

STUDENT EDUCATION NUMBER									

Samoa School Certificate

MATHEMATICS 2021

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.
- 4. 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 at the appropriate places in this booklet.

s	TRANDS	Pages	Time (min)	Weighting
STRAND 1	NUMBERS	2	21	12
STRAND 2	ALGEBRA	4	71	38
STRAND 3	MEASUREMENTS	10	26	15
STRAND 4	TRIGONOMETRY	13	32	18
STRAND 5	GEOMETRY	17	30	17
	TOTAL	180	100	

Check that this booklet contains pages 2-21 in the correct order and that none of these pages are blank. HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION. 1. Write $4\frac{1}{2}$ as a percentage.

SL 1

 There are 84 members of a basketball club. Of the 84 members, 30 are girls. Express the number of girls as a fraction of the total members. Give your answer in its simplest form.



3. Calculate $\frac{42.3}{8.6+12.9}$, giving your answer to 2 significant figures.



- 4. Sandy used \$15 to buy 8.5 litres of kerosene at \$1.10 per litre. How much change did she receive?
- SL 3

5. The population of a town is 18,000. It increases by 10% during the first year and by 20% during the second year. Find the population of the town after 2 years.



STRAND 2:	ALGEBRA	WEIGHTING 38

6. The coordinates of point k on the graph could only be:





7. For the function $f(x) = x^2 + 1$, when x = 2 the value of f(x) would be:



8. Factorise the given expression $x^2 - 2x - 3$



Use the quadratic equation given below to answer Questions 9, 10 and 11.

$$y = x^2 - 2x - 3$$

9. Solve the given quadratic equation.

SL 3

10. Find the equation of the line symmetry.

SL 1

11. Sketch the graph of $x^2 - 2x - 3 = y$





Use the information given below to answer Questions 12 and 13.

Sebastian owns a swimming pool that is 20 metres by 10 metres, surrounded by a tiled walkway of uniform width around the edge of the pool.

[Diagram NOT drawn to scale]



Length of pool and walkway is 2x + 20 metres Width of pool and walkway is 2x + 10 metres Area of the swimming pool is $20 \times 10 = 200$ sq metres

12. Describe the process of working out the total Area of the walkway and the swimming pool.



13. If he bought enough tiles to cover 400 square metres of the walkway, how wide will the walkway be?

14. Simplify the expression $2(a^2b+3ab^2)-ab^2-a^2b$

SL 2

15. Expand and simplify (2a-1)(4a+3)



16. Write the equation of the given function.





17. Use the 3 point method or otherwise to sketch the graph of y = 2x

SL 4

18. Describe how the solution of $x-3 \ge 0, x \in I$, relates to its given graph



19. Describe the method of solving a linear in-equation.





Use the function given below to answer questions 20 and 21.

$$y = (x+2)(x^2-1)$$

20. Sketch the graph of the function $y = (x+2)(x^2-1)$





21. Describe the shape of the graph of $y = (x+2)(x^2-1)$ with regards to its intercepts.

MEASUREMENT

22. Damian has 96 minutes to complete a Mathematics Test at school. The Test begins at 1:59pm and Damian has soccer practice at 4:00pm. How much time, will Damian have between the end of the Test and the beginning of soccer practice?

SL 2

23. Willie covers 75 kilometres in 3 hours. At this rate, how long (in hours) will it take him to travel 375 kilometres?

24. Andy sells freshly made sandwiches from his mobile food van, which he sells for \$2.50. The table below shows how many sandwiches Andy sells in one week of trading.

	Monday	Tuesday	Wednesday	Thursday	Friday
Number of sandwiches	45	43	39	48	55

Calculate Andy's total earnings for Monday and Thursday.



Use the information given below to answer Questions 25 – 27.

The red carpet shown below has a width of x - 2 cm and a length of 4x cm.



25. Write an expression for the Area, in cm^2 , of the carpet.



26. If the Area of the carpet is 32 cm^2 , find the value of x.



27. Calculate the length and the width of the red carpet.



STRAND 4: TRIGONOMETRY

28. State the Cosine rule for finding the unknown side of a non-right angled triangle.



29. Use the Rule in Question 28 to find side *b*. Answer in 1 decimal place.





30. Give the Pythagoras Theorem of \triangle PQR given below.





31. Some pedestrians want to get from point X on one road to point Y on another. The two roads meet at right angles. Instead of following the roads, they decide to follow a footpath which goes directly from X to Y. How far is this route? Answer to 1 decimal place.





32. Determine the amplitude of the function y = 2Sin(-4x)

SL 2

33. A television camera is to be mounted on a wall in the ANZ Bank so as to have a good view of the first teller. Calculate the angle of depression the camera lens should make with the horizontal.



Use the graph below to answer Questions 34 and 35.



- 34. Name the trigonometric graph.
- 35. Write the coordinates of the two turning points.



SL 2

STRAND 5:

GEOMETRY

Use the diagram below to answer Questions 36 – 38.



36. State the property for angle $w = 110^{\circ}$

SL 1	

37. State the property of angles on a straight line.



38. 33. If $w = 110^{\circ}$, find angle v.



39. In the diagram shown below, figure PQRS maps onto P'Q'R'S' by a translation. Write the vector that is used to describe the translation.



Vector: _____

40. If
$$\vec{a} = \begin{pmatrix} 6 \\ -2 \end{pmatrix}$$
 and $\vec{b} = \begin{pmatrix} -4 \\ 4 \end{pmatrix}$ then calculate $2\vec{a} + 2\vec{b}$

41. As part of his house renovation plan, Thomas is putting in a tile floor. He needs to determine the angles that should be cut in the tiles to fit in the corner. The angle in the corner is 90°. One piece of the tile will have a measure of 26°. Write an equation, and use it to determine the size of the angle of the second piece of tile.



42. Two similar bottles were placed on a table. The bigger bottle has been transformed into the smaller size bottle. The volume of the larger bottle is 950 millilitres. Find the volume of the smaller bottle.





43. Define the term *scale factor*.

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MATHEMATICS

2021

(For Scorers only)

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STRAND 1 NUMBERS		12			
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