REPUBLIC OF NAMIBIA

MINISTRY OF EDUCATION

NAMIBIA SENIOR SECONDARY CERTIFICATE

MATHEMATICS
SPECIMEN PAPERS 1 – 4, MARK SCHEMES AND ANALYSIS

ORDINARY LEVEL

GRADES 11 – 12

THESE PAPERS AND MARK SCHEMES SERVE TO EXEMPLIFY THE SPECIFICATIONS IN THE LOCALISED NSSC MATHEMATICS ORDINARY LEVEL SYLLABUS

2006

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TABLE OF CONTENTS

MINISTRY OF EDUCATION

Namibia Senior Secondary Certificate (NSSC)

MATHEMATICS: ORDINARY LEVEL

PAPER 1:
SPECIMEN PAPER

TIME: 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number on all the work you hand in.
Write in dark blue or black pen in the spaces provided on the question paper.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
If working is needed for any question it must be shown below the question.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is **60**.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, either use your calculator value or 3.142

This question paper consists of 9 printed pages.

1. Work out:
$13 + 3 \times 5 - 8$

Answer: …… [1]

---

2. On a certain day the temperature at Aus changed from -7°C at night to 22°C at noon. Write down the change in temperature.

Answer: ……°C [1]

---

3. **M A R I E T J I E**

(a) In the word above

(i) which letters have no line of symmetry?

Answer **(a)(i)**: …… [2]

(ii) Which letter has rotational symmetry of order 2?

Answer **(a)(ii)**: …… [1]

(b) If a letter is chosen at random what is the probability that it will be an E?

Answer **(b)**: …… [1]

---

4. 1 2 3 8 9 10

From the numbers above write down

(a) two prime numbers,

Answer **(a)**: …….. [1]

(b) a multiple of 4,

Answer **(b)**: …….. [1]

(c) two square numbers,

Answer **(c)**: ……. [1]

(d) two factors of 15

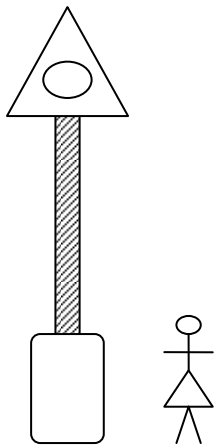
Answer **(d)**: ……. [1]

(e) two numbers, m and n, from the list such that m = $\sqrt{n}$ and n = $\sqrt{81}$.

Answer **(e)**: m = …… and *n* = …… [1]

---

5. The figure shows a woman of average height standing in front of a lamppost in Independence Avenue.
Estimate the height of the lamppost.



Answer: …… m [2]

---

6. Factorise completely $2xy - 8y$.

Answer: ……..…… [2]

---

7. Solve the following equations:

(a) $2x - 7 = 9$,

*Answe*r **(a)**: x = …… [2]

(b) $(x - 1)(x + 5) = 0$.

Answer **(b)**: x = ……..... or …… [2]

---

8. The distance between Walvis Bay and Buitepos is 700 km, correct to the nearest 50 km. Complete the inequality in the answer space.

Answer: ……. km ≤ distance < …….km [2]

---

9. On a particular day a newsagent sold 45 copies of *The Namibian*, 50 copies of *Die Republikein* and 30 copies of *New Era*.

(a) Express the sales figures as a ratio in its simplest form.

Answer **(a)**: …… : …… : … [1]

(b) The following day, the number of *New Era* sold increased in the ratio 3 : 2. Find the number of *New Era* sold on this day.

Answer **(b)**: …… [2]

---

10. Write down the value of

(a) $\left(\frac{3}{2}\right)^{-3}$

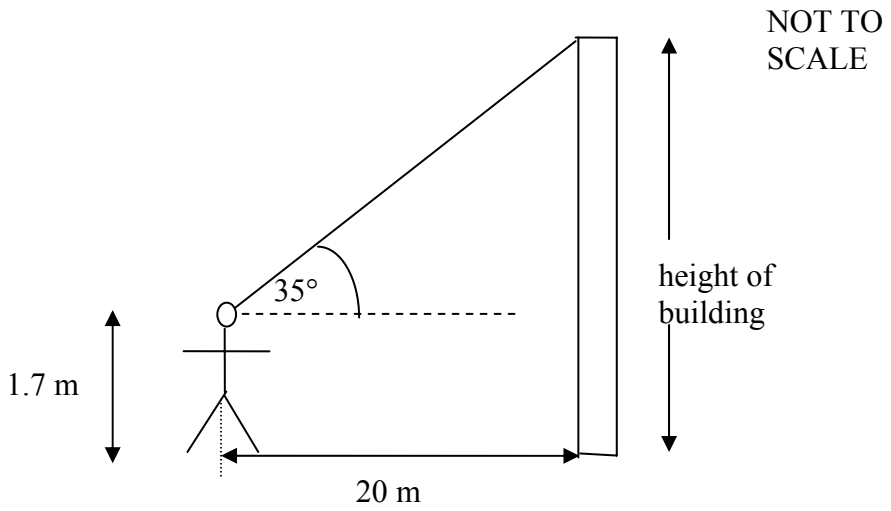
Answer **(a)**: …… [2]

(b) $\left(\frac{1}{6}\right)^{0}$

Answer **(b)**: …… [1]

---

11. Welcy, who is 1.7 m tall, stands 20m in front of the Nampost building. If she looks at the top of the building, the angle of elevation is 35°.
Find the height of the building.



Answer: …… [3]

---

12. The population of Namibia is approximately 1723000. Write this number in Standard form.

Answer: ……. [2]

---

13. In 2004 Frankie went to Athens for the Summer Olympics. He changed N$ 5000 into Euros (€) at an exchange rate of 1 Euro = N$ 8.09.
How much did he receive in Euros? Give your answer to two decimal places.

Answer: …….€ [2]

---

14. Write down the next number in the following sequences.

(a) 1 , 2 , 4 , 7 , 11 , …

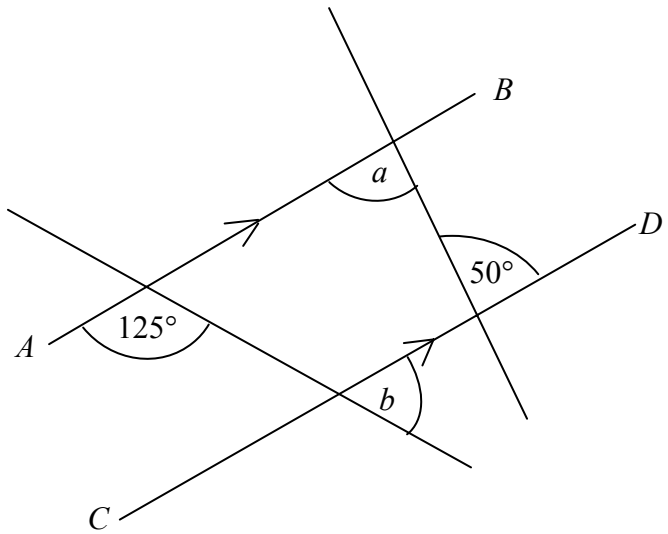
Answer **(a)**: …….. [1]

(b) 81 , 49 , 25 , …

Answer **(b):** ……..…… [1]

---

15. Line *AB* is parallel to line *CD*.



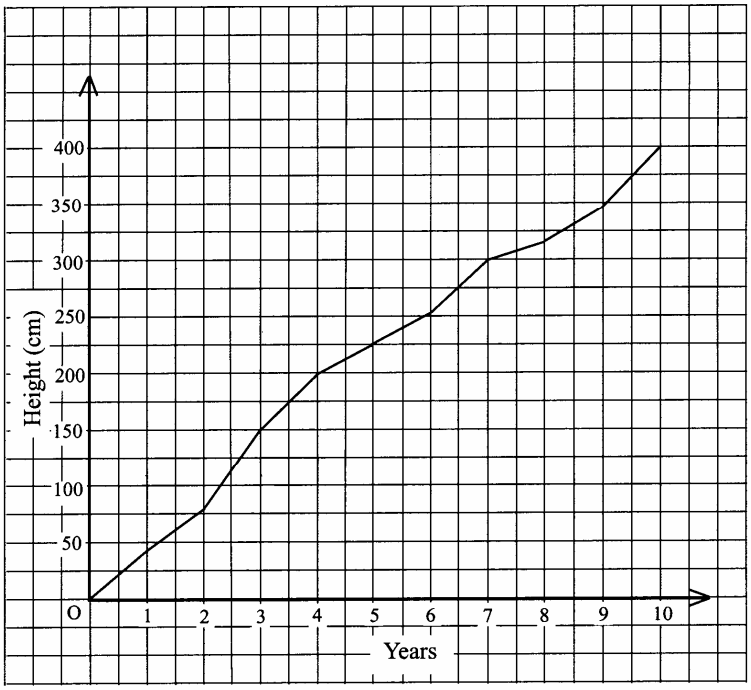
NOT TO SCALE

Write down, with reasons, the size of angles a and *b*.

Answer: *a* = …….° *reason*: …… [2]

Answer: *b* = ……° *reason*: …… [3]

16. The graph shows the height of a thorn tree, measured at the end of each year, for 10 years.
For example, at the end of year 3 the height was 150 cm.



(a) What was the height of the tree after 5 years?

Answer **(a)**: ……cm [1]

(b) In which year did the tree grow the fastest?

Answer **(b)**: …… [1]

(c) How many centimetres did the tree grow from year 7 to year 8?

Answer **(c)**: ……cm [1]

(d) How many years did it take for the tree to grow to a height of 300 cm?

Answer **(d)**: …… [1]

(e) Estimate the height of the tree after 4½ years.

Answer **(e)**: …… [1]

17.

COASTAL YOUTH CHOIR
Live at Walvis Bay City Hall
From Monday 23 August to Saturday 4 September
Daily Performance starts at 19 30
No performance on Sunday
Price: Adults N$ 25
Children (under 16 years of age): N$ 15
Each performance ends at 22 15

(a) How long was each performance? Give your answer in minutes.

Answer **(a)**: ...…….minutes [2]

(b) How many performances were there?

Answer **(b)**: ……. [1]

(c) On 27 August, 319 adults and 83 children paid to see the performance.
What was the total cost of their tickets?

Answer **(c)**: N$…… [2]

(d) The prices of the tickets for the last performance were increased by 15%.
How much did an adult pay for the last performance?

Answer **(d)**: N$……..…..… [2]

---

18. Solve the following simultaneous equations

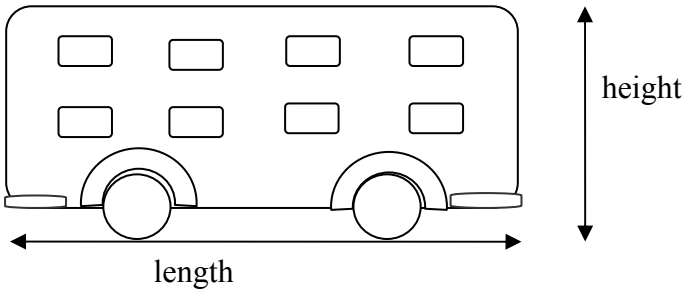
$4x - 3y = 12$
$2x - y = 2.$

*Answe*r: x = …….. and y = …… [4]

---

19. The figure shows the model of a bus (drawn to scale) used by Bush Tours to transport tourists.

1 cm represents 2 m



(a) Measure the height of the scale drawing.

Answer **(a)**: ……..cm [1]

(b) Find the length of the bus.

Answer **(b)**: ……m [2]

MINISTRY OF EDUCATION

Namibia Senior Secondary Certificate (NSSC)

MATHEMATICS: ORDINARY LEVEL

PAPER 1:
MARK SCHEME

Question Number		Mark Scheme Details			Part mark
1		20	1		**1**
2		29	1		**1**
3	**(a)**	(i) R, J (ii) I	1 + 1 1	Lose one mark for every wrong letter	**4**
	(b)	$\frac{2}{9}$	1	Accept equivalent fractions, decimals percentages (with % sign)	
4	**(a)**	2 and 3	1	Both numbers must be correct	**5**
	(b)	8	1		
	(c)	1 and 9	1	Both numbers correct to score the mark	
	(d)	1 and 3	1		
	(e)	$m = 3, n = 9$	1		
5		4.5 – 5.4	2	**B1** for slightly outside range	**2**
6		$4y(3x – 2)$	2	**M1** for y(2x – 8) or 4(3xy – 2y) or 2y(6x – 4) or 2(6xy – 4y)	**2**
7	**(a)**	8	2	**M1** for 2x = 16	**4**
	(b)	x = 1 or x = – 5	1 + 1		
8		675 ≤ r.d.< 725	1 + 1	**SC1** if reversed	**2**
9	**(a)**	9 : 10 : 6	1		**3**
	(b)	45	2	**M1** for $\frac{3}{2} \times 30$	
10	**(a)**	$\frac{8}{27}$ accept 0.296…	2	**SC1** for $\frac{27}{8}$ or $\left(\frac{2}{3}\right)^3$	**3**
	(b)	1	1		
11		15.7	3	**M1** for 20 tan 35° or tan 35 = $\frac{h}{20}$ **M1** for adding 1.7 to their answer	**3**
12		$1.72(3) \times 10^6$	1 + 1		**2**
13		618.05	2	**M1** for 5000 ÷ 8.09	**2**

Question Number		Mark Scheme Details			Part mark
14	**(a)**	16	1		**2**
	(b)	9	1		
15		$a = 50°$ alternate angles	1 1	Any valid reason	**5**
		$b = 55°$ angles on a straight line add up to 180° corresponding angles	1 1 1	Any valid reasons	
16	**(a)**	225	1		**5**
	(b)	3 rd year	1	Accept: 'from 2 to 3 years'	
	(c)	10 – 14 (cm)	1		
	(d)	7	1		
	(e)	210 – 215 (cm)	1		
17	**(a)**	165 (minutes)	2	**M1** for 2 h 45minutes <u>seen</u>	**7**
	(b)	12	1		
	(c)	(N$) 9220	2	**M1** for (319 × 25 + 83 × 15)	
	(d)	(N$) 28.75	2	**M1** for (0.15 × 25) or 3.75 <u>seen</u>	
18		$x = -3$ $y = -8$	4	**M1** for attempt to multiply one or both equations to get equal coefficients **M1** for attempting to eliminate one unknown by a correct method **A1** for one correct value (x or y)	**4**
19	**(a)**	3 – 3.1 cm	1		**3**
	(b)	13.2 – 13.6 m	2	**M1** for (6.6 – 6.8) × 2	

MINISTRY OF EDUCATION

Namibia Senior Secondary Certificate (NSSC)

MATHEMATICS: ORDINARY LEVEL

PAPER 1:
PAPER ANALYSIS

		Paper: Core/1		Year:				Target grades			
Qn	Syll ref	Topic	Context	Nu	Alg	SS	HD	G	E	C	Notes
1	1g1	Number - basic operations		1				1			
2	1c1	Number - directed numbers		1						1	localised
3	4c1 10b1	Geometry Probability				4		4			
4	1a1	Numbers		5				4	1		
5	1h1	Numbers-estimation		2					2		Localised
6	5b2	Algebra - factors			2					2	
7	5d1 5d3	linear equations quadratic equations		3					2	2	new in syllabus
8	1i1	limits of accuracy		2						2	
9	1j1 1j5	ratio and proportion increase in ratio			4			1		2	localised new in syllabus
10	5fi	Algebra-indices			3			1	2		
11	8a3	Trigonometry				3				3	
12	1f	Number-standard form		2						2	localised
13	1l1	Currency		2						2	
14	5e	Number-sequences			2			2			
15	4d3	geometry-parallel lines				5			5		
16	6a2	Graphs					5	2	3		
17	1l3	Money and finance		2			5	5	2		localised
18	5d2	Simultaneous equations			4					4	
19	1j3	Numbers-ratio, scale		3				1	2		
20											
21											
22											
23											
24											
25											
		Totals for paper		23	15	12	10	21	19	20	
Target totals for paper 1 [60 marks]				Nu	Alg	SS	HD	G	E	C	
			approx.	24	12	15	9	20-24	18-20	18-20	
Target totals for paper 3 [90 marks]				Nu	Alg	SS	HD	G	E	C	
			approx.	36	18	22	14	30-36	27-30	27-30	
			approx %	40	20	25	15	33-40	30-33	30-33	

MINISTRY OF EDUCATION

Namibia Senior Secondary Certificate (NSSC)

MATHEMATICS: ORDINARY LEVEL

PAPER 2:
SPECIMEN PAPER

TIME: 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number on all the work you hand in.
Write in dark blue or black pen in the spaces provided on the question paper.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
If working is needed for any question it must be shown below the question.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is **80**.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, either use your calculator value or 3.142.

This question paper consists of 13 printed pages.

1. Sakaria has a rectangular piece of paper which is 47 cm long and 36 cm wide.

(a) Calculate the perimeter of the piece of paper, giving your answer in metres.

Answer **(a)**: …… m [2]

(b) He wishes to cut up the paper in squares each of which measures 5 cm by 5 cm. Find the largest number of whole squares he can cut out.

Answer **(b)**: …… [2]

---

2. Dr Swarbooi travels from Windhoek to Otjiwarongo. This is a distance of 235 km.

(a) The car consumes 8 litres of petrol for every 100 km travelled. How many litres of petrol are needed for the journey?

Answer **(a)**: ……litres [2]

(b) Fuel costs N$4.05 per litre. Dr Swartbooi spends N$100 on fuel for the journey. Calculate the value of the amount of fuel left in the tank at the end of the journey.

Answer **(b)**: N$……..… [2]

---

3. Mr Shiimi sells a car for N$ 63 000. By doing so, he makes a profit of 12%.
Find the cost price of the car.

Answer: N$…….. [3]

---

4. Solve the inequality $7 + 4x > 6x - 3$, given that x is a **positive** integer.

Answer: …….. [3]

---

5. A booklet containing the New Testament, the Psalms and the Proverbs has 633 pages.
The booklet, excluding the outer covers, is 1.5 cm thick.
Calculate the thickness of each page in millimetres, giving your answer in standard form.

Answer: …… [3]

---

6. Work out $\sqrt{\dfrac{1.7^3 + 4.5^2}{2.3^3}}$, giving

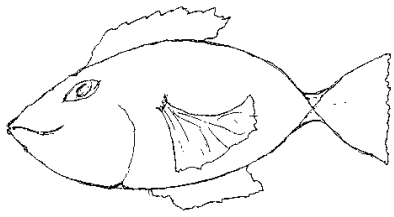
(a) the full calculator display of your answer,

Answer **(a)**: …… [1]

(b) your answer correct to 2 decimal places.

Answer **(b)**: …… [1]

7.



"A Fisherman's Catch of the Day"

The fish pictured above was weighed as 2.4 kg, to the nearest tenth of a kilogram.

(a) Given that the weight of the fish is w kg, write down the upper and lower bounds for the weight of the fish.

Answer **(a)**: …… $\leq w <$ …….. [1]

(b) Calculate the maximum percentage error for the weight of 2.4 kg.
Give your answer correct to 1 decimal place.

Answer **(b)**: ……% [2]

---

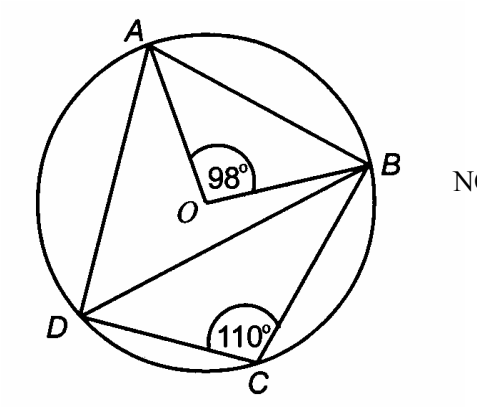
8. Simplify, giving your answer with positive indices

$$\frac{(2^{-1}x^{\frac{1}{2}})^2}{x^3}$$

Answer: …… [3]

---

9. In the diagram A, B, C and D are points on a circle, centre O.



NOT TO SCALE

Angle $AOB = 98^{o}$ and angle $DCB = 110^{o}$.

(a) Find angle ADB.

Answer **(a)**: ……^{o} [1]

(b) Give a reason why angle $DAB = 70^{o}$.

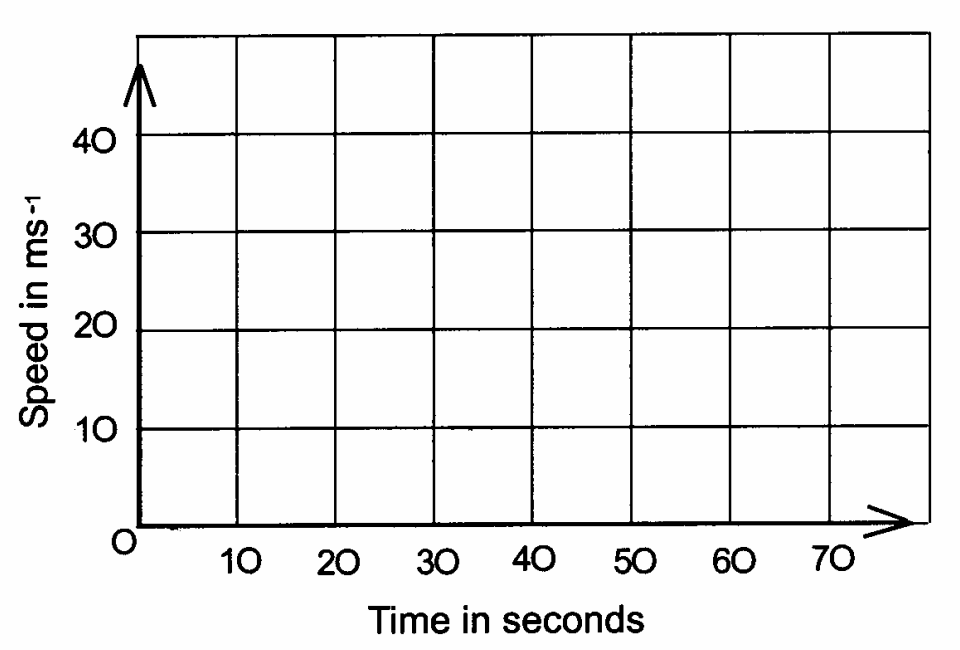
Answer **(b)**: …….. [1]

(c) Find the size of angle DAO.

Answer: ……^{o} [1]

10. A car accelerates from rest at a constant rate for 20 seconds until it reaches a speed of 30 ms^{-1}. It then travels at a constant speed of 30 ms^{-1}.

(a) On the axes below draw a speed-time graph for the journey. [2]



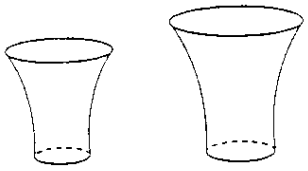
(b) Calculate the rate at which the car was accelerating in the first 30 seconds.

Answer: …… ms^{-2} [1]

(c) Calculate the distance travelled by the car in the first 60 seconds.

Answer: …… m [2]

11. The two glasses shown in the diagram are geometrically similar.



NOT TO SCALE

The height of the smaller glass is 12 cm and the height of the larger glass is 18 cm.

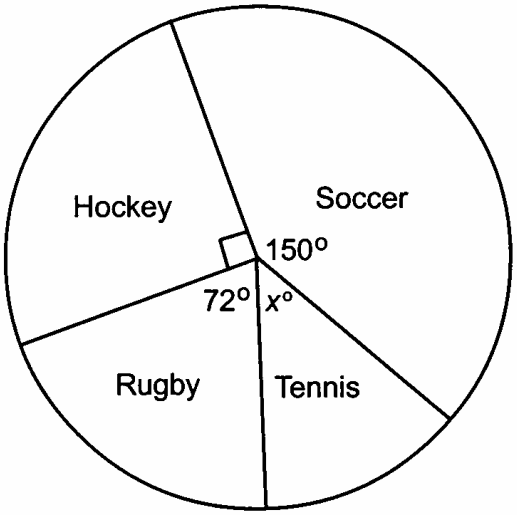
(a) The top of the larger glass has a circumference of 21 cm.
Find the circumference of the top of the smaller glass.

Answer **(a)**: ……cm [2]

(b) The glasses are completely filled with fruit juice.
The cost of the fruit juice in the smaller glass is 80cents.
Find the cost of the fruit juice in the larger glass.

Answer **(b)**: …… cents [3]

12. Donnie makes a survey of the types of sport that are played by the boys in his town. The results are shown on the given pie chart.



NOT TO SCALE

(a) Calculate:

(i) the value of x,

Answer **(a)(i)**: x = ……. [1]

(ii) the percentage of boys who play hockey.

Answer **(a)(ii)**: ……% [1]

(b) Calculate the number of boys who took part in the survey, given that 104 more boys play soccer than rugby.

Answer **(b)**: ……. [3]

13. The time, *T* hours, taken to harvest a field of mahangu is inversely proportional to the number of people, n, harvesting the field.

(a) Given that 6 people take 18 hours to harvest the field, write down an equation in T and in n.

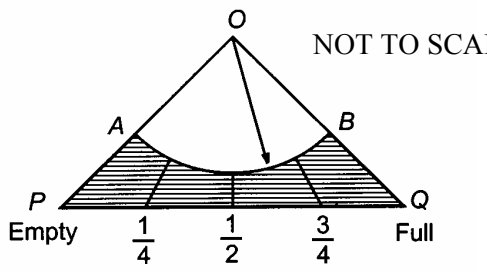
Answer **(a)**: …… [3]

(b) Find the number of people needed to harvest the field in 4 hours.

Answer **(b)**: …… [3]

---

14. The diagram represents a gauge which shows how much petrol is in a tank. A full tank holds 80 litres of petrol.



(a) Estimate the number of litres in the tank when the needle is in the position shown.

Answer **(a)**: ……litres [1]

(b) It is given that $OP = OQ = 6$ cm and angle $POQ = 90^{o}$.
Arc AB has a radius of 4 cm and centre *O*.
Calculate the shaded area *ABQP*.

Answer **(b)**: ……. cm^2 [3]

---

15. $f(x) = \frac{3}{x+2}$ for $x > -2$ and $g(x) = 3 - 2x$ for any value of x

(a) Find

(i) $f(-\frac{1}{2})$,

Answer **(a)(i)**: …… [1]

(ii) $gf(-\frac{1}{2})$

Answer **(a)(ii)**: …… [1]

(b) Find

$f^{-1}(x)$, giving your answer as a fraction.

Answer **(b)**: …… [2]

---

16. Given the sequence $5 + 9 + 13 + \ldots$

Find

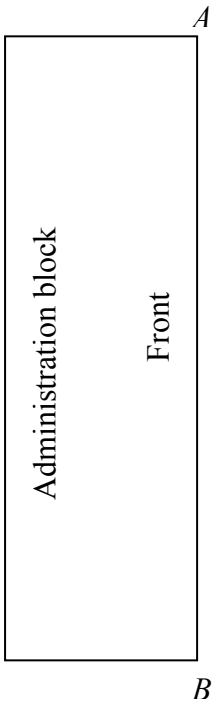
(a) the 24th term,

Answer **(a)**: …… [3]

(b) the sum to 24 terms.

Answer **(b)**: …… [2]

17.



AB represents the length of the front of the new administration block at Ombili School. The diagram is drawn to a scale of 1 cm = 1 m.

(a) Using ruler and compasses only, construct on the diagram the locus of the points which are 5 m from the front, *AB*, of the administration block.
Label it *PQ*. [3]

(b) A flag post is to be erected in front of the building. It must not be more than 8 m from *A*, not more than 7 m from *B* and at least 5 m from the block.

By making appropriate constructions, indicate clearly, by shading on the diagram, those points which represent the possible positions of the flag post. [4]

---

18. Divide $(2x^3 - 7x^2 + 7x - 2)$ by $(x - 2)$.

Answer: ……. [3]

---

19. Solve simultaneously for x and for y

$x + y = 1$ and $x^2 + y - 8 = 0$.

Answer: x = ……. or …….

y = ……. or ……. [5]

---

20. (a) Solve the equation $3^x = 6$, using logarithms.

Answer **(a)**: x = ……. [3]

(b) Express $\log 1000x^2$ in the form $a \log x + b$,
where a and b are integers.

Answer **(b)**: ……..…. [3]

MINISTRY OF EDUCATION

Namibia Senior Secondary Certificate (NSSC)

MATHEMATICS: ORDINARY LEVEL

PAPER 2:
MARK SCHEME

1. (a) Perimeter = 2 x (47 + 36) = 1.66m (b) 9 squares along 47 cm and 7 squares along 36 cm Maximum no of squares = 9 x 7 = 63	B1 B1 M1 A1 **4**	B1 for correct answer B1 for changing to metres
2. (a) $235 \times \frac{8}{100} = 18.8$ (b) 100 – 4.05 x 18.8 = N$ 23.86	M1 A1 M1 A1 **4**	
3. $63000 \times \frac{100}{112} = N\$56250$	M2 A1 **3**	M1 for 112 M1 for multiplication by $\frac{100}{112}$ or M2 for division by 1.12
4. x < 5 Answer: 1, 2, 3, 4	B1 B2,1,0 **3**	
5. $\frac{15}{633} = 2.37 \times 10^{-2}$	M1 A1 **2**	
6. (a) 1.43810122 (b) 1.44	B1 B1 **2**	Accept up to 6 d.p.
7. (a) $2.35 \leq x < 2.45$ (b) $\frac{0.05}{2.4} \times 100 = 2.1\%$	B1 M1 A1 **3**	
8. $\frac{2^{-2}x}{x^3} = \frac{1}{4x^2}$	M1 A1 A1 **3**	for removal of brackets for 4 in the denominator for x^2 in the denominator
9. (a) 49^0 (b) Opposite angles in a cyclic quadrilateral (c) 29^0	B1 B1 B1 **3**	
10. (a) straight line from (0,0) to (20,30) line parallel to *t*-axis from (20,30) (b) 1.5 (b) 10 x 30 + 40 x 30 = 1500 m	B1 B1 B1 M1 A1 **5**	

11. (a) $\frac{2}{3}\times 21 = 14\text{ cm}$ (b) ratio of volumes: $3^3 : 2^3$ cost = $\frac{27}{8}\times 80 = 270$ cents	M1 A1 M1 M1 A1 **5**	for decreasing in ratio 2 : 3 for correct ratio of volumes accept answer in N$
12. (a) (i) 48^0 (ii) 25% (b) 78^0 is 104 boys 360^0 is $\frac{104}{78}$ x 360 is 480 boys	B1 B1 M1 M1 A1 **5**	
13. (a) $T = \frac{k}{n}$ $k = 108$ $T = \frac{108}{n}$ (b) $n = \frac{108}{4} = 27$	M1 M1 A1 M1A√ **5**	M1 for constant of proportionality, k M1 for interpreting inverse proportion
14. (a) $\frac{5}{8}$ x 80 = 50 litres (b) Area = $\frac{6x6}{2} - \frac{16\pi}{4} = 5.43\text{cm}^2$	B1√ M2 A1 **4**	Accept any reasonable answer, also decimal between 0.6 and 0.65 M1 for are of triangle M1 for area of sector
15. (a) 2 (b) -1 (c) $x = \frac{3}{y+2}$ $f^{-1}(x) = \frac{3-2x}{x}$	B1 B1 M1 A1 **4**	 for exchanging x and y or any attempt to solve for x in the equation for f
16. (a) 24th term = 5 + 23 x 4 = 97 (b) sum = 12(5 + 97) = 1224	M1 M1 A1 M1 A1 **5**	M1 for recognising AP M1 for correct formula or any other valid method M1 for correctly applied formula or any other valid method
17. (a) and (b)	B1 M1 A1 M1 A1 A1 B1 **7**	for using correct scale for construction of parallel line for accuracy of parallel line (5cm) for drawing arcs for arc from A accurate (8 cm) for arc from B accurate (7 cm) for shading correct region
18. Answer: $2x^2 - 3x + 1$	B3 **3**	B1 for each correct coefficient
19. $y = 1 - x$ By substitution $x^2 + 1 - x - 8 = 0$ $x^2 - x - 7 = 0$ $x = \frac{1 \pm \sqrt{29}}{2}$ $x_1 = 3.19 \quad x_2 = -2.19$ $y_1 = -2.19 \quad y_2 = 3.19$ or $x = 1 - y$	 M1 M1 M1 A1 A1√	 for substitution for obtaining quadratic for using formula for both x-values for both y-values

By substitution $(1-y)^2 + y - 8 = 0$ $y^2 + y - 7 = 0$ $y = \frac{-1 \pm \sqrt{29}}{2}$ then obtain y-values and x-values as above	**5**	
20. (a) $\log 3^x = \log 6$ $x \log 3 = \log 6$ $x = 1.63$ (b) $\log 1000x^2 = \log 1000 + \log x^2$ $= 3 + 2 \log x$ $a = 2$ and $b = 3$	M1 M1 A1 M1 M1 A1 **6**	

MINISTRY OF EDUCATION

Namibia Senior Secondary Certificate (NSSC)

MATHEMATICS: ORDINARY LEVEL

PAPER 2:
PAPER ANALYSIS

(Specification Grid)

Q	Syll. Ref.	Topic	Context					Target Grades			Total
				Nu	Alg	SS	HD	E	C	A	
1	3(a),1,2	Mensuration	Rect: perimeter,area			4		2	2		4
2	1(j)1,1(*l*)2	Number	Ratio, rate	4				2	2		4
3	1(d)6	Number	Reverse percentage	3						3	3
4	1(a)1,5(d)7	Number, algebra	Linear inequality	2	1				2	1	3
5	1(f)1	Number	Standard form	2				2			2
6	1(k)1	Number	Calculator	2				2			2
7	1(i)1,1(d)3	Number	Lim. of accuracy, %	3				1	2		3
8	5(f)3	Algebra	Indices		3			1		2	3
9	4(d)4, 9, 11	Geometry	Angles properties			3		1		2	3
10	6(a)4, 5	Graphs	Speed-time graph		5					5	5
11	1(j)5,4(a)3	Geometry	Ratios			5			2	3	5
12	10(a)3	Statistics	Pie chart				5	5			5
13	1(j)1, 6	Number, algebra	Variation	2	3				2	3	5
14	1(*l*)3,3(a)1,2	Mensuration	Area: triangle,arc			4		1	1	2	4
15	6(c)1,2	Algebra	Functions		4					4	4
16	5(c)1,2,4	Algebra	Sequences		4			2		2	4
17	4(e)1,2	Mensuration	Loci			7		2	5		7
18	5(c)2	Algebra	Polynomials		3					3	3
19	5(d)6	Algebra	Simult. equations		5					5	5
20	5(g)1,2	Algebra	Logarithms		6					6	
		Totals for paper		18	34	23	5	20	18	42	80
			Percentage					25	22.5	52.5	100
				Nu	Alg	SS	HD	E	C	A	
	Target totals for paper 2 (80 marks) approx.			16	32	20	12	20-24	18-20	36-42	

MINISTRY OF EDUCATION

Namibia Senior Secondary Certificate (NSSC)

MATHEMATICS: ORDINARY LEVEL

PAPER 3:
SPECIMEN PAPER

TIME: 1 hour 45 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number on all the work you hand in.
Write in dark blue or black pen in the spaces provided on the Question Paper.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, and glue or correction fluid.

Answer **all** questions.
If working is needed for any question it must be shown below the question.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is **90**.

Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, either use your calculator value or 3.142

This question paper consists of 10 printed pages.

1.

12	**61**		**70**		**78**
		64		**85**	
	63		**81**		**99**

From the table of numbers, write down the following:

(a) a multiple of 6,

Answer **(a)**:…… [1]

(b) a factor of 396,

Answer **(b)**:…… [1]

(c) a cube number,

Answer **(c)**:…… [1]

(d) a power of 3,

Answer **(d)**:…… [1]

(e) two numbers whose product is 5355,

Answer **(e)**:…… [1]

(f) a prime number,

Answer **(f)**:…… [1]

(g) three numbers which add up to 197,

Answer **(g)**:…… [1]

(h) the number whose square root is 9.

Answer **(h)**:…… [1]

---

2. **(a)** Mr Kapenda bought a house for N$ 250 000. He wants to renovate the bathrooms in the house and buys the following items. Fill in the missing values.

6 taps @ N$ 32.95 each	N$ …….
1 shower door @ N$ 399	N$ …….
2 baths @ N$ 410.50 each	N$ …….
Total	N$ ……. [3]

(b) Mr Kapenda has N$ 2 000 to spend on the bathrooms.

(i) Calculate the amount he has left after buying the previous items.

Answer **(b)(i)**: N$ ……..…. [1]

(ii) The price of floor tiles is N$ 48.95 per square metre. How many square metres of floor tiles can Mr Kapenda buy with the remaining amount?

Answer **(b)(ii)**: …… [2]

(c) After the renovations, Mr Kapenda wants to sell his house for an increase of 20% on the original price. Calculate the selling price of the house.

Answer **(c)**: N$ ……. [2]

(d) If Mr Kapenda had invested the N$ 250 000 for 3 years at 15% simple interest, calculate the amount of money he would receive after 3 years.

Answer **(d)**: N$ …… [2]

3. **(a)** Arrange the following numbers in order of size, starting with the smallest first.

$\frac{3}{4}$, 72%, 0.8, 0.09

Show all your working

Answer : ……, ……., ……, …… [4]

(b) Each of the numbers, j, k, l, m and n is a different number in the set 2, 3, 6, 8, 9.
Also, $j = k - 3l$, $k = 5j - n$, $m = l^3$ and $n = 3l$.
Find the values of j, k, l, m and n.

Answer **(b)**: j = ……

k = ……

l = ……

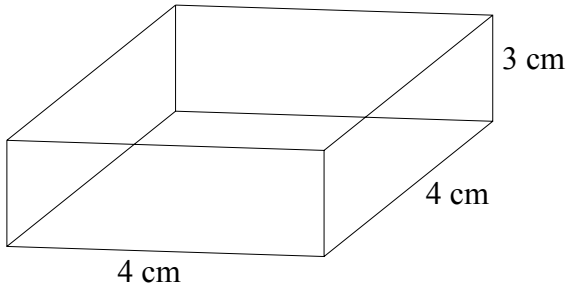
m = ……

n = …… [4]

4. **(a)** Find the area of a circle with radius 1.5 cm.

Answer **(a)**: ……..…cm^2 [2]

(b) A copper block is in the shape of a cuboid measuring 4 cm by 4 cm by 3 cm.

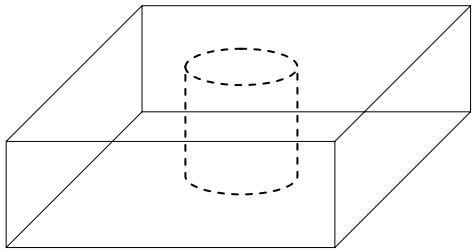


NOT TO SCALE

Find the volume of the copper block.

Answer **(b)**:……. cm^3 [2]

(c) A hole of radius 1.5 cm is drilled in the copper block as shown in the figure.



NOT TO SCALE

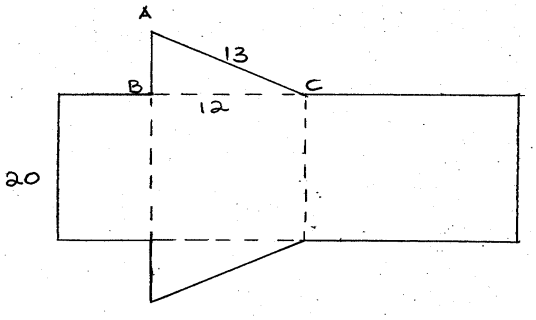
(i) Use your answer to (a) to find the volume of the hole.

Answer **(c)(i)**: ……..cm^3 [2]

(ii) Calculate the percentage of copper which remains in the block.

Answer **(c)(ii)**: ……..% [3]

(d) The figure shows the net of a solid. All lengths are given in centimetres.



NOT TO SCALE

(i) What special name is given to the solid?

Answer **(d)(i)**: …… [1]

(ii) By calculation, show that the length of AB = 5 cm.

[2]

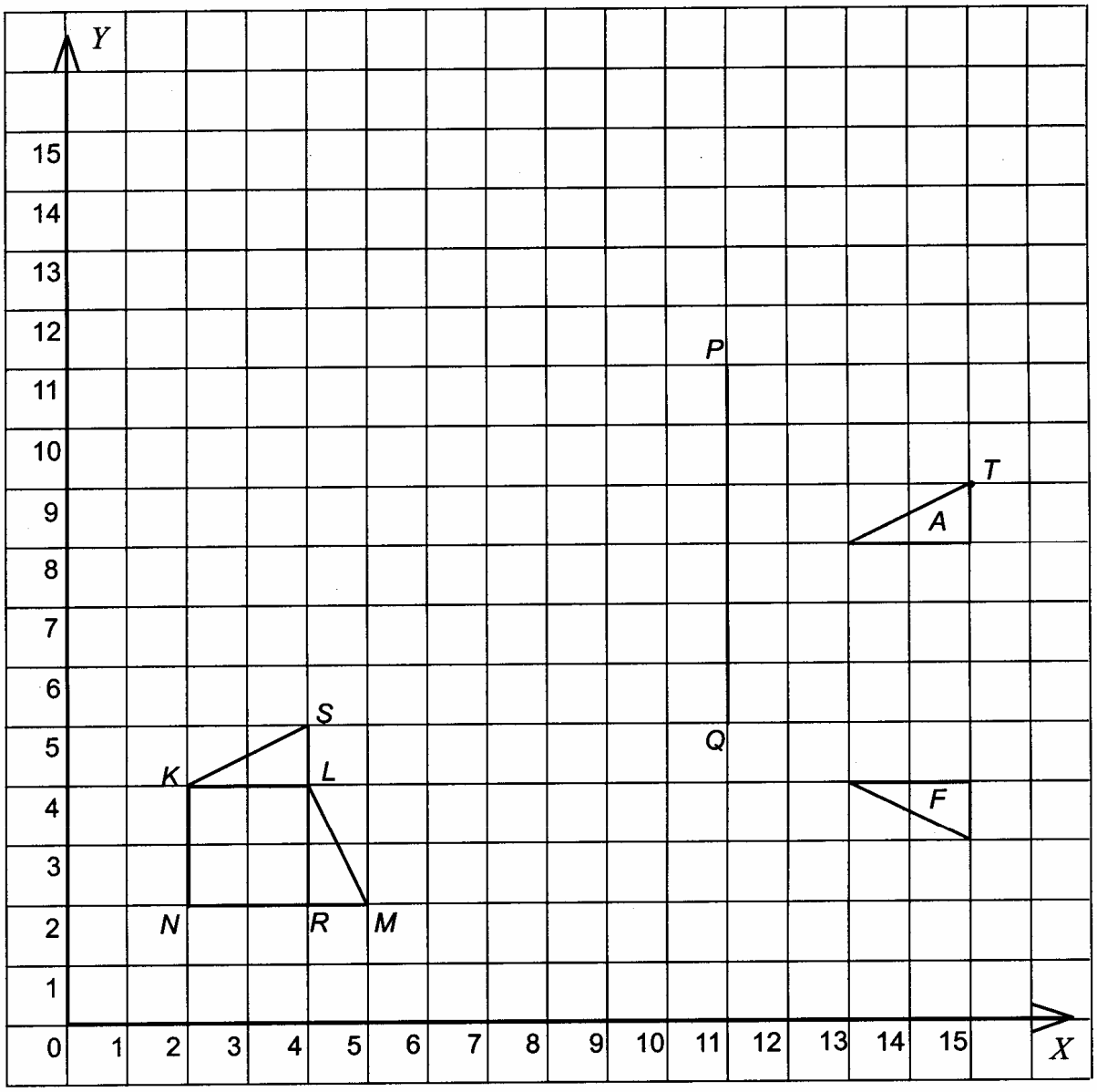
(iii) Calculate the total surface area of the solid.

Answer **(d)(iii)**: ……cm^2 [3]

(iv) Calculate the total length of all the edges of the solid.

Answer **(d)(iv)**: ……cm [2]

5.



(a) Draw accurately the image of triangle A under the following transformations:

(i) Reflect triangle A in the line PQ. Label the image B. [2]

(ii) Translate triangle A by the vector $\begin{pmatrix} -4 \\ -2 \end{pmatrix}$. Label the image C. [2]

(iii) Rotate triangle A about the point T through 90° clockwise. Label the image D. [2]

(iv) Enlarge triangle A with T as centre of enlargement and scale factor 2. Label the image E. [2]

(b) Describe fully the single transformation which maps triangle *A* onto triangle *F*.

……. [2]

(c) Trapezium *KLMN* is rotated onto trapezium *NKSR* with *M* mapped onto *S*.
Write down:

(i) the angle of rotation

Answer: ……° [1]

(ii) the coordinates of the centre of rotation.

Answer: (……., ……..) [2]

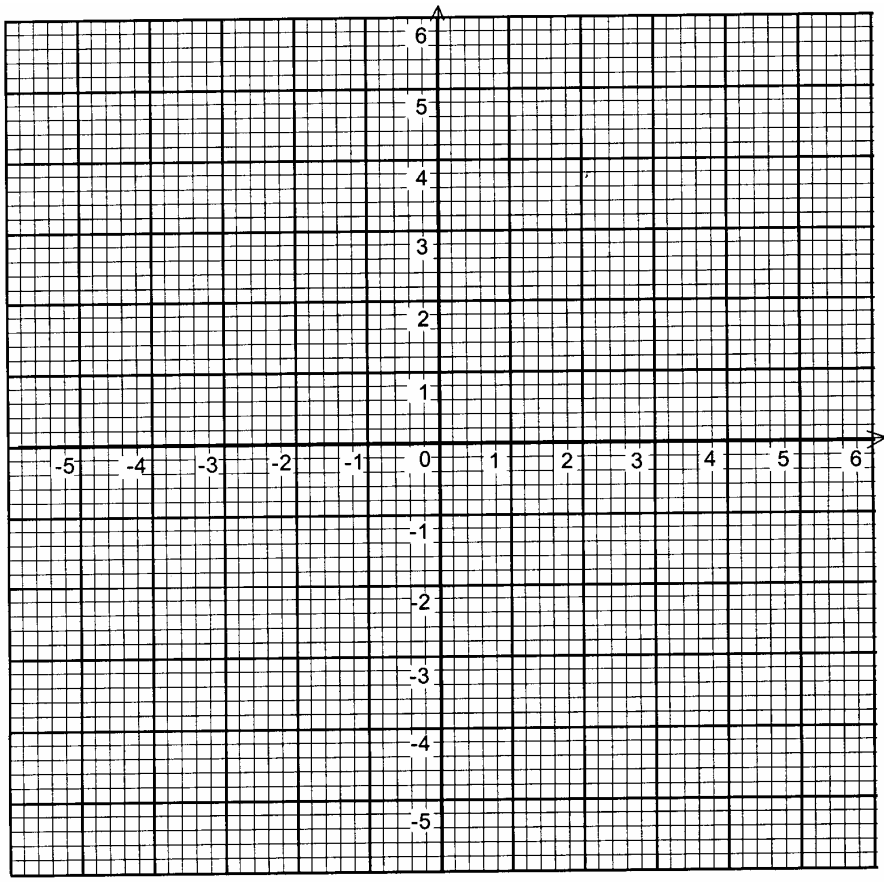
---

6. **(a)** Complete the table for $y = x^2 + 2x - 3$

x	–4	–3	–2	–1	0	1	2
y		0	–3	–4	–3		5

[2]

(b) On the grid, draw the graph of $y = x^2 + 2x - 3$ for $-4 \leq x \leq 2$. [3]



(c) Complete the table of values for $y = -x + 1$

x	– 5	– 3	– 1	0	1	2
y		4	2	1		– 1

[1]

(d) On the grid above, draw the graph of $y = -x + 1$ for $-5 \leq x \leq 2$ [2]

(e) Find the coordinates of the points of intersection of the graphs $y = x^2 + 2x - 3$ and $y = -x + 1$.

Answer (e): (……, ……..) [1]

(……, ……..) [1]

7. The table below shows the rubbish which Petrus collected during the school cleaning campaign.

Type of rubbish	Bottles	Plastics	Papers	Tins
Number of items	5	11	8	6

(a) Find

(i) the mean number of items

Answer **(a)(i)**: …….. [3]

(ii) the mode.

Answer **(a)(ii)**: ……. [1]

(b) For which types of rubbish did Petrus collect more than 6 items?

Answer **(b)**: …….. [1]

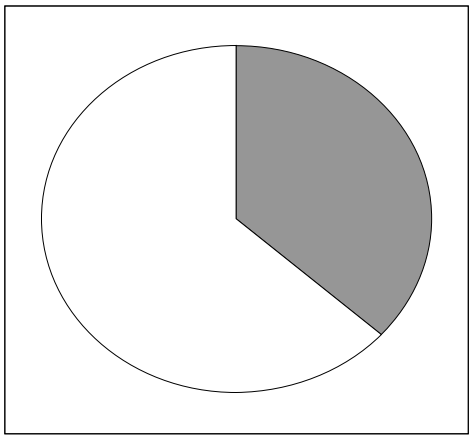
(c) One item is picked at random. What is the probability that the picked item is a bottle?

Answer **(c)**: ……. [2]

(d) Mrs Haingura wants to draw a pie chart of Petrus' collection. Calculate the sector angles for the tins, bottles and papers.

Answer **(d)**: tins ……...°
bottles …..…...°
papers …….....° [3]

(e) Display the information on the pie chart below. The pie chart is drawn to scale and the angle for plastics is already drawn and shaded for you. [2]



(f) Calculate the percentage of plastic collected.

Answer ……..% [2]

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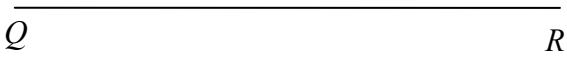
8. **(a)** Construct accurately a triangle PQR with base $QR = 7$ cm, $PQ = 11$ cm and angle $PQR = 30°$.
QR has been drawn for you.



(b) Using a straight edge and compasses only, construct

(i) the locus of points equidistant from P and Q. [2]

(ii) the bisector of angle R. [2]

(c) Shade the region inside the triangle which contains all the points nearer to R than to P and nearer to PR than to PQ. [2]

MINISTRY OF EDUCATION

Namibia Senior Secondary Certificate (NSSC)

MATHEMATICS: ORDINARY LEVEL

PAPER 3:
MARK SCHEME

Question Number		Mark Scheme Details			Part mark
1	**(a)**	78	1		
	(b)	99	1		
	(c)	64	1		
	(d)	81	1		
	(e)	85 and 63	1		
	(f)	61	1		
	(g)	63, 64 and 70	2	**SC1** for 2 correct	
	(h)	81	1		**9**
2	**(a)**	197.70 399.00 821.00 1417.70	1 1 1	c.a.o c.a.o c.a.o	
	(b)	(i) 582.30	1		
		(ii) 11	2	**M1** for their (b) (i) divided by 48.95	
	(c)	300 000	2	**M1** for 1.2 × 250 000	
	(d)	362 500	2	**M1** for 250 000 × 1.5 × 3	**10**
3	**(a)**	0.09, 72%, $\frac{3}{4}$, 0.8	4	**B3** if correct without working seen **SC3** if answers in reverse order **SC1** for 0.72 and 0.75 seen	
	(b)	$j = 3$ $k = 9$ $l = 2$ $m = 8$ $n = 6$	4	**SC2** for *m, l* and *n* all correct **FTB2** for *j* and *k* correct using their values of *m*, *l* and *n*	**8**
4	**(a)**	7.07	2	**M1** for 3.142×1.5^2	
	(b)	48	2	**M1** for 3 × 4 × 4	
	(c)	(i) 21.20	2	**M1** for 7.07×3 OR $\pi \times 1.6^2 \times 3$	
		(ii) 55.8%	3	**M1** for 48 – 21.2 = 26.8 **M1** for $\frac{26.8}{48} \times 100$	
	(d)	(i) triangular prism	1	Accept prism	
		(ii) 5	2	**M1** for $\sqrt{169-144}$	
		(iii) 660	3	**M1** for 2(0.5×12×5) + (12×20) + (13×20) +(5×20) **M1** for adding all areas	
		(iv) 120	2	**M1** for (3×20) + (2×12) + (2×5) +(2×13)	**17**

Question Number		Mark Scheme Details			Part mark
5	**(a)**	(i) B vertices(9,8), (7,8), (7,9)	2		
		(ii) C vertices (11, 6) (9,6) (11,7)	2		
		(iii) D vertices (15,9) (15,11) (16,9)	2	**SC1 for translated by** $\begin{pmatrix}-2\\-4\end{pmatrix}$ **etc.** **SC1 for 90° clockwise from A**	
		(iv) E vertices (15,7), (15,9) (11,7)	2	**SC1 if different scale factor about T or enlargement of to s.f.2 about other point**	
	(b)	Reflection	1		
		In line y = 6	1		
	(c)	(i) 90° (anticlockwise)	1	**Accept 270° clockwise**	**13**
		(ii) (3 , 3)	1 1		
6	**(a)**	5 ; 0	1 1		
	(b)	Correct graph drawn	3	**FT P2 for 7 points from their table plotted correctly** **FT P2 for ≥ 5 points from their table plotted correctly** **C1 for a correct smooth curve drawn**	
	(c)	6 ; 0	1		
	(d)	Ruled line through all points	2		
	(e)	(– 4 , 5) and (1 , 0)	1 1		**10**
7	**(a)**	(i) 7.5	3	**M1 for (5 + 11 + 8 + 6)** **M1 for (÷ 4)**	
		(ii) Plastic	1		
	(b)	Paper and plastic	1		
	(c)	$\frac{1}{6}$ or 1.66… or 16.6…%	2	**M1 for** $\frac{5}{30}$	
	(d)	(i) 72°	1		
		(ii) 60°	1		
		(iii) 96°	1		
	(e)	Pie chart completed	2	**B1 for all angles drawn correctly from (d) (±2°)** **B1 for correctly labelling sectors**	
	(f)	36.7%	2	**M1 for** $\frac{11}{30}\times 100$	**14**
8	**(a)**	Triangle PQR drawn	3	**M1 for angle PQR = 30°** **M1 for PQ = 7 cm** **A1 if PR = ± 6 cm**	
	(b)	(i) Correct locus constructed	2	**M1 for arcs seen** **A1 for midpoint of PR = ± 3.2 cm**	
		(ii) angle R correctly bisected	2	**M1 for arcs seen** **A1 for angle bisector to within 2°**	
	(c)	Region correctly shaded	2		**9**

MINISTRY OF EDUCATION

Namibia Senior Secondary Certificate (NSSC)

MATHEMATICS: ORDINARY LEVEL

PAPER 3:
PAPER ANALYSIS

		Paper: Core/3		Year:				Target grades			
Qn	Syll ref	Topic	Context	Nu	Alg	SS	HD	G	E	C	Notes
1	1a1	Number - basic operations		9				9			
2	1m2	Money and finance		10				6	4		localised
3	1e1 5a3	Numbers Algera		4	4			4	4		
4	3a1	Mensuration - Area volume		7		6	4	3	8	6	
5	9b1 9b2 9b3 9b4	reflection rotation translaton and enlargement describe transformations				10	3	2	2	9	
6	6d1 6d2	construct tables draw and interpret graphs			10				3	7	
7	10a2 10a3 10a4 10b1	interpret statistical tables construct a pie chart calculate mean, mode calculate probability		5			9	7	7		Localised
8	4b2 4b4 4e3	construct a triangle constructions locus				7	2		3	6	
		Totals for paper		35	14	23	18	31	31	28	
Target totals for paper 1 [60 marks]				Nu	Alg	SS	HD	G	E	C	
			approx.	24	12	15	9	20-24	18-20	18-20	
Target totals for paper 3 [90 marks]				Nu	Alg	SS	HD	G	E	C	
			approx.	36	18	22	14	30-36	27-30	27-30	
			approx %	40	20	25	15	33-40	30-33	30-33	

MINISTRY OF EDUCATION

Namibia Senior Secondary Certificate (NSSC)

MATHEMATICS: ORDINARY LEVEL

PAPER 4:
SPECIMEN PAPER

TIME: 2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces provided on the answer paper.
Write in dark blue or black pen in the spaces provided on the Question Paper.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, and glue or correction fluid.

Answer **all** questions.
Write your answers and working on the separate answer paper provided.
All working must be clearly shown. It should be done on the same sheet as the rest of the answer.
Marks will be given for working which shows that you know how to solve a problem even if you get the answer wrong.
If you use more than one sheet of paper, fasten the sheets together.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 120.

Electronic calculators should be used.
If the degree of accuracy is not specified and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, either use the calculator value or 3.142

This question paper consists of 8 printed pages.

1. The Desert Express train starts its journey in Windhoek.
On Sunday, 45 of the 80 passengers are adults and the rest are children.

(a) At Okahandja, 20% of the adults and $\frac{1}{5}$ of the children get off the train.

(i) Find the number of children that get off the train. [1]

(ii) Find the number of adults that get off the train. [1]

(b) At Okahandja, 30 adults and x children get onto the train
The total number of passengers on the train is now 120.

(i) Find the number of adult passengers that are on the train as it sets off again. [1]

(ii) Find the value of x. [1]

(c) The train journey takes 14 hours and 30 minutes.
The Desert Express leaves Windhoek on Sunday at 15 53 for Swakopmund.

(i) State the correct time of arrival of the train in Swakopmund. [2]

(ii) The distance travelled is 350 km. Calculate the average speed of the train. [2]

---

2. Vernon and Surine plan a holiday in the U.S.A. in September 2004.
Vernon decides to change N$3 500 into US dollars in January 2004 when the exchange rate is US$1 = N$7.13.
A bank charge of 1% is then deducted.

(a) Calculate how many US$ Vernon receives, giving your answer to the nearest US$. [3]

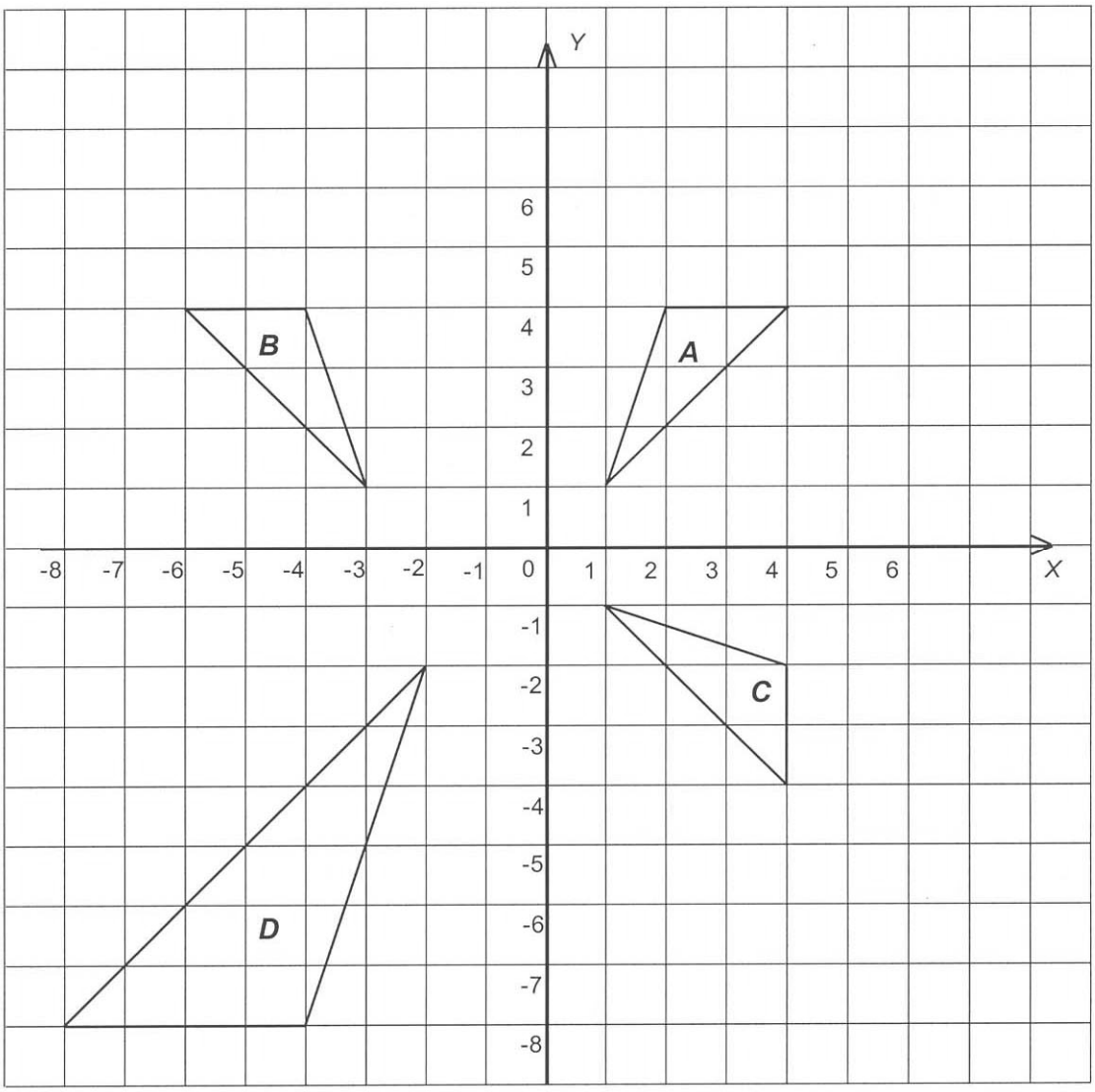
(b) Vernon spends US$50 on 4 CDs.
Calculate the number of CDs he can buy for US$120. [2]

(c) In February 2004, Surine invests her N$3 500 for 6 months at an interest rate of 9% p.a.

(i) Calculate the total amount she receives at the end of 6 months. [3]

(ii) She now changes this amount into US$.
Now the exchange rate is US$1 = N$7.11 and there are no bank charges.
Calculate who has more US$ to take on their holiday,
Vernon or Surine. [2]

3.



(a) Describe fully the transformation which maps

(i) A onto B, [2]

(ii) A onto C, [3]

(iii) A onto D. [3]

(b) A is mapped onto E by a translation with vector $\begin{pmatrix} 2 \\ -4 \end{pmatrix}$.

Write down the coordinates of the image of point P. [2]

---

4. Ben's height is 140 cm and Hilaria's height is 160 cm.

(a) State the ratio of Ben's height : Hilaria's height, in its simplest form. [1]

(b) Ben and Hilaria decide to share 45 sweets in the ratio of their heights.
Find the number of sweets that Hilaria receives. [2]

(c) A year ago, Ben's height was 130 cm.
Find the percentage increase of his height. [2]

(d) Hilaria's younger brother is 10 cm shorter than half her height.
Find her brother height. [1]

(e) The ideal mass, M kilogram, of a person is twice the circumference of the head, c centimetres, divided by the length, l metres, of the person.

(i) Construct an equation to find the ideal mass of a person in terms of the length and the circumference of the head of the person. [2]

(ii) The circumference of Hilaria's head is 45 cm.
Find her ideal mass. [2]

---

5. **Answer the whole** of this question on a sheet of graph paper.

A school must transport netball players to Windhoek. The soccer coach asks to have all the vacant seats on the bus for the soccer players.
The bus cannot transport more than 36 learners.
The soccer coach asks that at least his 8 best players must be on the bus.
There must be at least twice as many netball players than soccer players on the bus.

Let the number of soccer players be x and the number of netball players be y.

(a) Explain how the above information leads to the following inequalities:
$x + y < 36$; $x > 8$ and $y > 2x$. [3]

(b) Draw and label an x-axis and a y-axis from 0 to 40.
Use a scale of 2 cm equals 10 units on both axes.

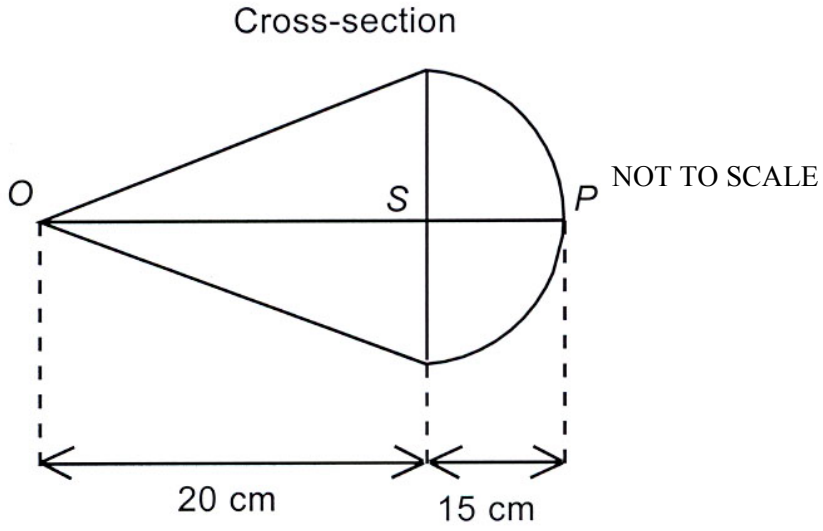
Draw the straight lines for $x + y = 36$, $x = 8$ and $y = 2x$ on the same system of axes. [4]

(c) By shading the unwanted region on the graph, indicate the region that satisfies the three inequalities simultaneously. [2]

(d) Using your graph, find the maximum number of soccer players that can go to Windhoek in the bus. [1]

---

6. Hilja belongs to a mathematics club.
She decides to construct a cone mounted on a hemisphere.



The distance *OS* is equal to 20 cm and *SP* is 15 cm.

(a) Calculate the area of the cross-section. [3]

(b) Calculate the volume of the solid. [3]
[Volume of a cone = $\frac{1}{3}\pi r^2 h$ and the volume of a sphere = $\frac{4}{3}\pi r^3$.]

(c) Write an equation for the radius, *r*, of a cone in terms of volume, *V*, and height, *h*. [2]

---

7. **Answer the whole of this** question on a sheet of graph paper.

(a) **(i)** Write $x^2 - x - 1$ in the form $(x + d)2 + e$, where *d* and *e* are constants. [3]

(ii) Use your answer in part *(i)* to write down the coordinates of the turning point of the graph of $y = x^2 - x - 1$. [2]

(b) A table of values for $y = x^2 - x - 1$ is given below.

x	-2	-1	0	1	2	3
y	5	a	b	-1	1	c

(i) Calculate the values of *a*, *b* and *c*. [3]

(ii) Using a scale of 2 cm to represent 1 unit draw an *x*-axis for $-2 \leq x \leq 3$, and using a scale of 2 cm to represent 1 unit draw a *y*-axis for $-2 \leq y \leq 5$.
Draw the graph of $y = x^2 - x - 1$, clearly indicating the turning point. [6]

(c) Use your graph to solve the equation $x^2 - x - 1 = 0$. [2]

(d) **(i)** Draw a tangent to your curve at the point (0, – 1) on your diagram. [1]

(ii) Use your diagram to estimate the gradient of the tangent. [2]

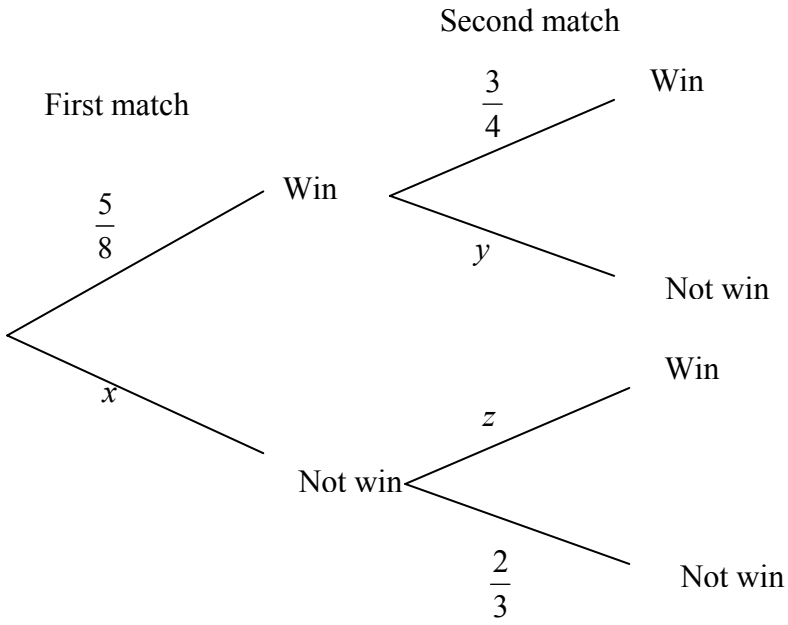
---

8 Blue Waters soccer team is playing two matches next week.
The probability that the team will win the first match is $\frac{5}{8}$.

(a) Write down the probability that Blue Waters will loose their first match. [1]

The probability that they will win the second match is $\frac{3}{4}$, given that they won the first match.
If they lost the first match, the probability that they win the second match is $\frac{1}{3}$.

(b) Write down the missing values for x, y and z in the tree diagram below. [2]



(c) Calculate the probability that

(i) Blue Waters wins both matches, [2]

(ii) Blue Waters wins at least one match. [2]

---

9. **(a)** Line l_1 has the equation $2x + y = 8$.
Find the gradient of l_1. [1]

(b) Line l_2 passes through point A(12, 4).
Lines l_1 and l_2 are perpendicular to each other.
Find the equation of l_2 in the form $y = mx + c$. [3]

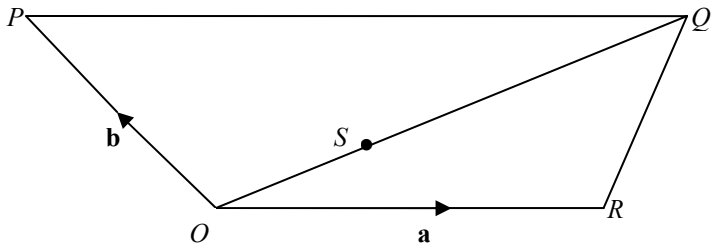
(c) Find the coordinates of the midpoint, M, of OA, where O is the origin. [1]

(d) The lines l_1 and l_2 intersect at P.

(i) Find the coordinates of P. [3]

(ii) Find the length of AP. [2]

10.



TO SCALE

The figure shows the position of points P, Q and R where
$\vec{OR} = \mathrm{a}, \quad \vec{OP} = \mathrm{b}, \quad \vec{OS} = \frac{1}{3}\vec{OQ}$ *and* $\vec{PQ} = 2\vec{OR}$

(a) Express in terms of **a** and/or **b**:

(i) $\vec{PQ}$ [1]

(ii) $\vec{OQ}$ [1]

(iii) $\vec{PS}$ [2]

(iv) $\vec{RS}$ [2]

(b) Explain why S does not lie on the line PR. [2]

---

11. The table below shows the heights of some bean plants after 2 weeks.

Height (h in cm)	$0 < h \leq 1$	$1 < h \leq 2$	$2 < h \leq 5$	$5 < h \leq 9$	$9 < h \leq 10$
Number of plants	5	10	19	11	15

(a) Write down the modal class. [1]

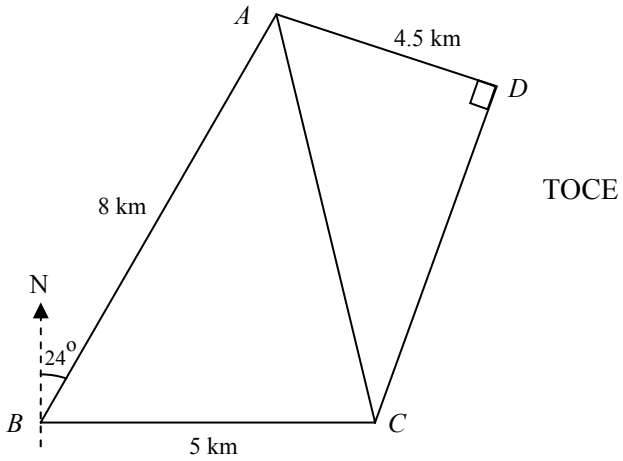
(b) Calculate an estimate of the mean height of the plants. [4]

(c) Use the information in the table above to find the values of p, q and r in the following cumulative frequency table: [3]

Height (h in cm)	$h \leq 1$	$h \leq 2$	$h \leq 5$	$h \leq 9$	$h \leq 10$
Cumulative frequency	5	p	q	r	60

(d) Find the inter-quartile range. [2]

12.



TOCE

The diagram above represents a farm in Namibia. A, B, C and D are the corner beacons. C is due east of B and the bearing of A from B is 24^o. $BA = 8$ km, $BC = 5$ km, $AD = 4.5$ km and angle $ADC = 90^o$.

(a) Find angle ABC. [1]

(b) Show by calculation that the distance AC is 7.51 km. [3]

(c) Find the distance DC. [2]

(d) Calculate the area of the farm.
Give your answer in hectare (1 ha = 10 000m^2). [4]

MINISTRY OF EDUCATION

Namibia Senior Secondary Certificate (NSSC)

MATHEMATICS: ORDINARY LEVEL

PAPER 4:
MARK SCHEME

1. (a) (i) 7 (ii) 9 (b) (i) 66 (ii) 26 (c) (i) 06 23 on Monday (ii) $\frac{350}{14.5} = 24.1\,\text{km/h}$	B1 B1 B1 B1 B1 B1 M1 A1 **8**	
2. (a) 0.99 x $\frac{3500}{7.13}$ = US$ 486 (b) $\frac{120}{50} \times 4 = 9.6$ Can buy 9 CDs (c) (i) 0.5 x 3500 x 0.09 = 157.50 Amount = 3657.50 (ii) $\frac{3657.50}{7.11}$ = US$ 514.42 Surine receives more	M1 M1 A1 M1 A1 M1M1 A1 M1 A1 **10**	for 0.99 or equivalent for correct conversion no mark if not correct to the nearest $ correct application of proportion only if answer is exactly 9 M1 for multiplying by 0.5 M1 for multiplying by 0.09 for determining Surine's amount
3. (a) (i) Reflection in the line $x = -1$ (ii) Rotation, 90^0 clockwise, around (0, 0) (iii) Enlargement, scale factor – 2, centre (0, 0) (b) (6, 0)	B2 B3 B3 B2 **10**	 B1 for each coordinate
4. (a) 7 : 8 (b) $\frac{8}{15} \times 45 = 24$ sweets (c) $\frac{10}{130} \times 100 = 7.69\%$ (d) 70 cm (e) (i) $M = \frac{2c}{l}$ (ii) $M = \frac{2 \times 45}{1.6} = 56.25$	B1 M1 A1 M1 A1 B1 B2 M1A1 **10**	 B1 for multiplying c by 2 B1 for dividing by l M1 for division by 1.6

5. (a) $x + y \le 36$: sum of soccer players (x) and netball players (y) must be less or equal to the number of places in the bus $x \ge 8$: 8 or more soccer players (x) must go along $y \ge 2x$: The must be at least double the number of netball players (y) than soccer players. (b) Draw axes and label to scale $x + y = 36$, cuts both axes at 36 $x = 8$ is parallel to y-axis and cuts x-axis at 8 $y = 2x$ goes though (0, 0) and (10, 20) (c) Shade unwanted areas (wanted area is triangle with vertices (12, 24) (8, 28) and (8, 16) (d) 12 soccer players	B1 B1 B1 B1 B1 B1 B1 B2, 1, 0 B1√ **10**	B2 if correct, B1 for one area incorrect, SC1 for shading wanted area
6. (a) Area = $\frac{1}{2}\times 30\times 20+\frac{1}{2}\times\pi\times 15^2 = 654$ cm^2 (to 3 s.f.) (b) Volume = $\frac{1}{3}\times\pi\times 15^2\times 20+\frac{2}{3}\times\pi\times 15^3 = 11800$ cm^3 (c) $r^2 = \frac{3V}{\pi h}$ $r = \sqrt{\frac{3V}{\pi h}}$	M2 A1 M2 A1 M1 A1 **8**	M1 for area of triangle M1 for area of semi-circle M1 for volume of cone M1 for volume of hemi-sphere
7. (a) (i) $x^2 - x + \frac{1}{4} - \frac{1}{4} - 1 = (x - \frac{1}{2})^2 - 1\frac{1}{4}$ (b) $(\frac{1}{2}, -1\frac{1}{4})$ (c) (i) $a = 1$, $b = -1$, $c = 5$ (ii) Draw axes to scale Plot six point correctly Smooth curve Curve going through turning point (c) $x_1 = -0.61$, $x_2 = 1.61$ (d) (i) Draw tangent at correct point (ii) Gradient = – 1	M1 A2 B2 B3 B1 B3, 2, 1, 0 B1 B1 B2 B1 B1√ B1 **19**	for completion of square A1 for $-\frac{1}{2}$ and A1 for $-1\frac{1}{4}$ accept x_1 between – 0. 55 and – 0.65 accept x_2 between 1.55 and 1.65 B1√ for reading off gradient from their diagram B1 for "negative" gradient
8. (a) $\frac{3}{8}$ (b) $x = \frac{3}{8}$, $y = \frac{1}{4}$, $z = \frac{2}{3}$ (c) (i) $\frac{5}{8}\times\frac{3}{4} = \frac{15}{32}$ (ii) $1 - \frac{3}{8}\times\frac{2}{3} = \frac{3}{4}$	B1 B2, 1, 0 M1A1 M1A1 **7**	or $\frac{15}{32} + \frac{5}{8}\times\frac{1}{4} + \frac{3}{8}\times\frac{1}{3}$
9. (a) – 2 (b) $y = \frac{1}{2}x + c$ Substitute (12, 4)	B1 B1 M1	B1 for gradient is $\frac{1}{2}$

$y = \frac{1}{2}x - 2$	A1		
(c) $M(6, 2)$	B1		
(d) (i) $\frac{1}{2}x - 2 = -2x + 8$	M1		
$P(4, 0)$	A2		for each coordinate
(ii) $AP = \sqrt{8^2 + 4^2} = 8.94$ units	M1A1	**10**	
10. (a) (i) $\overrightarrow{PQ} = 2\boldsymbol{a}$	B1		
(ii) $\overrightarrow{OQ} = \boldsymbol{b} + 2\boldsymbol{a}$	B1		
(iii) $\overrightarrow{PS} = \frac{2}{3}a - \frac{2}{3}b$	M1 A1		M1 for adding correct vectors
(iv) $\overrightarrow{RS} = \frac{1}{3}b - \frac{1}{3}a$	M1 A1		M1 for adding correct vectors
(b) PS and RS are not parallel because they are multiples of different vectors	B2	**8**	B1 for stating not parallel B1 for explaining reason
11. (a) $2 < h \leq 5$	B1		
(b) $\frac{0.5\times5 + 1.5\times10 + 3.5\times19 + 7\times11 + 9.5\times15}{60} = 5.06$ cm	M3 A1		M1 for class midpoints M1 for multiplying by frequencies M1 for dividing by 60
(c) $p = 15$, $q = 34$, $r = 45$	B3		
(d) upper quartile = 9, lower quartile = 2 interquartile range = 7	M1 A1	**10**	M1 for finding upper and lower quartiles
12. (a) 66^0	B1		
(b) $AC^2 = 8^2 + 5^2 - 2 \text{ x } 8 \text{ x } 5 \text{ x } \cos 66^0 = 56.46\ldots$	M3		M1 for using cos rule M1 for substituting correctly M1 for square root to find AC
(c) $DC^2 = 7.51^2 - 4.5^2 = 36.150\ldots$ $DC = 6.01$ km	M1 A1		
(c) Area $= \frac{1}{2}\times8\times5\times\sin 66^0 + \frac{1}{2}\times4.5\times6.01$ $= 31.793$ km^2 $= 3180$ ha	M2 A1 A1	**10**	M1 for area with area rule M1 for area of triangle

MINISTRY OF EDUCATION

Namibia Senior Secondary Certificate (NSSC)

MATHEMATICS: ORDINARY LEVEL

PAPER 4:
PAPER ANALYSIS

(Specification Grid)

Q	Syll. Ref.	Topic	Context					Target Grades			Total
				Nu	Alg	SS	HD	E	C	A	
1	1(d)1,3; 1(f)1; 1(j)4	Numbers and operations	Localised problem	8				8			8
2	1(*l*)1, 2	Money and finance	Currency and interest	10				10			10
3	9(b)3,4	Transformations	Describe from diagram			10		4	6		10
4	1(j)1,5; 1(d)5; 5(d)1	Ratio and construction of equation	Comparing heights and weights	6	4			2	8		10
5	6(b)1	Linear programming	Localised problem		10				3	7	10
6	3(1)1,2; 5(a)6	Mesuration and algebra	Areas and volumes, transformation of formulae		2	6			3	5	8
7	6(d)1,2,3,4; 6(c)1; 5(d)6	Algebra and graphs, including new topic	Completing square, drawing graph and gradient of tangent		19			3	8	8	19
8	10(b)1,3,5	Probability	Localised context				7	1		6	7
9	7(a)1,2,3	Coordinate geometry	New topic		10				1	9	10
10	9(a)3,4,5	Vectors	Vectors represented by directed line segments and maipulation				8			8	8
11	10(a)6,7,8,9	Statistics	Cumulative frequency curve, estimate of mean, modal class				10			10	10
12	8(a)1,2,5	Trigonometry	Bearing, Pythagoras, cos and area rules			10		3		7	10
		Totals for paper		24	45	26	25	31	29	60	120

Q	Syll. Ref.	Topic	Context					Target Grades			Total
				Nu	**Alg**	**SS**	**HD**	**E**	**C**	**A**	
			Percentage	20	37.5	21.7	20.8	25.8	24.2	50	100
				Nu	Alg	SS	HD	E	C	A	
	Target totals for paper 4 (120 marks) approx.			24	42	36	18	24-30	24-30	60-72	
	Totals for Paper 2 and 4			**42**	**79**	**49**	**30**	**51**	**47**	**102**	**200**
	Percentage			**21**	**39.5**	**24.5**	**15**	**25.5**	**23.5**	**51**	**100**

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