GOVERNMENT OF SAMOA
MINISTRY OF EDUCATION, SPORTS AND CULTURE

Samoa School Certificate

MATHEMATICS

2018

QUESTION and ANSWER BOOKLET

Time allowed: 3 hours &10 minutes

INSTRUCTIONS:

1. You have 10 minutes to read **before** you start writing.
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 space for 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	Page Number	Time (minutes)	Weighting
1. Numbers	2	21	12
2. Algebra	4	60	33
3. Measurements	11	28	15
4. Trigonometry	13	28	16
5. Geometry	17	28	16
6. Probability	20	15	8
TOTAL		180	100

CHECK! This booklet contains pages 2-22 in the right order.
YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

1. Arrange these fractions in order from smallest to largest.

$$\frac{2}{3}, \frac{3}{5}, \frac{13}{20}$$

SL 1

2. Write 165 thousand in standard form.

SL 2

3. Evaluate $2^2 - 3 \times (10 - 6)$

SL 1

4. In a Science exam there are 40 marks for Chemistry questions and 30 marks for Biology questions. The teacher who set the exam estimates that the Chemistry questions should take 50 minutes to answer.

How long should the Biology questions take to answer?

SAI MOTORS

A breakdown of new car costs is as follows:

Dealer's profit	$4,750.00
Shipping Import Costs	$7,500.00
Overseas Manufacturer	$9,250.00
Advertising	$2,000.00
	$23,500.00

5. A car dealer has three cars in his yard. He has to pay the Insurance company $\frac{1}{2}\%$ of the value of his goods. How much will he have to pay?

Port costs to import the car are $2,650.00.

6. What is this as a percentage of the total shipping costs?

QUESTION 2: **ALGEBRA** **Weighting 33**

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7. Expand and simplify $2(a+5)-5(a-3)$
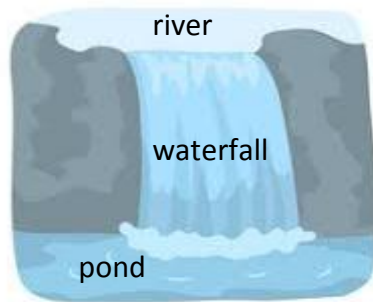
8. Simplify $\dfrac{4x^2-9y^2}{2x-3y}$

9. Solve $2x - 7 = 13$

Describe the **two operations** that will be used to solve for the unknown, x, in the above linear equation.

The diagram shows the path followed by water as it flows along a river and then down a waterfall into a pond. The path can be approximated by part of the graph of $y = 9 - x^2$, with x and y being measured in metres.

10. Draw the graph of $y = 9 - x^2$ labeling the intercepts clearly and give the coordinates of the turning point of the given parabola.

11. The parabola only represents the path of the waterfall for values of x between 0 and 3. What does a measurement of 3 metres represent in this situation?

SL 1

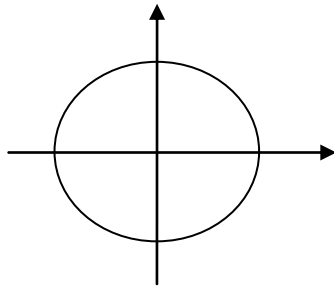**12.** Define a *linear inequation*.

SL 1

13. Solve $\dfrac{-5x+6}{2} \geq -7$ for all possible values of $x : x \in N$

SL 3

The graph of the circle $x^2 + y^2 = 5$ is given below
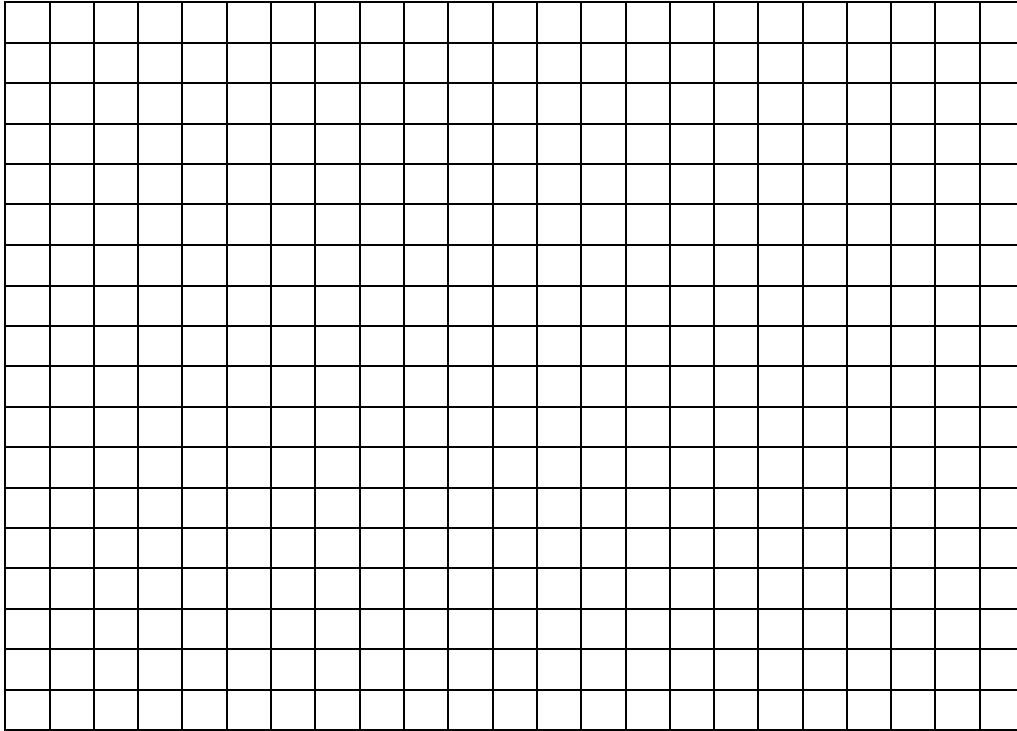

14. Calculate the radius of the circle

SL 1

A cubic function is given as $y = (x - 1)(2x + 1)(x + 2)$

15. Find the coordinates of its x-intercepts and y-intercepts

SL 3

16. On the grid provided below, draw the graph of $y = (x - 1)(2x + 1)(x + 2)$

17. Solve the quadratic equation $x^2 - 1 = 15$

At Georgie's Pizza, large pizzas sell for $30 and small ones sell for $20 each. On one particular Friday evening, a total of 300 pizzas were sold for a total turnover of $6350. There were x large pizzas and y small pizzas.

18. Solve the simultaneous equations to find the number of each size of pizza sold.
$$30x + 20y = 6350$$
$$x + y = 300$$

SL 3

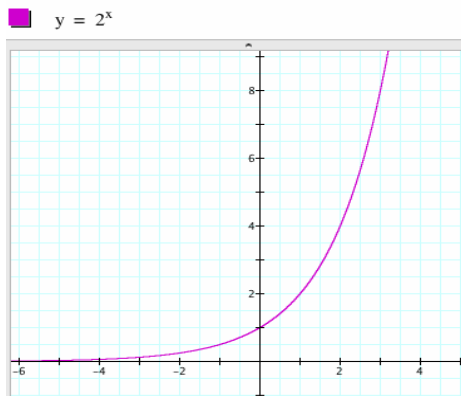**19.** Given the equation $2x + 3y = 6$, find the value of the *gradient* and the **y-intercept** and sketch the graph of the function given.

Given below is the graph of $y = 2^x$

y = 2^x

20. State the domain and range of the above function.

QUESTION 3: **MEASUREMENT** **Weighting 15**

On Monday, a painter spent 6 hours and 20 minutes to paint a building. On Tuesday, the painter spent 4 hours and 45 minutes to finish painting the building.

21. How long did the painter spend to paint the building?

SL 2

22. A cuboid with a base area of $36 \ cm^2$ has a height of 6 cm. What is the volume of the cuboid?

6 cm

SL 2

23. The perimeter of a rectangular field is 60m and its width is 20m. Find the area of this field.
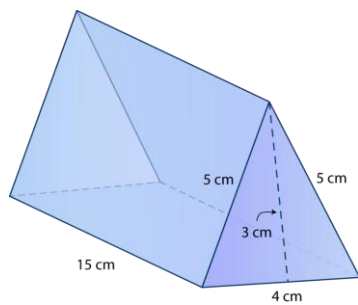
SL 3

24. A full wine cask contains 4.5 litres. How many 175mL glasses of wine could be poured from the cask?

SL 3

25. Calculate the total surface area of the triangular prism given below.

5 cm · 5 cm · 3 cm · 15 cm · 4 cm

SL 2

26. Varea has a rectangular flower garden that is 40m long and 8m wide. One bag of soil can cover $10m^2$. How many bags will she need to cover the entire garden?

SL 3

QUESTION 4:   **TRIGONOMETRY**   **Weighting 16**

Answer **True** or **False**

27. The graph of $Tan\, x$ has a period of 360°

SL 1

28. The trigonometric ratio of sin 45, cos 45, and tan 45 are equal.

SL 1

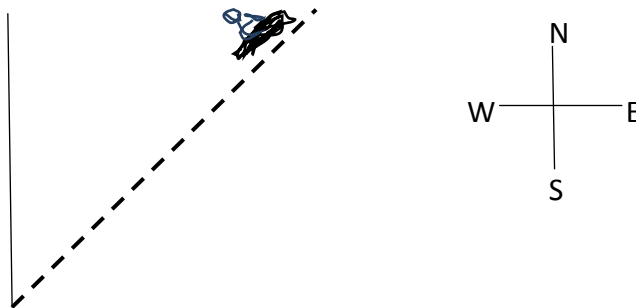**29.** Here is a student's working when they were calculating x in this diagram.

$$x + (0.9)^2 = (1.4)^2$$
$$x + 0.81 = 1.96$$
$$x = 1.96 - 0.81$$
$$x = 1.15$$

0.9m
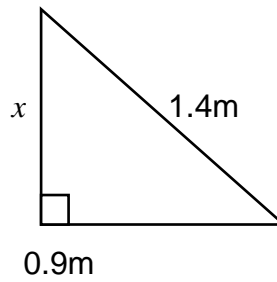
Explain what the mistake is in the working and calculate the correct answer.

SL 2

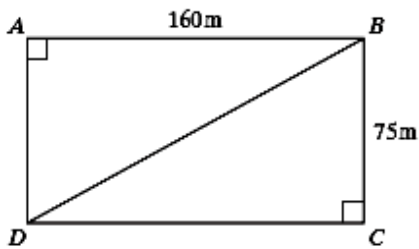A jet-ski travels 200m in a straight line until it is 160m north of its starting point.

30. Add a line to the diagram to form a right angled triangle and place the measurements 200m and 160m on two of the sides.

SL 2

31. Calculate the *bearing* that the jet-ski travelled on.

32. A rectangular field *ABCD* is shown.


Not to scale

The length of the field, *AB* = 160m. The width of the field, *BC* = 75m. Calculate the length of the diagonal *BD*. Give your answer to a suitable *degree of accuracy*.

The Bermuda Triangle is an area in the Atlantic Ocean notorious for the large number of ships and planes that have disappeared under mysterious circumstances. The Bermuda Triangle stretches from Miami (M) Florida, to San Juan (S) Puerto Rico, to the island of Bermuda (B).
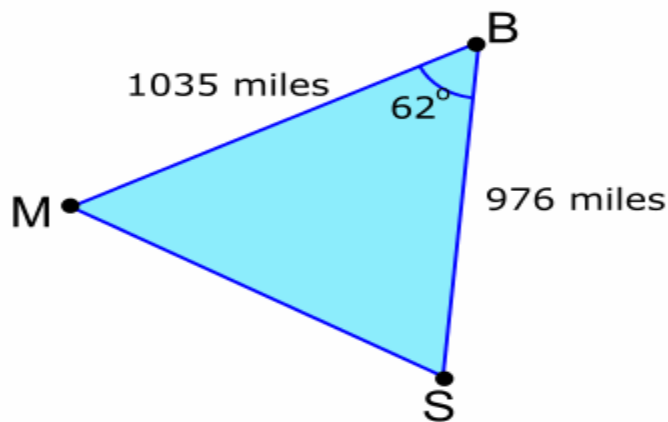
33. Calculate the area of the Bermuda Triangle to the **_nearest one thousand square miles_**.

$$\left(Area : \frac{1}{2} ab\, SinC \right)$$

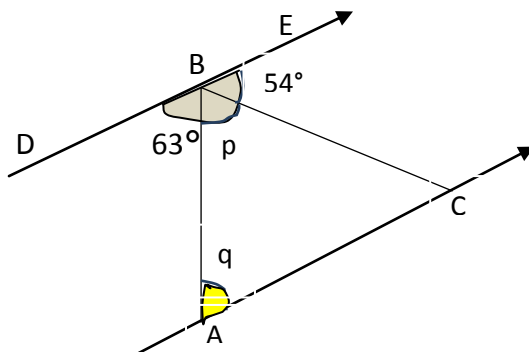|	
SL 3	

Complete these sentences.

34. The angle at the centre of a circle _____ the angle at the circumference.

SL 1

35. If two angles are supplementary, their measures add to _____ degrees.

SL 1

36. The diagram shows two parallel lines, DE and AC, $A\hat{B}D = 63°$ and $C\hat{B}E = 54°$
Prove that $\triangle ABC$ is isosceles. ***Complete the steps in the proof***.

Not to scale

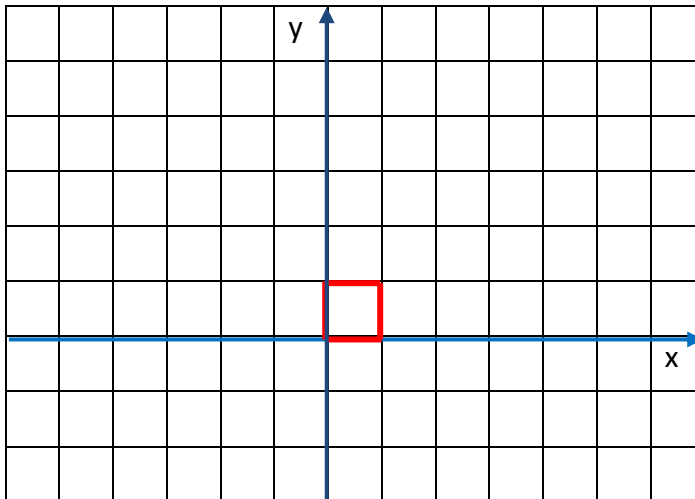| SL 3 |
|------|
| |

$q = 63°$ (reason: _____)

$p =$ _____ (reason: <'s on line add to 180°)

Therefore $\triangle A\hat{B}C =$ _____

Therefore $\triangle ABC$ is isosceles

The unit square is the name given to a square with sides of length 1 unit with its bottom left-hand corner at (0, 0)

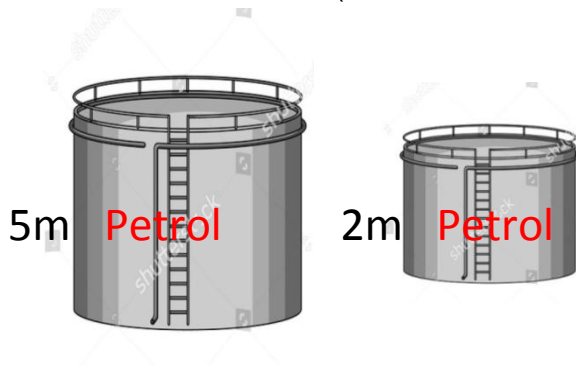**37.** Enlarge the unit square by a scale factor of 3, centre (0, 0)

38. What is the area of the image? Give your answer in $units^2$

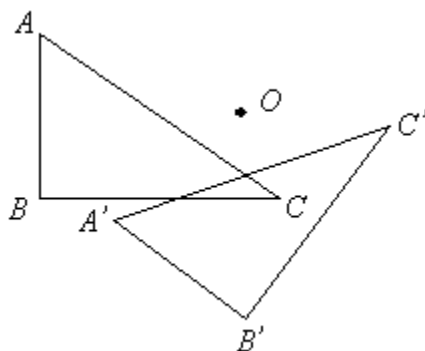These two petrol tanks are *similar* (have the same shape).

5m Petrol   2m Petrol

39. If the smaller tank holds 62,000 litres of petrol, how much petrol does the larger tank hold?

SL 4

40. Triangle *A'B'C'* is the image of △ *ABC* under *a* rotation about O. Find the angle of rotation.

SL 3

Complete the statement:

41.   An event that has no chance of happening has a probability of _____

SL 1

42.   Two coins are tossed at the same time.

List all the possible outcomes of the experiment.

SL 2

Answer **True** or **False**:

43.   If P = {a, b, c} and Q = {b, c, d}, then P intersection Q = {b, c}

SL 1

Given $S = \{1,\ 2,\ 3,\ 4,\ 5\},\quad A = \{1,\ 2,\ 3,\ 5\},\quad B = \{2,\ 4\}$

44. Show these sets on a Venn Diagram.

SL 2
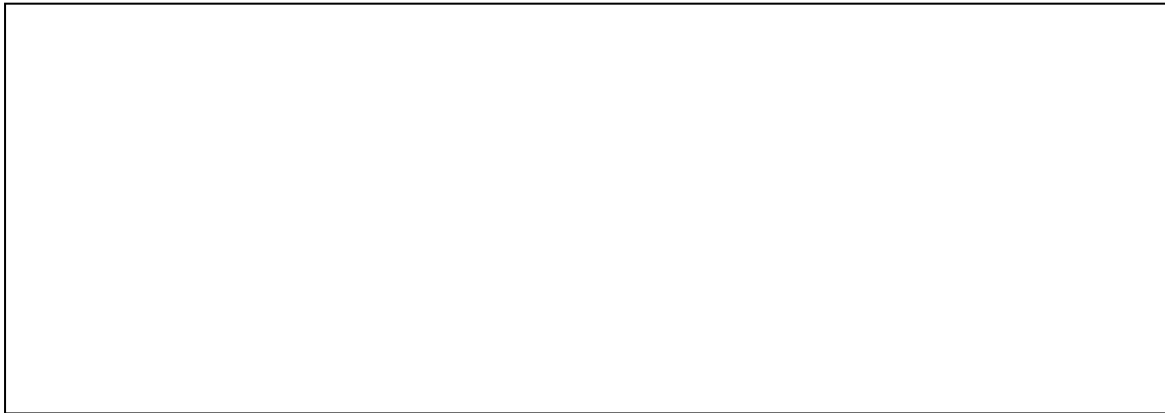
45. Find AUB

SL 2

STUDENT EDUCATION NUMBER

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For scorers use only

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