

STUDENT EDUCATION NUMBER									



Sāmoa School Certificate

MATHEMATICS 2016

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	15	28	16
5. Geometry	18	28	16
6. Probability	22	15	8
TOTAL		180	100

CHECK! This booklet contains pages 2-23 in the right order.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

STRAND 1

Numbers

Weighting 12

1.1 Solve for x in the following expression $x + 4 \div 2^2 + 1 = 7$.

Skill Level 1

1.2 Identify which fraction is equivalent to $\frac{3}{4}$. *Circle the right answer.*

$\frac{27}{54}$ $\frac{32}{128}$ $\frac{36}{48}$ $\frac{22}{27}$

Skill Level 1

1.3 State the number of decimal places in the number **1.567**.

Skill Level 1

1.4 Define the concept of percentage.

Skill Level 1

1.5 Express the fraction $7\frac{3}{4}$ into percentage

Skill Level 1

- 1.6 Christine orders an item on line from an American company. The cost is US\$80 (plus the postage cost ofUS\$9.90). If the exchange rate for one USD\$1.00 is ST\$2.50, what will be the total cost of her order in Samoan Tala?

Skill Level 3

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- 1.7 Albert's wage of \$480 per week is increased by \$24. The increase as a % of the previous wage is.

Skill Level 2

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- 1.8 Calculate $5\frac{1}{2}\%$ of \$250.00.

Skill Level 2

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STRAND 2

Algebra

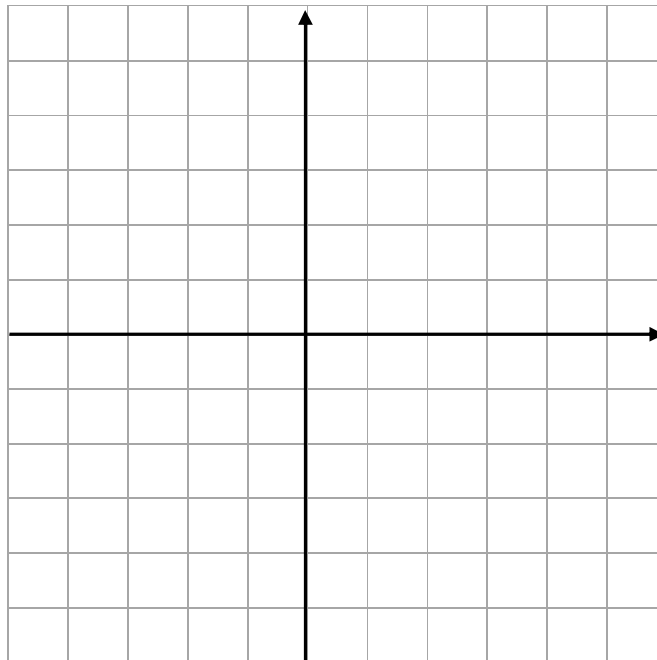
Weighting 33

2.1 Find the value of the function $f(x) = x^2 + 4x + 3$, when $x = -2$

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Skill Level 1

2.2a On the grid provided below, plot the following co-ordinates: **(-3,0)**, **(-1,-4)**, **(0,-3)**, **(1,0)**



Skill Level 1

2.2b Join the points in 2.2a by drawing a smooth curve.

Skill Level 1

2.2c Give the equation of the curve in 2.2b.

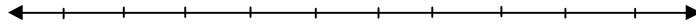
2.2d Give the equation of the line symmetry of the curve in 2.2b.

2.3 Which of the following represents the equation of a circle?
(Circle the correct answer)

- I. $4x + 2y + 2 = 0$
- II. $x^2 + 4x + 4 = 0$
- III. $x^3 + 3x^2 + 2x + 4 = 0$
- IV. $xy = 4$
- V. $x^2 + y^2 = 4$
- VI. $y = 3^x$

Skill Level 1

2.4 On the number line, show $\{x: -4 \leq x < 2, x \in \mathbf{R}\}$



Skill Level 1

2.5 Solve $4 - \frac{2}{3}x \geq 2$ for all the possible values of $x : x \in \mathbf{I}$

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Skill Level 3

2.6 Solve the following equation $\frac{x+1}{3} = \frac{x-2}{2}$

Skill Level 3

2.7 Expand the expression $(2t - 2)(2t + 2)$.

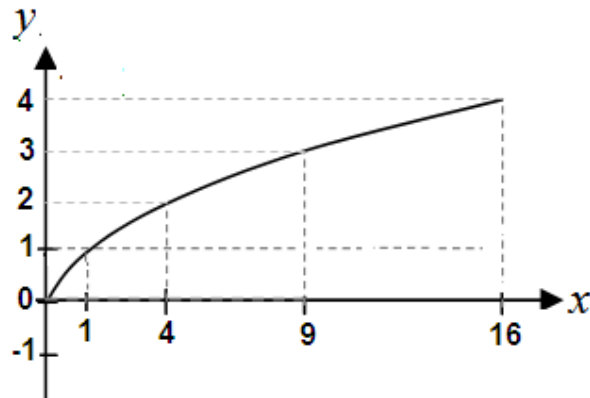
Skill Level 2

2.8 Describe the features of the graph of the function.

$$y = \frac{3}{x}$$

Skill Level 2

2.9a Give the name of the given graph.

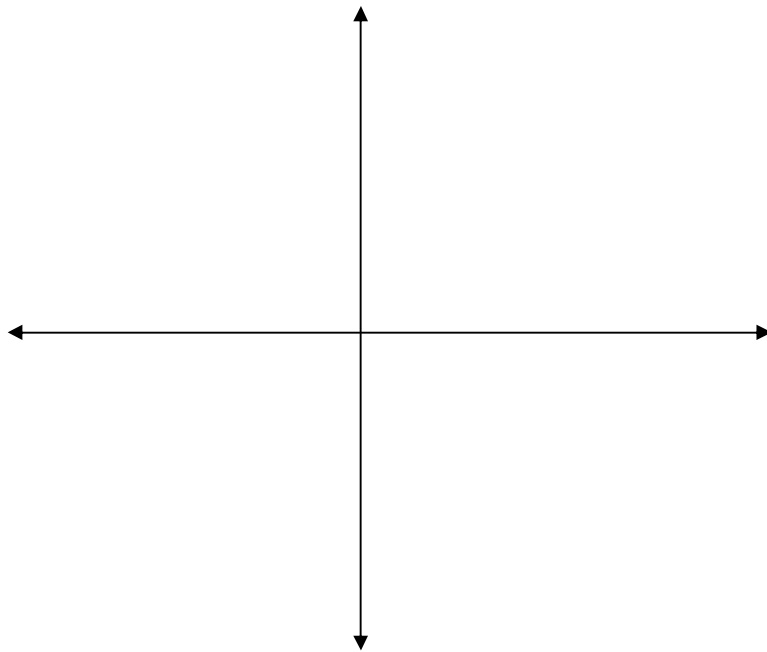


Skill Level 1

2.9b Name ONE (1) distinct feature of the function in 2.9a above?

Skill Level 1

2.10 Sketch the graph of $y = 3^{-x}$



Skill Level 1

2.11 Identify which of the following is a quadratic expression. (Circle the correct answer)

- i. $X^3 + 2x^2 - 3x = 4$
- ii. $xy = 4$
- iii. $2x + 4 - 8 = 0$
- iv. $x^2 - 6x + 9 = 0$

Skill Level 1

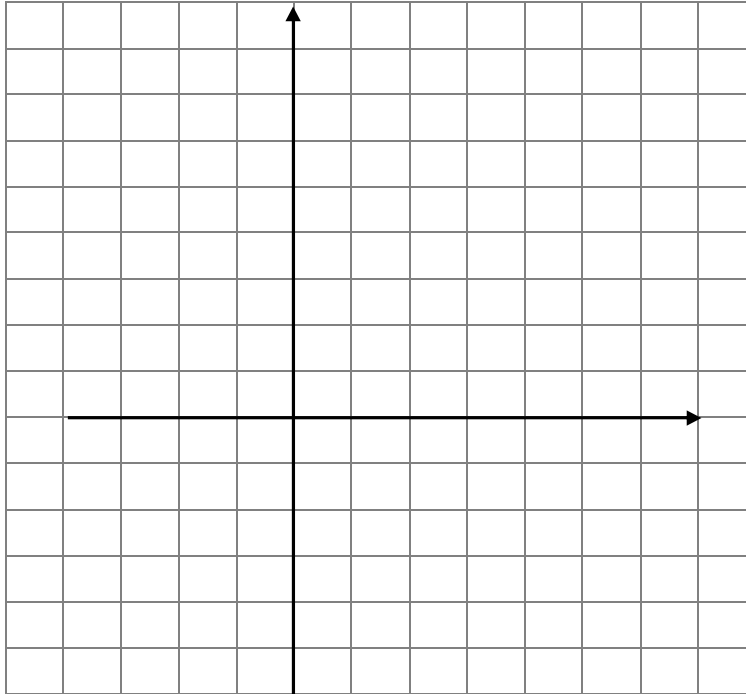
2.12 Find the factors of $y = x^3 + 2x^2 - x - 2$ using the factor theorem.

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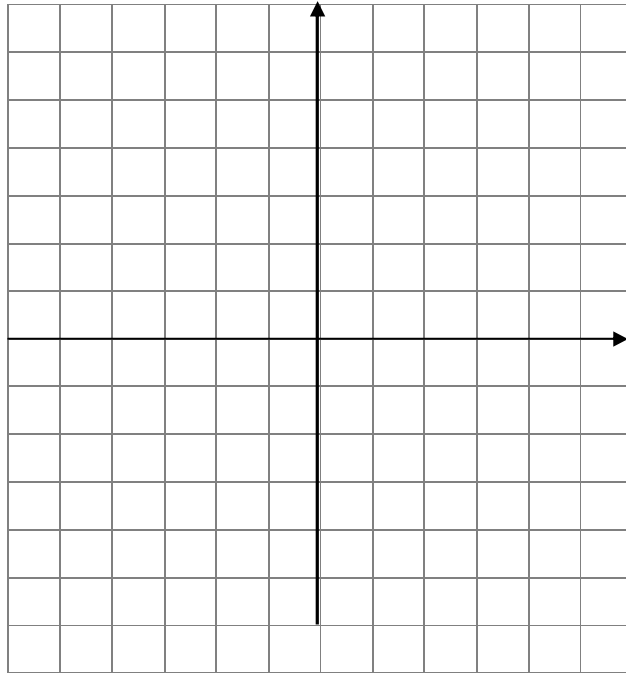
Skill Level 4

2.13 Draw the graph of the function $y = \frac{3x+6}{x-2}$, show and label all intercepts and asymptotes.

Skill Level 4



2.14 Draw the graph of $y = x^3 - x$, show and label all intercepts (not the turning points)



Skill Level 4

STRAND 3

Measurement

Weighting 15

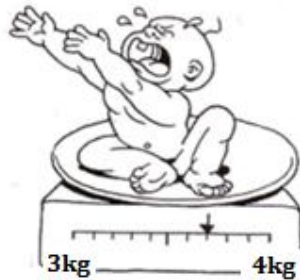
- 3.1 Fale left Siumu for work at Apia on the 5:30 am bus. The bus arrived at Lynn's supermarket at Motootua at 6:30 am, stopped for 15 minutes to allow people to buy breakfast. It then continued on to Apia in 10 minutes.

Skill Level 1

Calculate the total time of Fale's trip to Apia in minutes.

- 3.2 The arrow on the scale shows the weight of the baby. What is the baby's weight?

Skill Level 1

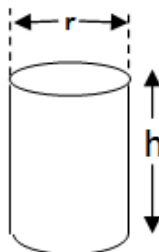


baby's weight: _____

- 3.3 2300 hours on the 24 hour clock is the same as _____ on the 12 hour clock.

Skill Level 1

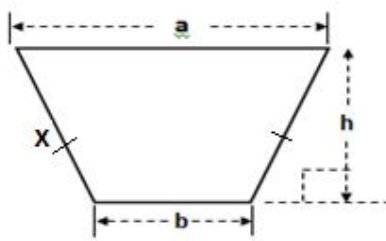
- 3.4 State the formula for calculating the volume of a cylinder.



Skill Level 1

- 3.5a State the formula for calculating the area of the trapezium below in terms of a , b and h . where $a = 10$ m, $b = 4$ m and $h = 4$ m.

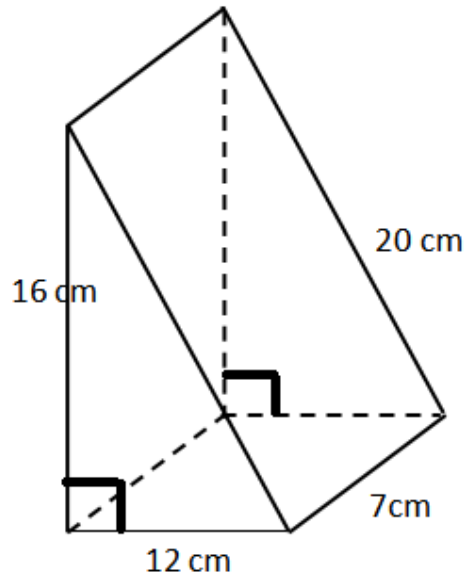
Skill Level 1



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- 3.5b Calculate the perimeter (in meters) of the shape 3.5a if $a = 10$ m, $b = 4$ m, $h = 4$ m and $x = 6$ m.

Skill Level 1

Use the diagram below to answer the following questions 3.6 (a) and (b)



3.6a Calculate the volume of figure above.

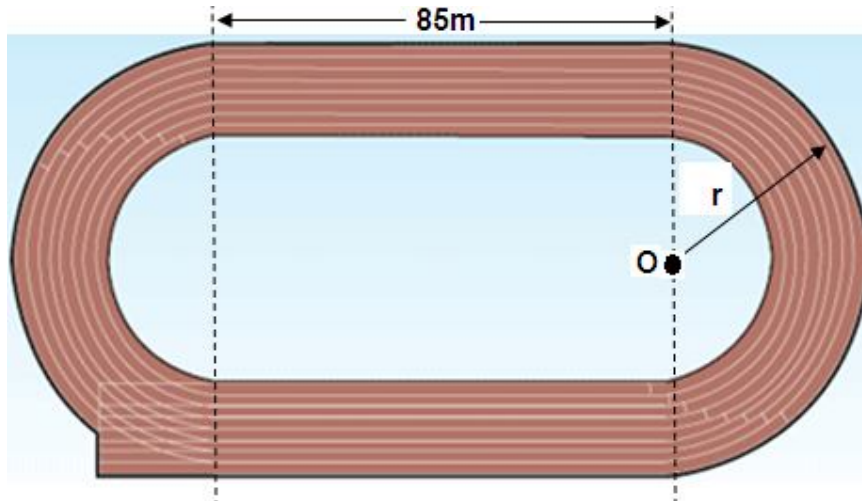
Skill Level 1

3.6b Calculate the total surface area of the figure.

Skill Level 2

- 3.7 The 400m athletic track at Apia park is shown below. The straights are 85m each. Each curved side of the track is a semi-circle with centre **O**.

Calculate the radius (**r**) correct to two decimal places.



Skill Level 3

- 3.8 Each slice of pizza sells for \$2.40 and represents 12.5% of the whole pizza. The total cost for the whole pizza is:



Skill Level 3

Efi wants to climb the ladder and replace a blown light bulb at the top of the wall x as shown in the diagram below.



4.1a Calculate the height of the wall.

Skill Level 3

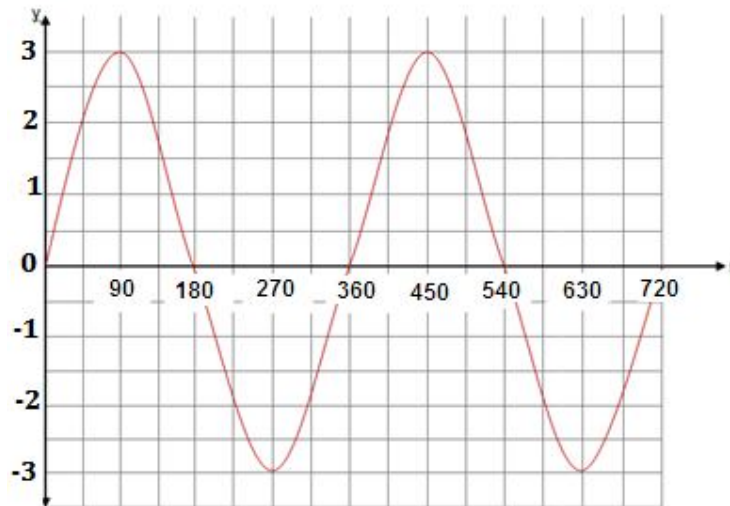
4.1b Calculate the angle θ , the ladder makes with the ground.

Skill Level 2

4.1c State the Trigonometry ratio for **Tangent θ** .

Skill Level 1

Use the graph below to answer questions 4.2a - 4.2c.



4.2a State the name of the graph given above?

Skill Level 1

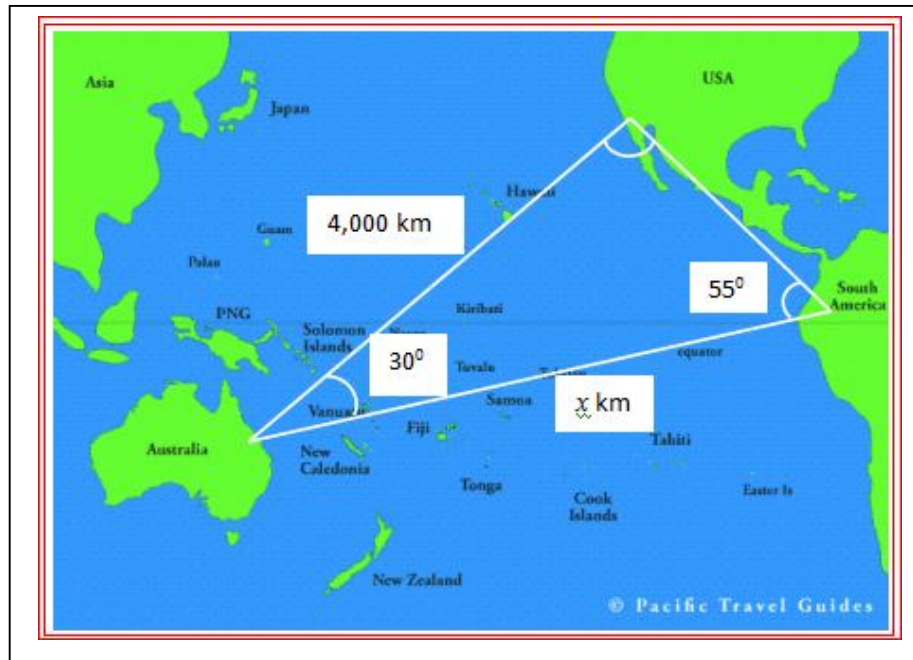
4.2b Determine the period of the curve given above.

Skill Level 2

4.2c On the same set of Cartesian axis, draw the graph of **$y = \tan x$** .

Skill Level 3

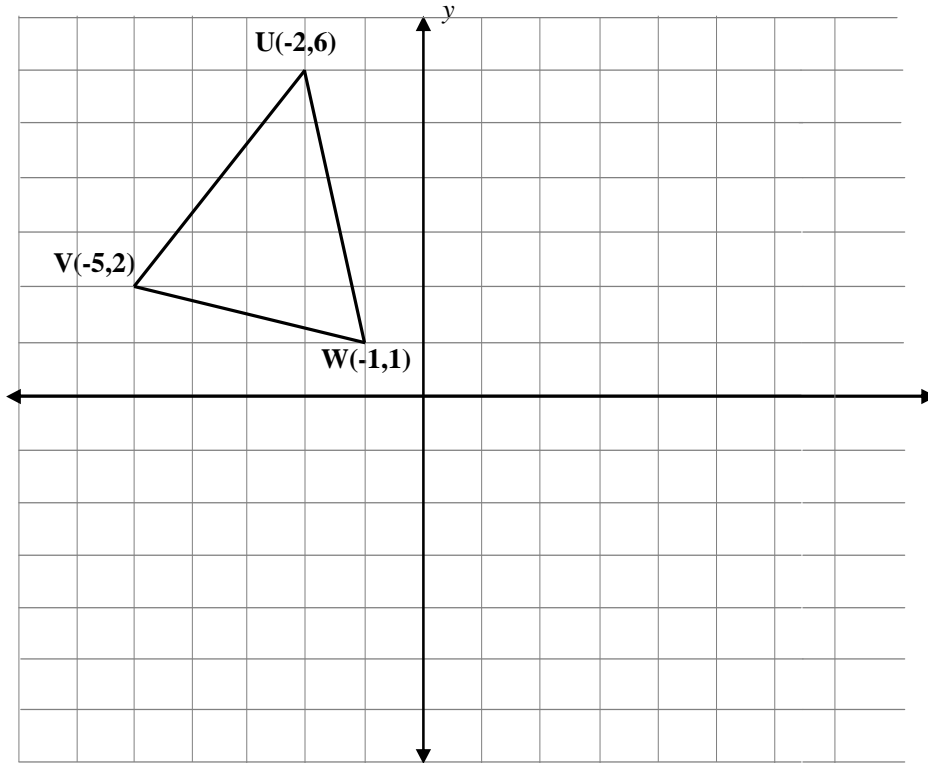
Felix who lives in Australia went to visit his aunt in USA then flew to South America for a few days before returning home as shown in the diagram.



4.3 Use the cosine Rule $a^2 = b^2 + c^2 - 2bc\cos A$ to calculate the distance x km, between Australia and South America.

Skill Level 4

Use the diagram below to answer questions 5.1a and 5.1c



5.1a Draw the line $y = x$ on the cartesian plane above.

Skill Level 1

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5.1b Draw the image of triangle UVW when reflected on the $y = x$ line.

Skill Level 2

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5.1c Label the image U'V'W' and the co-ordinates of the vertices (corners)

Skill Level 2

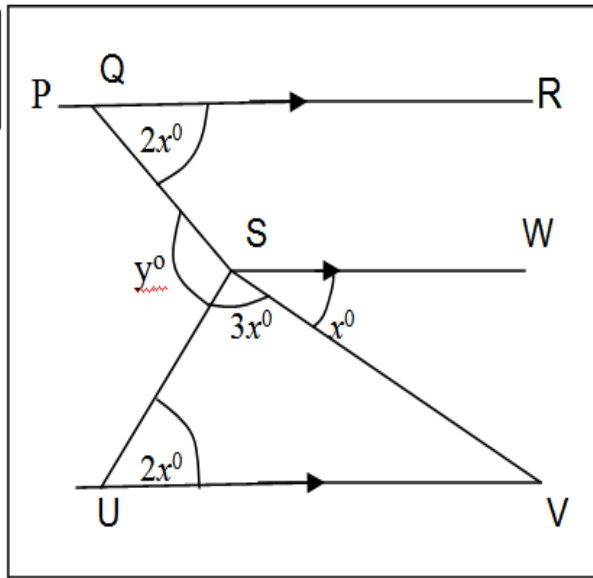
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5.2 State what an isosceles triangle is:

Skill Level 1

5.3 Find the value of x and y in the diagram below, giving reasons for each step taken.

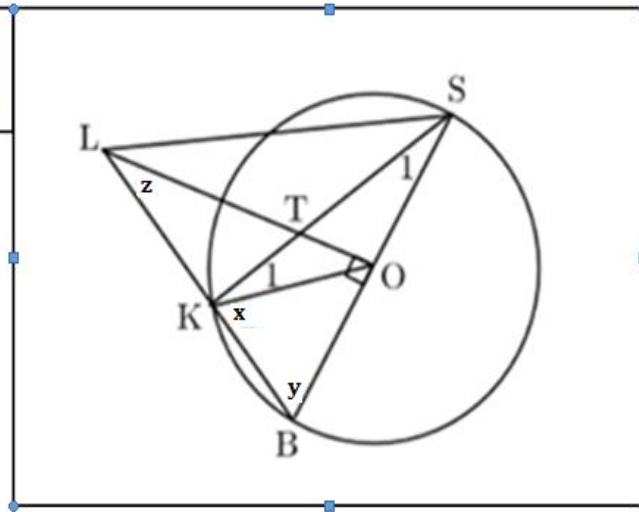
Diagram is NOT to scale



Skill Level 3

5.4

*Diagram is
NOT to scale*



Skill Level 3

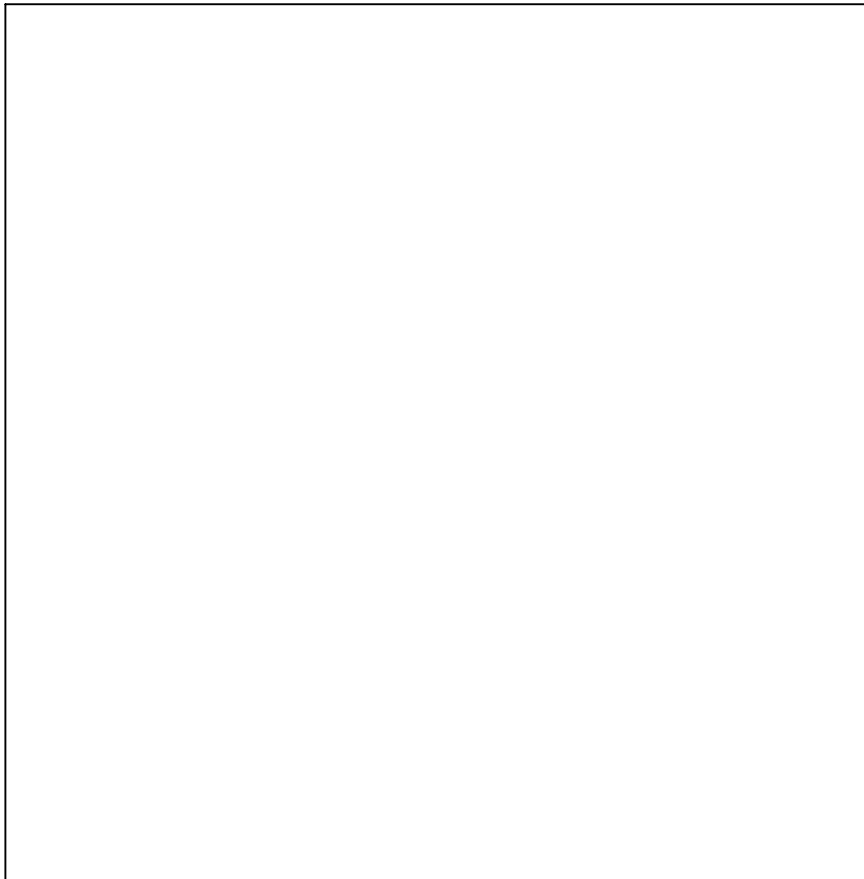
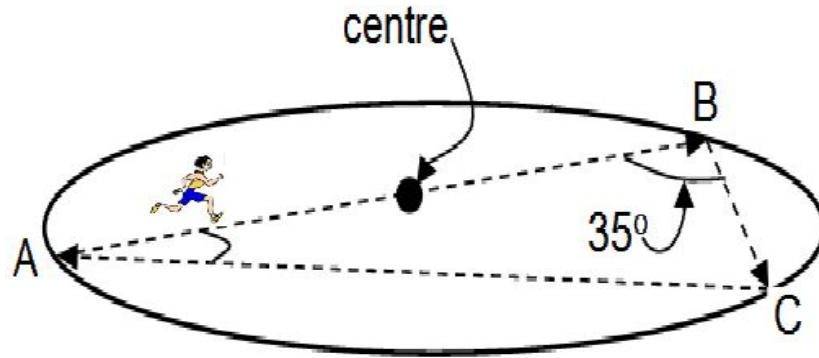
O is the centre of the circle

LO is perpendicular to BS and angle $K_1 = S_1 = 20^\circ$. Calculate angle z

You must give a geometric reason for each step leading to your answer

- 5.5 Tama draws a circle on the field with radius 20 metres and marked one side 'A' and the opposite side 'B'. He ran across the circle to the opposite side through the centre, to B. He then ran a 35° angle to C as shown and back to where he started from. Calculate angle A.

Skill Level 4



STRAND 6

Probability

Weighting 8

6.1 Define a null set.

Skill Level 1

6.2 Two regular dice are rolled and their outcomes are added.
Calculate the probability of getting a total of 7.

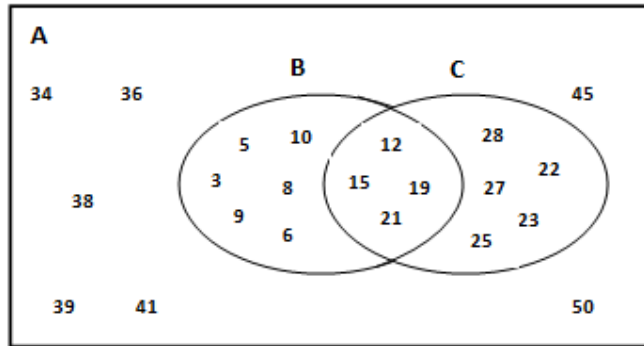


Skill Level 3

6.3 Define the union of two sets.

Skill Level 1

6.4 List down the elements of the set $B \cap C$.



Skill Level 1

6.5 From a pack of 52 cards, a card is drawn at random. Determine the probability that a card picked, is a red card less than 6.

Skill Level 2