



STUDENT EDUCATION NUMBER									

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# Samoa School Certificate

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# MATHEMATICS

# 2022

## 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.

STRANDS		Pages	Time (min)	Weighting
STRAND 1	NUMBERS	2-3	21	12
STRAND 2	ALGEBRA	4-11	71	38
STRAND 3	MEASUREMENT	12-14	26	15
STRAND 4	TRIGONOMETRY	15-18	32	18
STRAND 5	GEOMETRY	19-22	30	17
TOTAL			180	100

Check that this booklet contains pages 2-23 in the correct order and that none of these pages are blank.

**HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

For Question 1, choose the BEST answer and write the correct letter in the box provided.

1. The expression  $5^2 + (10 - 5) \times 25 \div 5$  is equal to.

- A. 50
- B. 50.5
- C. 49
- D. 51

SL 1

2. Evaluate the absolute expression below:

$$|2 + |8 - 10||$$

SL 2

3. Calculate  $0.957 + 0.5 - 0.21$  and round your answer into one decimal place:

SL 2

4. loane competed in a triathlon which involved swimming, cycling, and running. If the length of the swim was  $\frac{1}{12}$  of the total distance of the triathlon and cycling was  $\frac{2}{3}$  of the total distance. What fraction of the distance was the run?

SL 3

5. Marina had 55 cards. She gave 20% of them to her sister, 25% of the **remaining** to her brother, and the rest to her friend. What percentage of the cards did Marina give to her friend?

SL 4

For Questions 6 – 9, choose the BEST answer and write the correct letter in the box provided.

6. Which one below is the best definition for linear equation?
- A. An equation between two variables that gives a straight line when plotted on a graph.
- B. An expression where any two values are compared by inequality symbols.
- C. An equation between two variables that gives a parabola when plotted on the graph.
- D. An equation that has the standard form  $x^2 + y^2 = r^2$

SL 1

7. The equation of a line of symmetry of the quadratic equation below is:

$$y = x^2 + 2$$

- A.  $y = 2$
- B.  $x = 0$
- C.  $y = 0$
- D.  $x = 2$

SL 1

8. Which one below is **NOT** a feature of the function  $y = \sqrt{x}$  ?

- A. The function is called square root function.
- B. The domain of the function lies in the interval  $[0, +\infty]$ .
- C. The range of the function lies in the interval  $[0, +\infty]$ .
- D. The function is not an increasing function

SL 1

9. Which of the following equations is the circle function?

- A.  $y^2 = x^2 - 16$
- B.  $x^2 + (y + 1)^2 = 16$
- C.  $\frac{x^2}{25} - y^2 = 1$
- D.  $y^2 - x^2 = 1$

SL 1

10. Simplify the following:

$$2x^2 - (12x + 4 - 4x) \times 5x + 8$$

<b>SL 2</b>

11. Express linear function below in the form of  $ax + by + c = 0$

$$y = \frac{3x}{2} - \frac{1}{2}$$

<b>SL 2</b>

12. Expand the expression:  $(2x + 4)(3 - x)$

<b>SL 2</b>

13. Describe ANY TWO features of exponential functions.

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<b>SL 2</b>

14. Describe ANY TWO features of cubic functions.

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<b>SL 2</b>

15. Solve for the value of  $x$ :

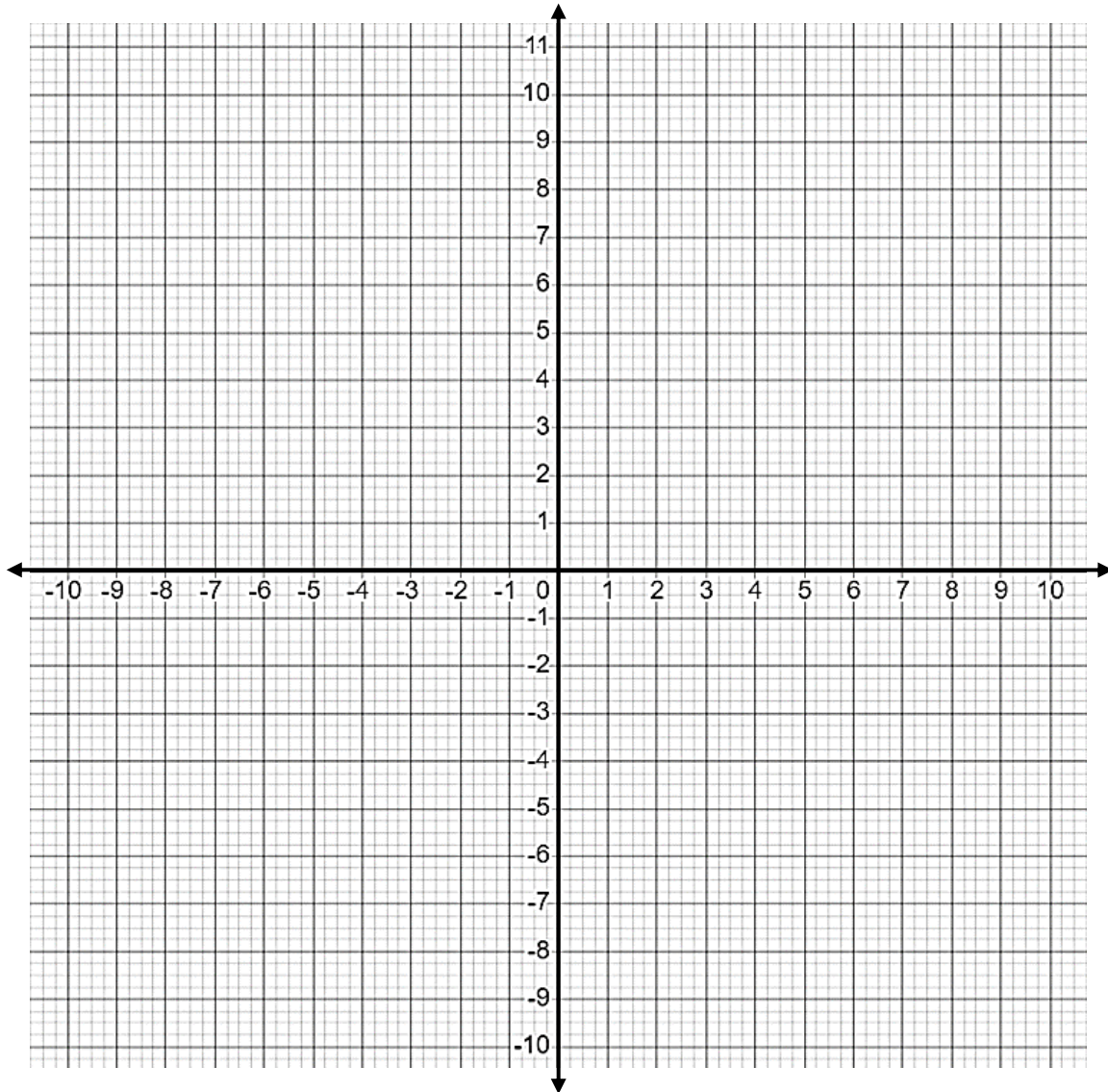
$$\frac{x - 2}{3x} + \frac{1}{2} = 1$$

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<b>SL 3</b>

16. Find the solution of the two linear inequations below using the graphical method.

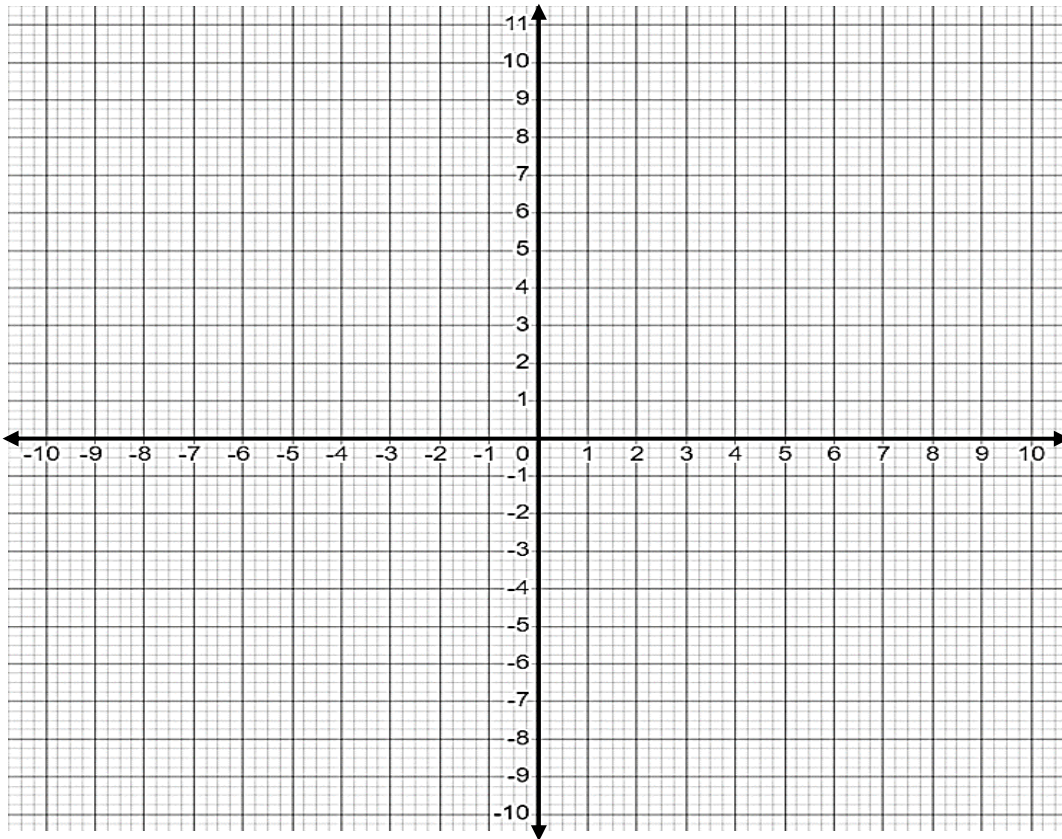
$$y \geq x + 1$$
$$y > 1 - x$$



SL 3

17. Sketch the quadratic equation below:

$$y = 2x^2 - 6x + 4$$



SL 4

18. Find the solution of the cubic function below if  $y = 0$ .

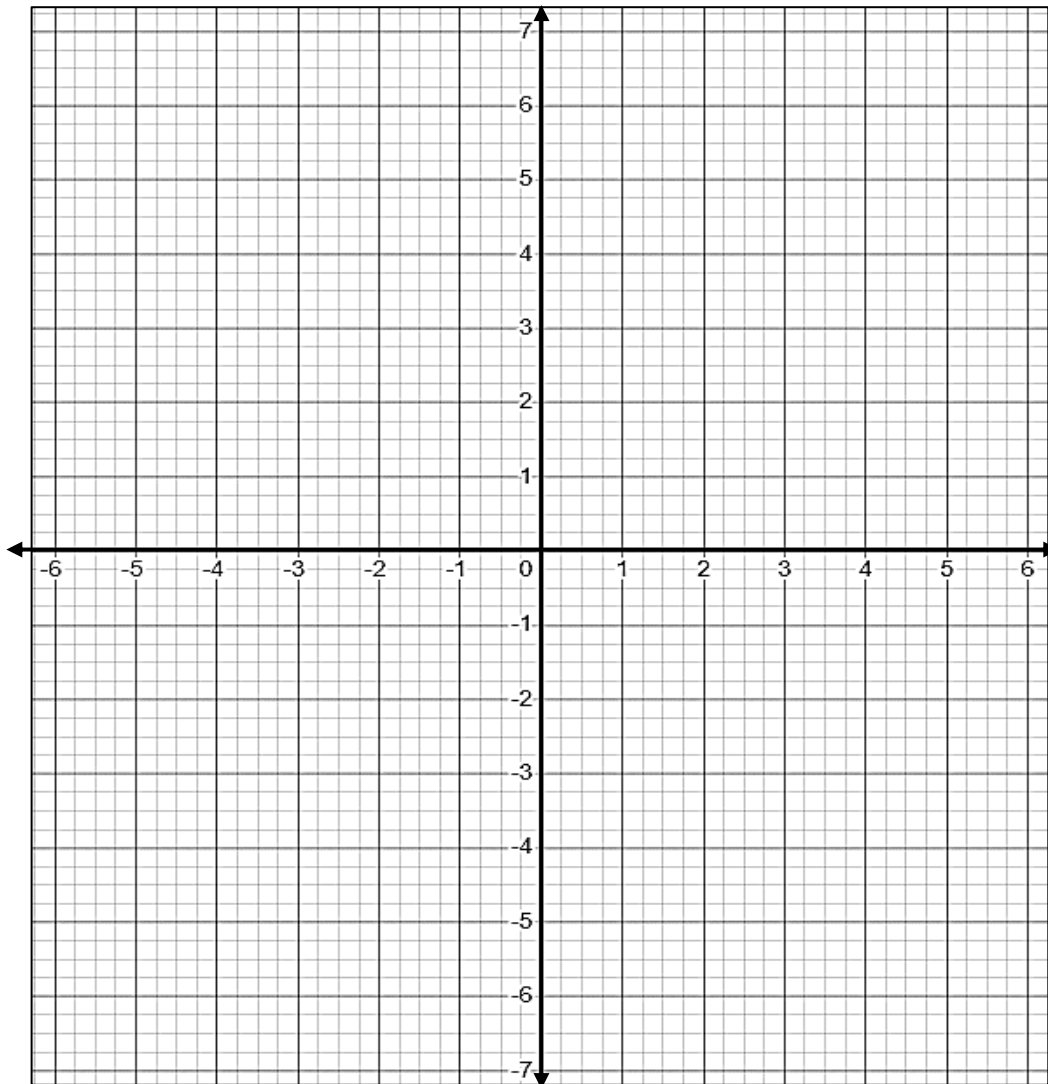
$$y = x^3 - x^2 - 2x$$

SL 3



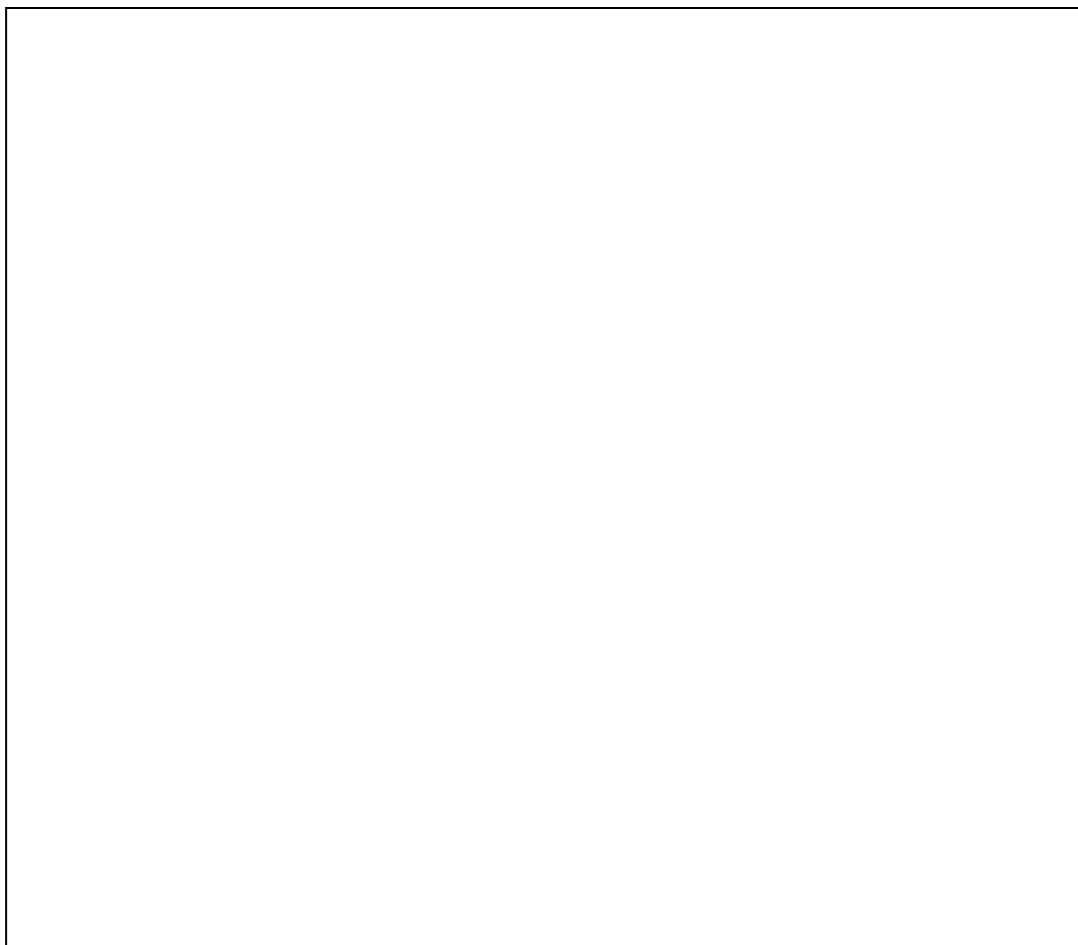
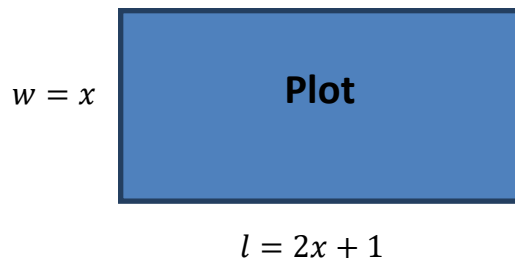
19. Sketch the graph of the linear function below using intercept method

$$y = 4x - 2$$



SL 3

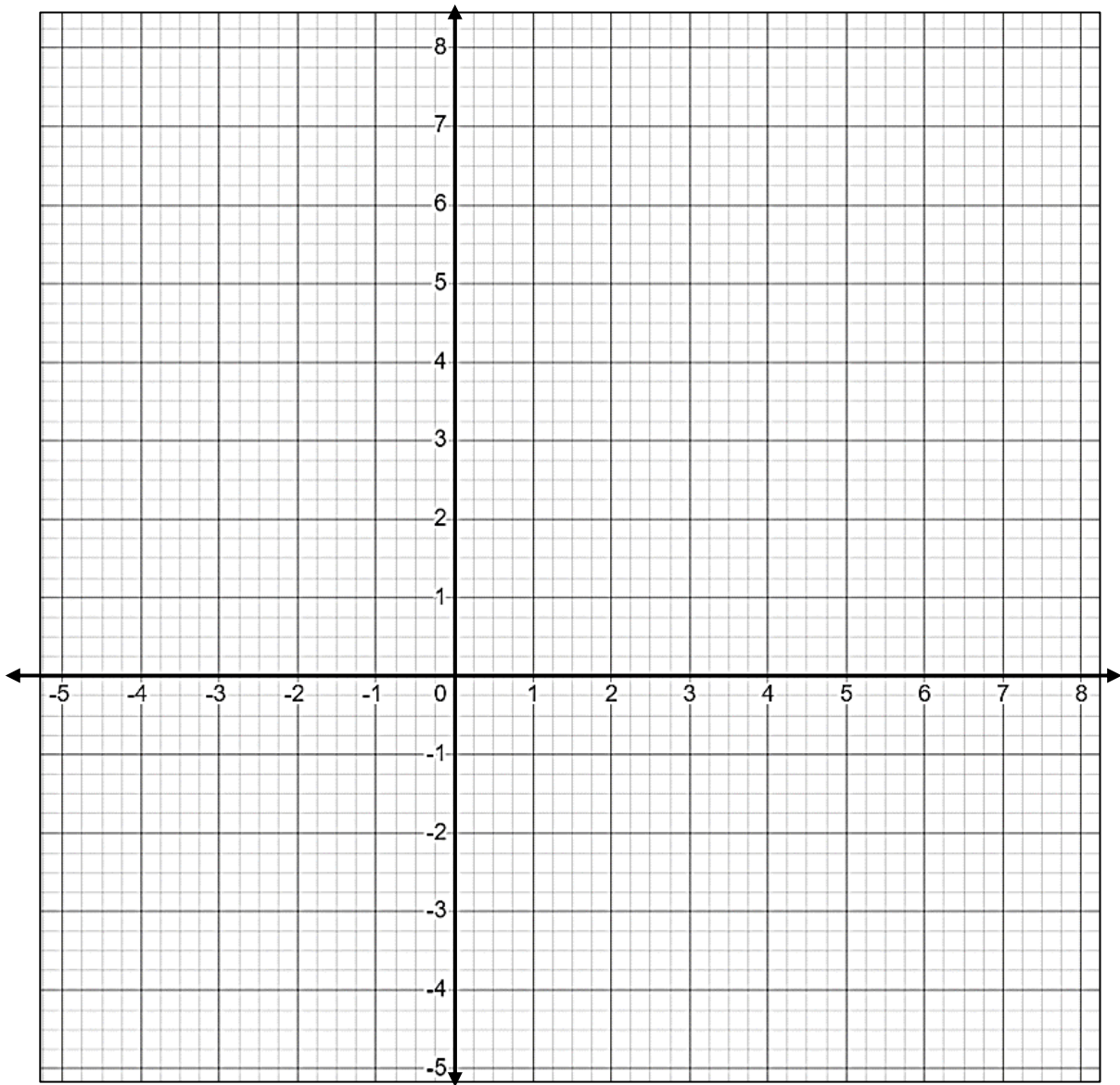
20. Tessi has been thinking of setting up her office. She bought a rectangular plot of area  $528ft^2$ . The length of the plot is one more than twice its width. Find the dimensions of the plot



SL 4

21. Draw the graph of the hyperbola below. Show asymptotes.

$$y = 1 - \frac{2}{x-1}$$

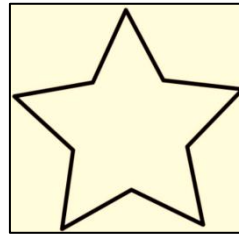


SL 4

22. Leififi Year 12 History class needs to get to the museum at 11:30 am. It is a 20 minutes walk from school to the museum. At which time must the Year 12 History class leave school if they are to arrive at the museum at exactly 11:30 am?

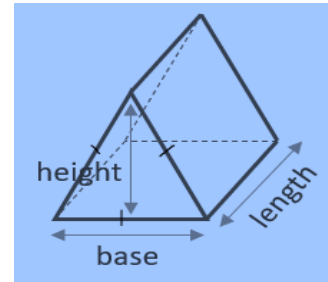
SL 2

23. If the sides of the star below are 2ft long each.  
Calculate the perimeter of the star.



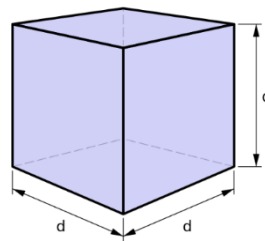
SL 2

24. Calculate the surface area of the triangular prism if the length is 10m, the base is 6m, and the height is 4m.



<b>SL 2</b>

25. Calculate the dimension of a cubic that will have its maximum volume if the surface area is  $150\text{cm}^2$



<b>SL 3</b>

26. Marina took 12 hours to read a 360-pages book. At this rate, how long will it take her to read a 400-page book?

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SL 3

27. Herma wants to do fencing around a circular garden that has a radius of 70 m. If the cost of fencing is \$12 per meter, find the total cost of fencing for the entire garden.  
(Use  $\pi = \frac{22}{7}$ )

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SL 3

For Questions 28 – 29, choose the BEST answer and write the correct letter in the box provided.

28. Which of the following is the correct tangent function ratio to find sides or angle of the right-angled triangle?

A.  $\tan \theta = \frac{A}{O}$

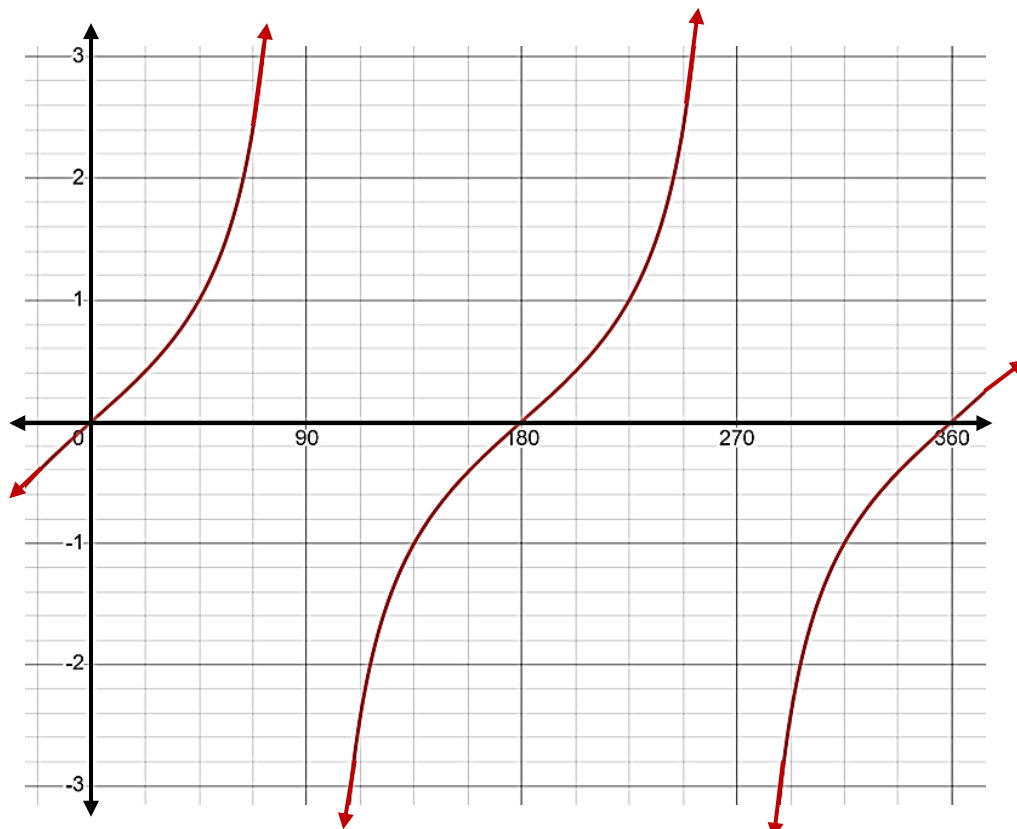
B.  $\tan \theta = \frac{O}{A}$

C.  $\tan \theta = \frac{O}{H}$

D.  $\tan \theta = \frac{H}{A}$

SL 1

29. Which trigonometry equation is for the graph below?



A.  $y = \sin x$

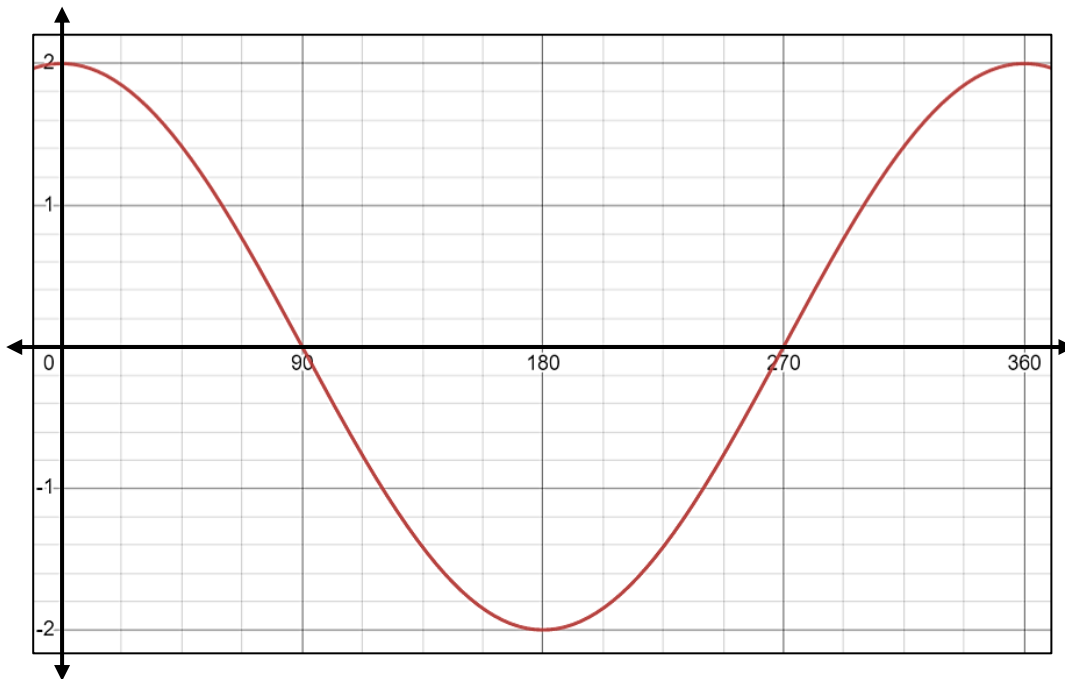
B.  $y = \cos x$

C.  $y = \tan x$

D.  $y = \sec x$

SL 1

Use the trigonometry graph below to answer Questions 30 – 32.



30. Determine the period of the function:

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SL 2

31. Determine the amplitude of the function:

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SL 2

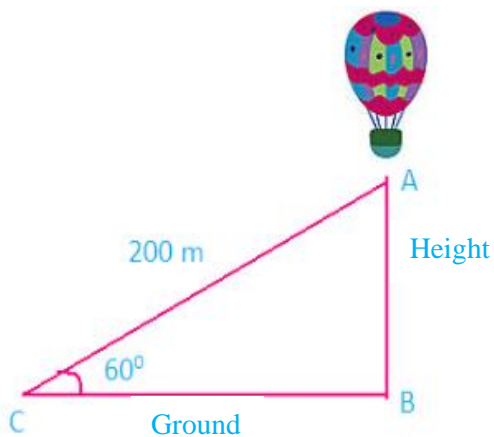
32. Determine the co-ordinates of the turning points of the function.

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SL 2

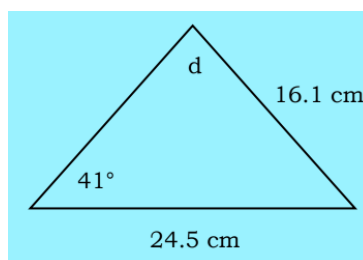


33. A balloon is connected to a metrological station by a cable of length 200m inclined at  $60^\circ$  angle with the ground. Find the height of the balloon from the ground and round your answer into one decimal place. (Imagine that there is no slack in the cable)



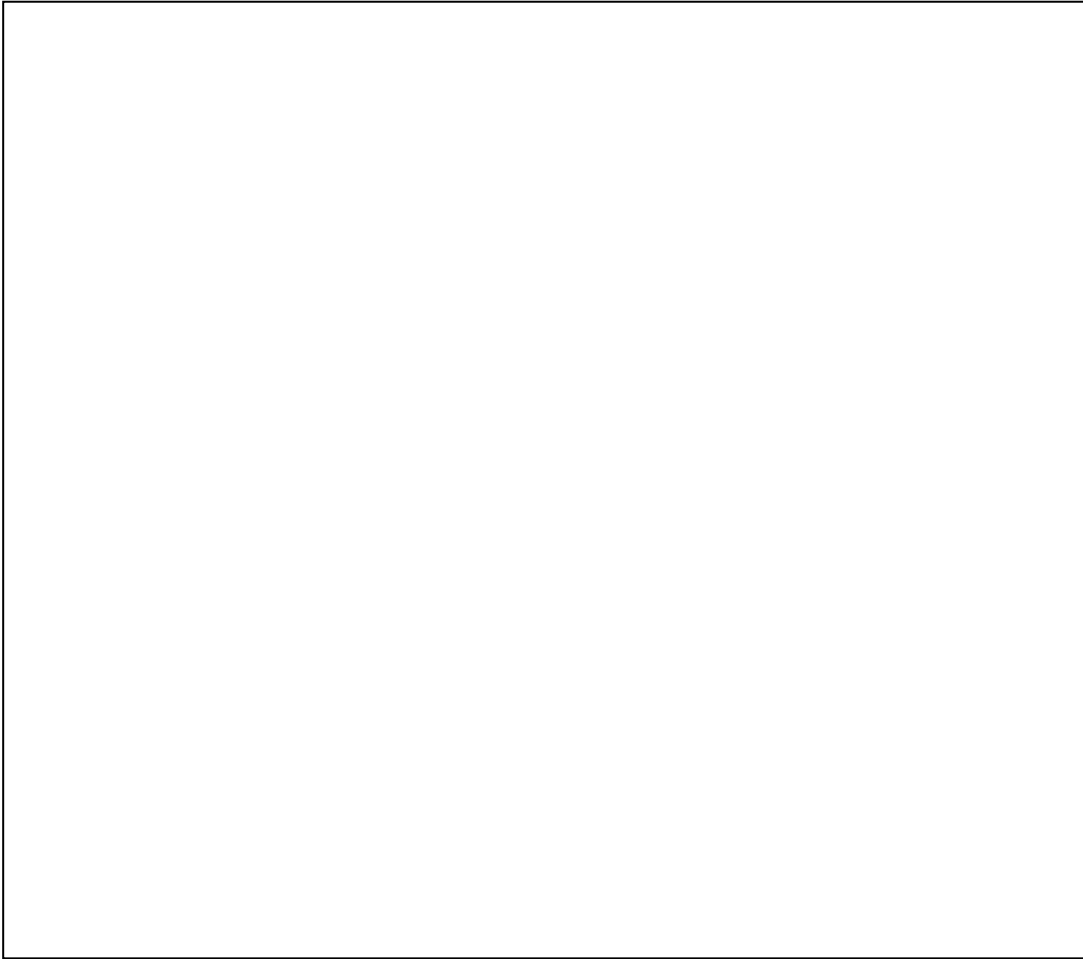
<b>SL 3</b>

34. Use sine rule to find the angle  $d$  and round your answer into 2 significant figures.



<b>SL 3</b>

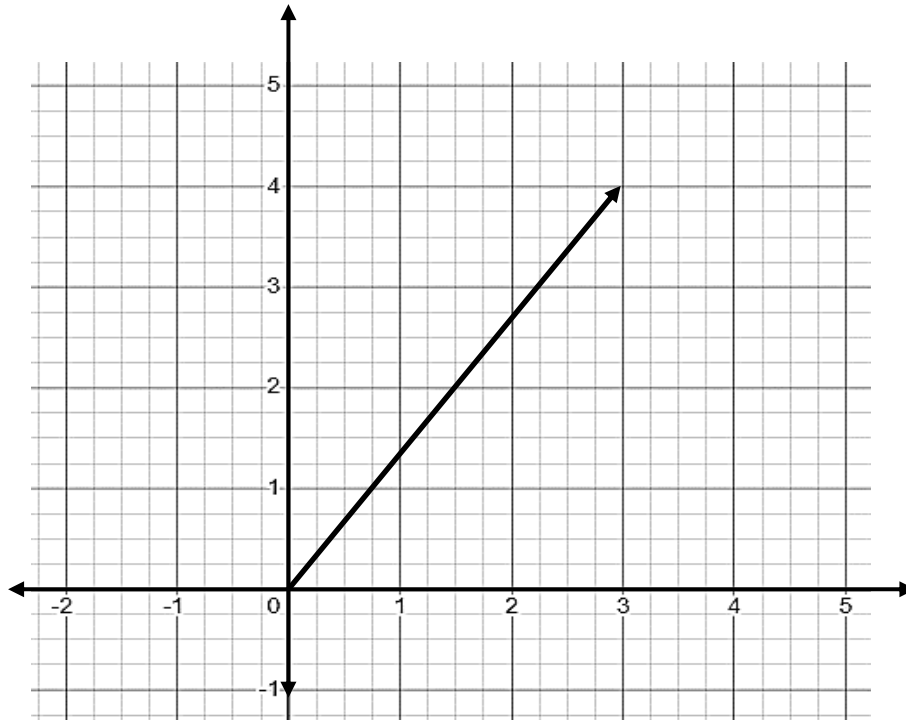
35. A farmer wants to purchase a triangle-shaped land with sides of 120 ft and 60 ft and the angle included between these two sides is  $60^\circ$ . Find the perimeter of the land.



SL 4

For Questions 36 – 38, choose the BEST answer and write the correct letter in the box provided.

36. Which coordinates best represents the vector in the diagram.



- A.  $\begin{pmatrix} 4 \\ 3 \end{pmatrix}$   
 B.  $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$   
 C.  $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$   
 D.  $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$

	SL 1

37. Which one below is the best definition of the mirror line?

- A. A line of symmetry that parallels the parabola graph.  
 B. A line of symmetry drawn through an object where one side reflects onto the other.  
 C. A line that approaches a curve but never touches.  
 D. A line perpendicular to the trigonometry graph.

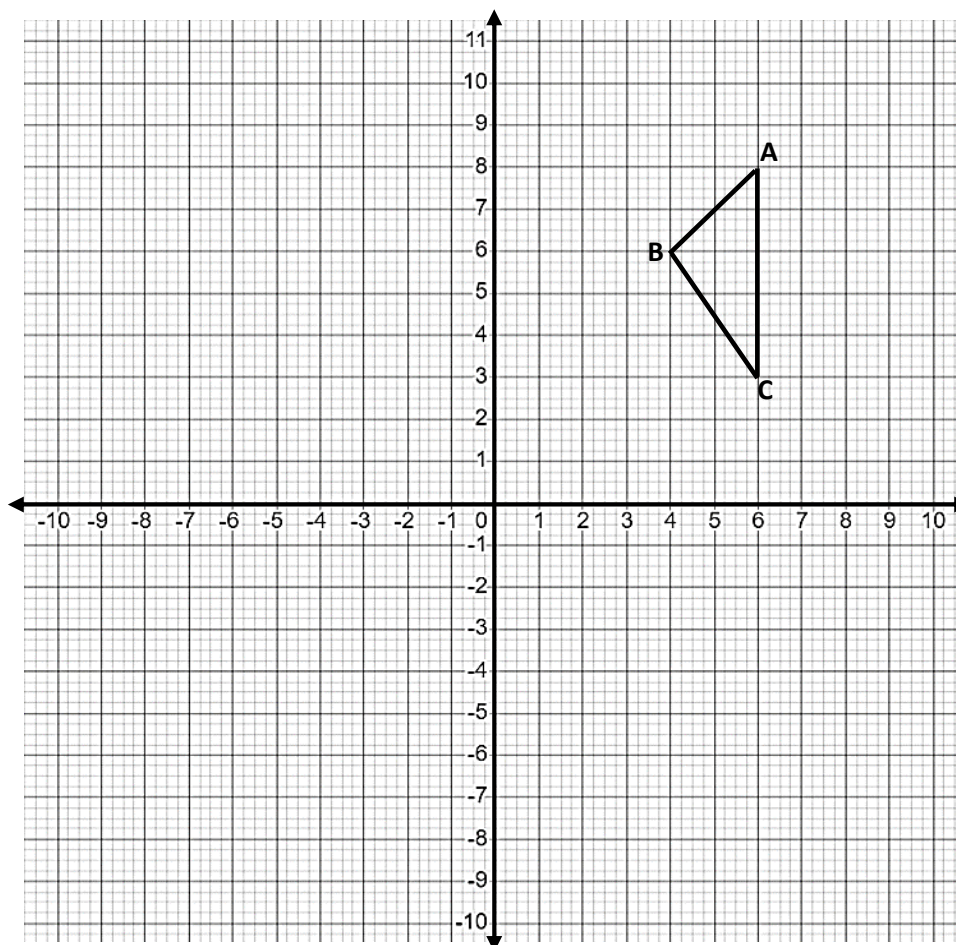
	SL 1

38. Which one below is NOT a property of interior and exterior angles?
- A. The interior angle lies inside the shape.
  - B. The interior angles are angles that lie in the area bounded between two parallel lines that are intersected by a transversal.
  - C. The sum of all exterior angles in a polygon is equal to 360 degrees.
  - D. The sum of an adjacent interior angle and exterior angle for any polygon is equal to 270 degrees.



SL 1

39. Reflect the figure ABC through the  $x$ -axis and write down the coordinates of image  $A'B'C'$



SL 2

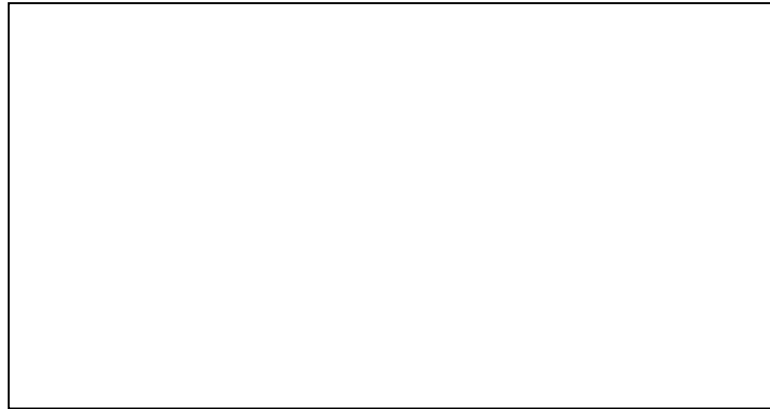
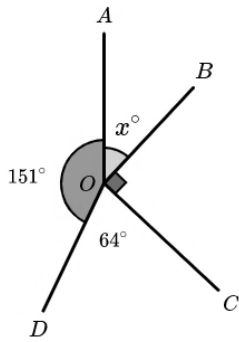
Co-ordinates:

$A'$ : (\_\_\_\_, \_\_\_\_)

$B'$ : (\_\_\_\_, \_\_\_\_)

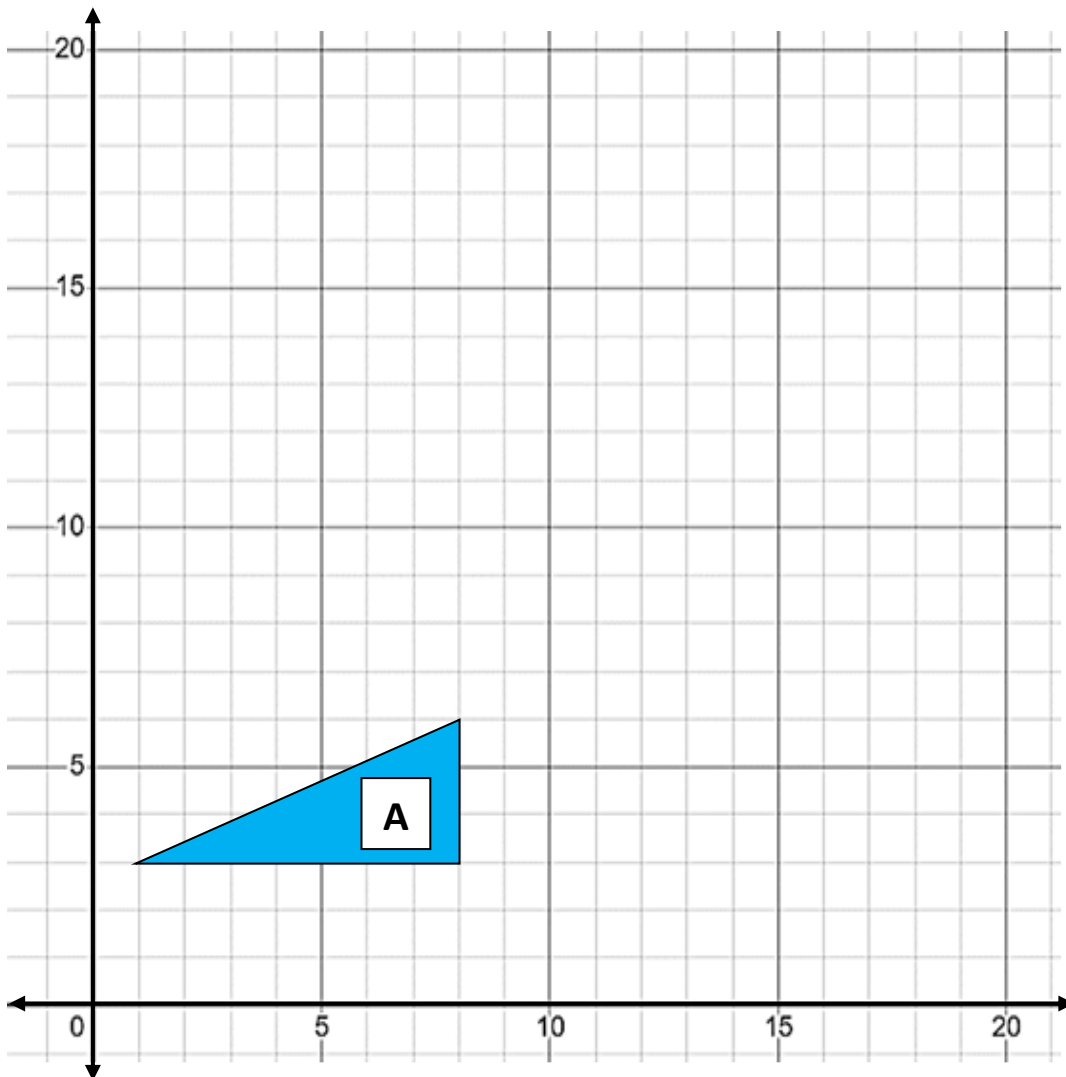
$C'$ : (\_\_\_\_, \_\_\_\_)

40. Calculate the size of angle  $x$ :



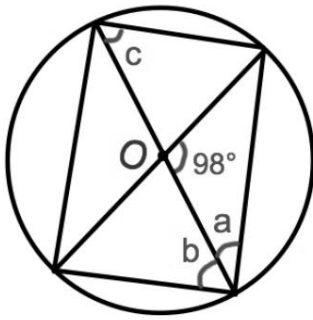
SL 2

41. Rotate **A** through centre  $(8,2)$  at  $90^\circ$  clockwise, label this figure **A'**. Then rotate **A'** through the point  $(8,8)$  at  $180^\circ$  anticlockwise and label this figure **A''**



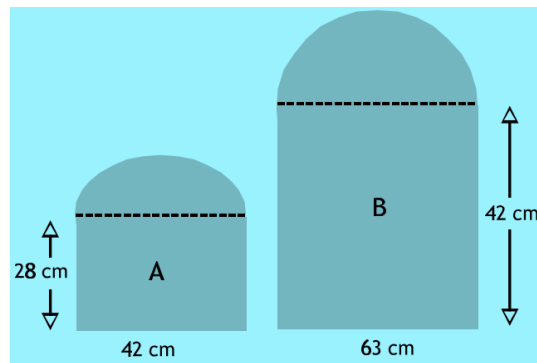
SL 3

42. Find angles  $a$ ,  $b$  and  $c$  using properties of angles.



SL 3

43. Two window frames (shown) are designed by combining a rectangle and a semicircle. Find the area of **A**, then use the scale factor of enlargement to find the area of **B** (in square meters)



SL 4

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## MATHEMATICS

2022

*(For Scorers only)*

STRANDS		Weighting	Scores	Check Scorer	AED Check
<b>STRAND 1</b>	NUMBERS	12			
<b>STRAND 2</b>	ALGEBRA	38			
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<b>STRAND 5</b>	GEOMETRY	17			
		<b>100</b>			