2 3 4 -1 -1 -2 -3
- 7. Fill in the table of value, plot the co-ordinates on the grid below and connect them to form a line, the first and last co-ordinates are plotted for you.



8. Graph the parabola below using any method.

 $y = x^2 + 1$





9. Simplify:

$$\frac{(2x)^3}{x^2 \times 4x^3}$$



10. Solve the quadratic equation below:

$$4x^2 - 1 = 0$$



11. Find the gradient of the line using the gradient method $m = \frac{y_2 - y_1}{x_2 - x_1}$, then write the equation of the line in the general form y = mx + c.







12. Three taxi drivers are working at an airport. The first driver transported seventeen passengers in one day. The second driver transported six more passengers than the first driver, while the third driver transported two fewer passengers than the second driver. How many passengers in total did the three drivers transport?

SL 4

STRAND 3

STATISTICS & PROBABILITY

For Questions 13 to 15, choose and write the LETTER of the correct answer in the box provided.

13. A die is thrown once. What is the probability of getting an even number?



- 14. A randomly selected sample of 19-year-old boys taken from a large population has an average height of 160cm. What would be the most likely average height of 19-year-old boys in the population?
 - A. 80 cm
 - B. 240 cm
 - C. 160 cm
 - D. 480 cm
- 15. A cup was filled with hot water and the temperature was recorded every five minutes. The results are shown in the graph below:

What was the temperature at the start of the experiment?

- A. 80°*C*
- B. 70°*C*
- C. 30°C
- D. 50°C





16. Draw a tree diagram to show the possible outcomes when two coins are tossed?

SL 2

17. Using your tree diagram in **Question 16**. What is the probability of getting two heads?

SL 2

18. For 75 employees of a large department store, the following distribution for years of service was obtained. Construct a **histogram graph** for the frequency table below and provide meaningful title, vertical & horizontal axis labels for your graph.

Numbers of Years	Numbers of Employees
1-5	21
6-10	25
11-15	15
16-20	0
21-25	8
26-30	6





19. At the Nu'u Gardening Centre, packs of 8 bulbs were planted into pots. The germination of the seeds was studied by counting how many in each pot actually grew. The results are shown in the table below. Using the information in the table, calculate the mean number of seeds that germinated.

Germinating Seeds (x)	Numbers of Pots (f)	Cumulative	x.f
		frequency	
0	0	0	0
1	0	0	0
2	1	1	2
3	4	5	12
4	16	21	64
5	12	33	60
6	10	43	60
7	5	48	35
8	2	50	16
Total	Σf =		Σx.f =

For Questions 20 to 22, choose and write the LETTER of the correct answer in the box provided.

MEASUREMENTS

- 20. The time is 18:35 on the 24-hour clock. What is 18:35 on am/pm clock?
 - A. 6:35 am
 - b. 6:35 pm
 - c. 18:35 am
 - d. 18:35 pm
- 21. How many miles is equivalent to 3000 meters? (*Note:* 1meter = 0.0006miles)
 - A. 1864 miles
 - B. 4828 miles
 - C. 1.8 miles
 - D. 18 miles
- 22. What 2D shapes form the 3D cylinder shown in the diagram?
 - A. Circle and Rectangle
 - B. Circle and Sphere
 - C. Cube and Sphere
 - D. Rectangle and Cube



SL 1

SL 1

SL 1

SNJSC | Mathematics

23. A circle with diameter of 14 cm is given. Find the circumference of the circle. Use $\pi = \frac{22}{7}$.



SL 2

24. The diagram shows a cone of height 8 units and base radius 6 units. What is its volume in the nearest units?

Note: formula volume of Cone: $V = \frac{1}{3}\pi r^2 h$ and $\pi = \frac{22}{7}$





25. A full can of soup has a diameter of 6cm and height 11cm. How much soup does the can hold? Give your answer to three decimal places.

Note:

Volume of cylinder $V = \pi r^2 h$, $\pi = \frac{22}{7}$ and $1ltr = 1000 cm^3$



26. Part of a map is shown below, indicating the location of two cities. Calculate the real-life distance, in miles, between Tehran and Tokyo.





27. Rachel works for 2 hours 25 minutes in the morning and 3 hours 40 minutes in the evening everyday including weekends. For how much time did Rachel work in a fortnight?



STRAND 5

GEOMETRY

For Question 28, choose and write the LETTER of the correct answer in the box provided.

- 28 What is an exterior angle in a convex polygon?
 - A. The sum of all interior angles.
 - B. The sum of all sides in a polygon.
 - C. An angle formed inside a polygon.
 - D. An angle formed outside a polygon by extending one side.
- 29. Find the size of each interior angle of a regular decagon. Show your working out.

Notes: Formula sum of interior angles is $S = (n - 2) \times 180^{\circ}$



SL 1

30. Describe how the two triangles are congruent.



31. Calculate the sum of the interior angles of a regular polygon below by dissecting the shapes into 4 triangles.



SL 3

32. *V*, *W*, *X* and *Y* are points on the circumference of a circle, center O. Chords VX and WY intersect at the point Z. $\angle WVX = 72^{\circ}$ and $\angle VXY = 38^{\circ}$. What is the size of $\angle VZW$?



33. Reflect the 'L'-shape on the y axis.



STRAND 6

TRIGONOMETRY

For Question 34, choose and write the LETTER of the correct answer in the box provided.

- 34. Which of the following shows the Pythagoras theorem?
 - A. $c^2 = \sqrt{a^2 + b^2}$
 - B. $c^2 = \sqrt{a^2 b^2}$
 - C. $c^2 = a^2 + b^2$
 - D. $c = a^2 + b^2$
- 35. State the sine rule for non- right-angled triangle using the labels in the diagram.



SL 1

36. The diagram shows the cross-sections of a roof.

а

What is the distance BC across the base of the roof?



 SL 1

37. Find the angle of elevation of the line graph to the nearest degree.





For Questions 38 to 41, choose and write the LETTER of the correct answer in the box provided.

38. Which of the following sequences of numbers is generated by the formula below?

 $t_n = 2n + 5$

- A. 7,9,11,13,15,...
- B. 0,9,11,15,13,...
- C. 9,7,11,13,15,...
- D. 7,11,13,15,...

39. Which sequence below is an example of finite sequence?

- A. 7,9,11,13,15,...
- B. 2,4,6,8,10,...
- C. 1,4,9,16,25,...
- D. 7,9,11,13
- 40. What is the next term of the sequence below?

4,7,12,19,28, ...

- A. 33
- B. 39
- C. 36
- D. 40







41. Which transformation is shown by the movement of Graph A (red) to Graph B (blue)?



- A. $y = x^2$ to $y = 2x^2$
- B. $y = x^2$ to $y = x^2 2$
- C. $y = x^2$ to $y = x^2 + 2$

D.
$$y = x^2$$
 to $y = -2x^2$

42. Express the exponential function $f(x) = 5^x$ using set-builder notation.





43. Identify domains where the graph increases, decreases, or no change.



44. In an Arithmetic Progression (AP) with difference of 8, the 4th term is 35.What term is 115?

Noted: General formula for the nth term in an Arithmetic Progression $t_n = a + (n-1)d \label{eq:tau}$

45. Given that $f(x) = 2x^2 + 1$ and a = 2. Find f(x) = a

SL 3

46. A scuba diver is 30 feet below the surface of the water 10 seconds after he entered the water and 100 feet below the surface after 40 seconds. Identify your meaningful independent (y) and dependent (x) variables and calculate the scuba diver's rate of change.





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SNJSC MATHEMATICS

2024

(For Scorers only)

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STRAND 1	NUMBERS & OPERATIONS	7			
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		100			