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MUGWANYA PREPARATORY SCHOOL, KABOJJA

SPECIAL EXAM SET 5, 2024

MATHEMATICS

Time Allowed: 2 hours 30 minutes

Index No.	*Random No.*						*Personal No.*		

Candidate's Name: ..... Guide .....

Candidate's Signature: ..... Compiled by Tr. Alex .....

School Random No. : .....

District ID: .....

FOR EXAMINER'S USE ONLY

Read the following instructions carefully:

Do not write your school or district name anywhere on this paper

1. The paper has **two** Sections: **A** and **B**.

2. Section **A**, 20 questions (40 marks)

3. Section **B** 12 questions (60 marks)

4. Answer **ALL** questions. All answers to both Sections **A** and **B** Must be written in the spaces provided.

5. All answers must be written using a blue or black ball-point Pen or ink. Diagrams should be drawn in pencil.

6. Unnecessary alteration of work may lead to loss of marks.

7. Any handwriting that cannot easily be read may lead to loss of Marks.

8. Do not fill anything in the box indicated for examiner's use only.

FOR EXAMINER'S USE ONLY		
QN. No.	MARK	SIGN
1 - 5		
6 - 10		
11 - 15		
16 - 20		
21 - 22		
TOTAL		

SECTION A: 40 MARKS

Answer all questions in this section

Questions **1** to **20** carry **two** marks each

1. Work out: 405 - 289

$$\begin{array}{r} {}^{3}\cancel{4}\,{}^{9}0\,{}^{15}\cancel{5} \\ -\,2\,8\,9 \\ \hline 1\,1\,6 \end{array}$$

2. Write 490,092 in words.

TH	Units
490	092

Four hundred ninety thousand, ninety-two

3. Simplify: 7mn - 7m - n – mn + m.

$7mn - mn + m - 7m - n$

$6mn - 6m - n$

4. Given D = (4, 0, 5, 8). List all proper subsets of D.

$\emptyset, \{4\}, \{0\}, \{5\}, \{8\}, \{4,0\}, \{4,5\}, \{4,8\}, \{0,5\}, \{0,8\}, \{5,8\}, \{4,0,5\}, \{4,0,8\}, \{4,5,8\}, \{0,5,8\}$

5. Find the square root of the next number in the sequence;

36, 49, 64, 81, ... 100

6^2 7^2 8^2 9^2 10^2

$10^2 = 10 \times 10$

$\sqrt[2]{100} = \sqrt[2]{(2\times2)\times(5\times5)}$

2×5

$\sqrt[2]{100} = 10$

2	100
2	50
5	25
5	5
	1

6. Express 0.1777777..... as a common fraction.

$$\frac{17-1}{100-10} = \frac{16}{90}$$

$$\frac{16 \div 2}{90 \div 2} = \frac{8}{45}$$

Precious slept at 10:15 p.m. and woke up after 2 hours and 40 minutes. What time did she wake up in 24-hour clock system?

Ending time = S.T + Duration

H	M
10	15
+2	40
12	55

12:55am

12:55am → 0055 hours

The temperature in Nevada at 7:00 a.m. was -6°c. It increased to 4°c. What was the increase in temperature?

$4^{\circ}C - (-6^{\circ}C) = t$

$4^{\circ}C + 6^{\circ}C$

$10^{\circ}C$

Use tallies to represent the quotient of 36 and 3.

Quotient : $\frac{36}{3}$

$\frac{3}{1}$

12

12

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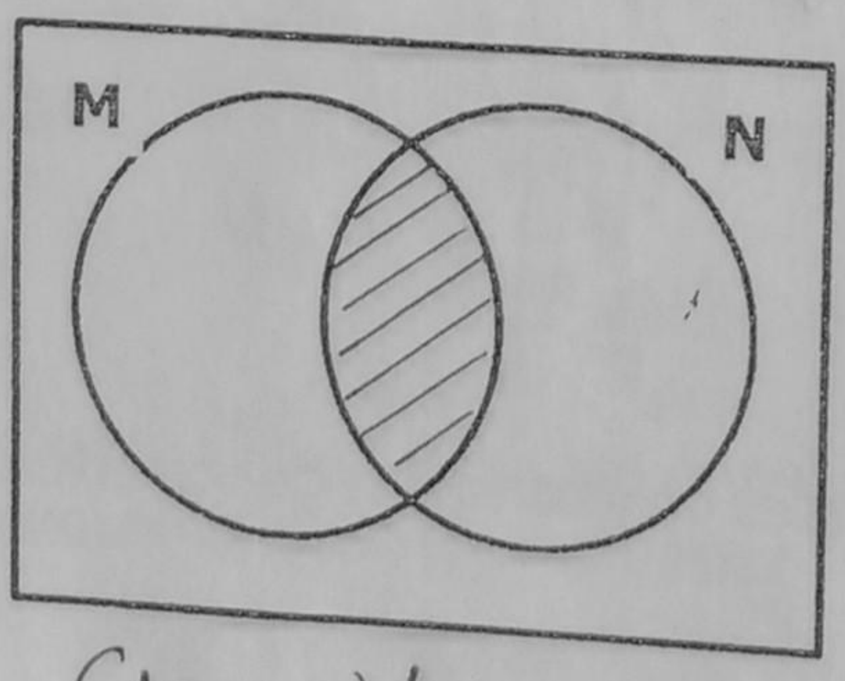
Study the diagram below and describe the shaded region.



$(M \cap N)'$

A sachet of gorillos weighed 12mg. What is its mass in decagrams?

Kg	Hg	Dg	g	dg	cg	mg
		1	0	0	0	0

10,000mg → 1Dg

12mg → $\frac{12}{10000}$

12mg → 0.0012Dg

3

12. If today is a Tuesday, what day of the week will it be 48days after tomorrow?

Tomorrow → Wednesday

$3 + 48 = \_\_ \pmod 7$

$51 = \_\_ \pmod 7$

$51 \div 7 = 7$ rem 2

2 represents Tuesday

The day will be a Tuesday

13. Find the sum of 679 and the smallest 3-digit number formed using digits 6, 0, 8.

Smallest no → 608

$$\begin{array}{r} {\scriptstyle 1\ \ \ } \\ 679 \\ +608 \\ \hline 1287 \end{array}$$

14. Raymond exercises every 12days and Moses every 8 days. Raymond and Moses both exercised today. How many days will it be until they exercise together again?

LCM of 12days and 8days

2	12	8
2	6	4
2	3	2
3	3	1
	1	1

$(2 \times 2) \times (2 \times 3)$

4×6

24 days

15. Using a ruler, pencil and a pair of compasses only construct the complementary angle of 75°.

Complement → $90° - 75°$

$15°$

n a P.7 class, the ratio of girls to boys is 5:3. If there 24. boys. Find the number of girls n P.7

3 parts rep 24
1 part rep 24 ÷ 3
1 part rep 8

5 parts rep (8 X 5) girls
40 girls.

Express 0.00643 in standard form.

0.00643 X 10
0.0643 X 10
0.643 X 10
6.43×10^{-3}

A canteen attendant bought 2 dozen of rulers at sh. 24,000. She later sold each ruler at sh. 1500. How much profit did she make?

2 dozen → (12 X 2) rulers
24 rulers.

Selling price → Sh. 1500 X 24
→ Sh. 36,000

profit = S.P − B.P
Sh. 36,000
− Sh. 24,000
Sh. 12,000

2
24
15
120
24
360

A car covered a distance of 660cm in **five** revolutions.
Calculate the diameter of the car wheel. (take $\pi = \frac{22}{7}$)

D
R | C

circumference = $\frac{D}{R}$

$C = \frac{660cm}{5}$

$C = 132cm$

$\pi D = C$

$\frac{22}{7} D = 132cm \times 7$

$\frac{22D}{22} = \frac{132cm \times 7}{22}$

Diameter = 42cm

In a basket of apples, 12% of them are rotten and 88 are in good condition.
Find the total number of apples in the basket.

% age of good apples → 100% − 12% = 88%

Total apples

$88 \div \frac{88}{100}$

$88^{1} \times \frac{100}{88_{1}}$

100 apples.

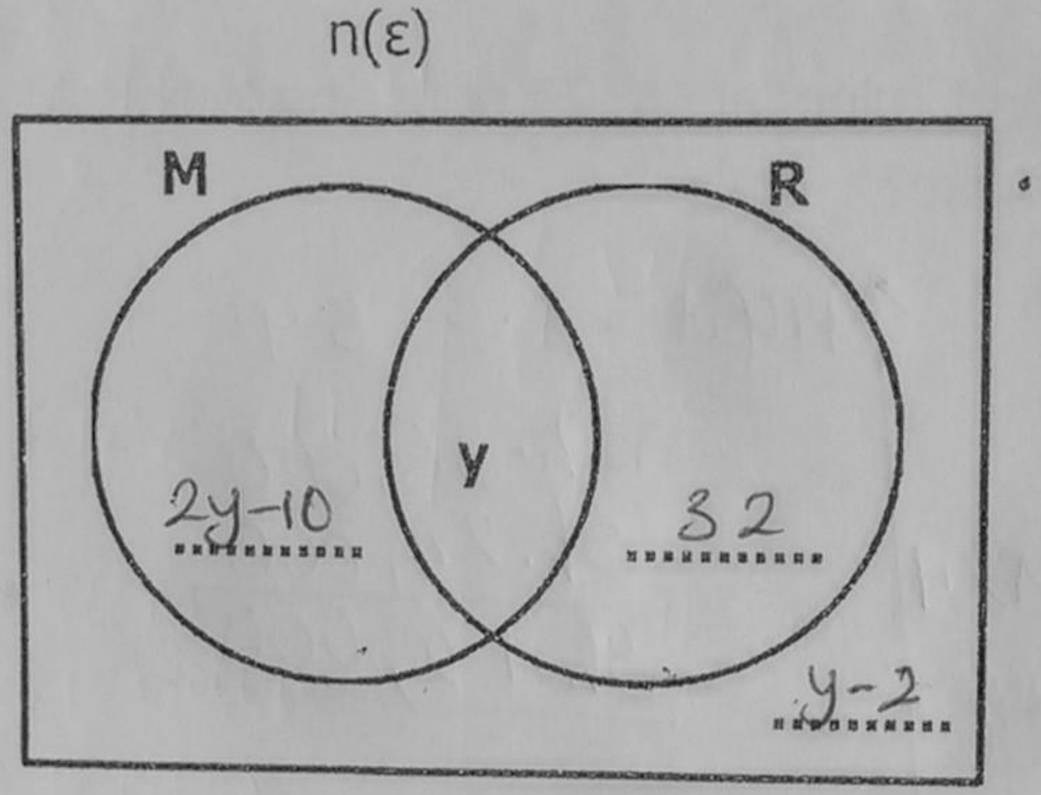
SECTION B: 60 MARKS

Answer all questions in this section

Marks for each question are indicated in the brackets

21. At a graduation party, 32 people like Rice only, y people liked both Rice (R) and Matooke (M), (2y-10) people like Matooke but not Rice, while (y-2) do not like any of the two foods.

(a) Use the information above to complete the Venn diagram below. (03 Marks)



(b) Given that those who like Matooke only are more than those who like Rice only by 38, find the value of y. (02 marks)

$n(M)\text{only} - n(R)\text{only} = 38$

$(2y-10) - 32 = 38$

$(2y-10) - 32 + 32 = 38 + 32$

$2y - 10 = 70$

$2y - 10 + 10 = 70 + 10$

$\frac{2}{2}y = \frac{80}{2}$

$y = 40$

22. A trader borrowed money from centenary bank at an interest rate 10% per annum for 2years.

(a) How much did he borrow if he paid an interest of sh.84,000? (02 Marks)

$P \times R \times T = I$

$P \times \frac{10}{100} \times 2 = Sh.84,000$

$\frac{1}{5} \times \frac{P}{5_1} = Sh.84,000 \times 5$

$P = Sh.420,000$

He borrowed Sh.420,000

(b) Calculate the amount he paid after 2 years. (02 Marks)

Amount = P + I

Sh. 420,000

+ Sh. 84,000

Sh-504,000

(a) Solve for y: 4(2y+3)31-3(y-1) (03 Marks)

(b) At Rania's 12th birthday her father was 50 years old. After how many years will the father be thrice as old as the daughter? (03 Marks)

Let 'k' rep the years.

	Rania	Father
NOW	12	50
In 'k' yrs	12+k	50+k

3(12+k) = 50+k

36+3k = 50+k

36-36+3k = 50-36+k

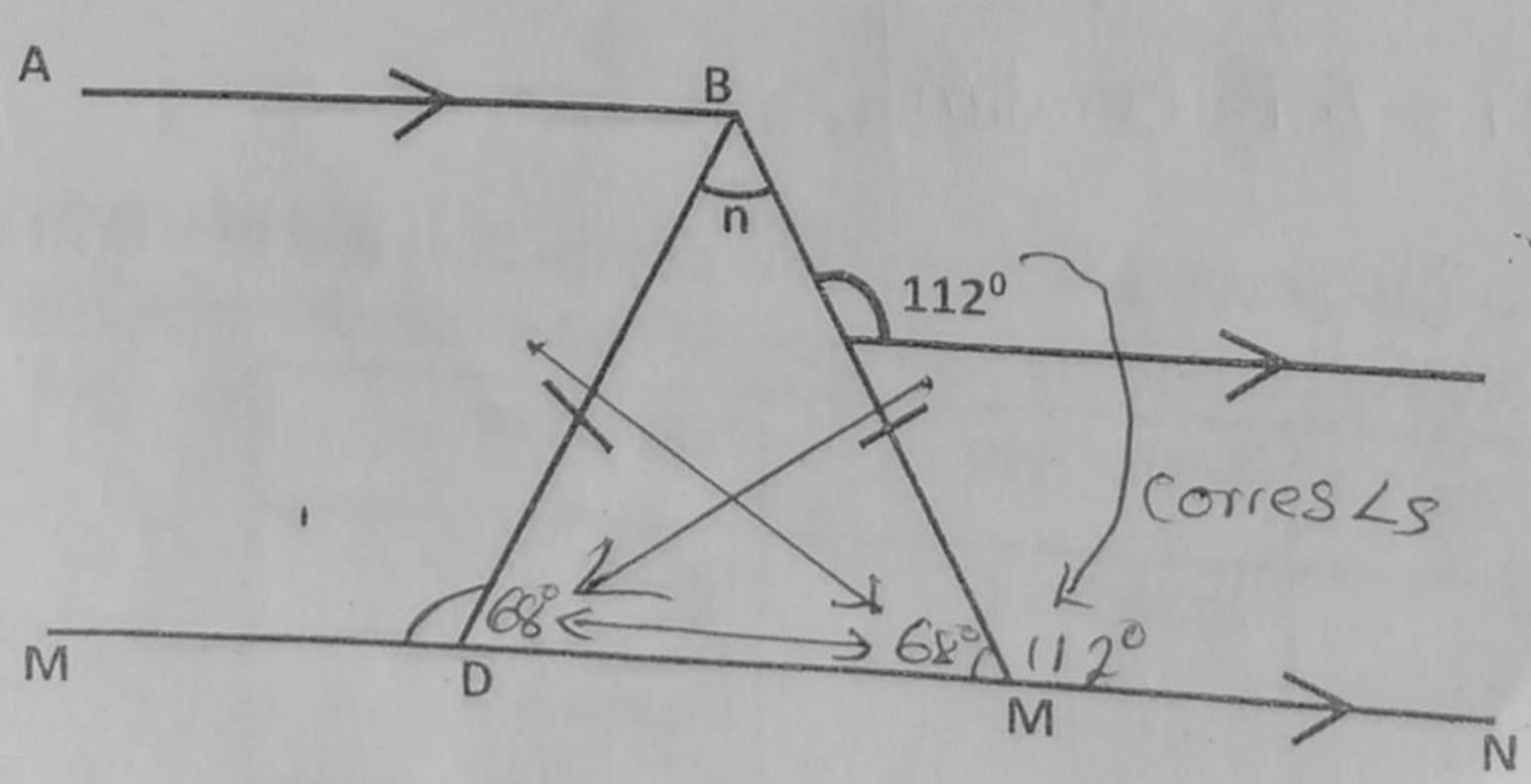
3k = 14+k

3k-k = 14+k-k

$\frac{2}{2}k = \frac{14}{2}$

k = 7 years.

Study the diagram below and use the information given to answer the questions that follow.



180°
-112°
68°

7

(a) Find the value of angle n. (02 marks)

$n + 68° + 68° = 180°$

$n + 136° = 180°$

$n + 136° - 136° = 180° - 136°$

$n = 44°$

(b) Find the size of angle marked

(02 marks)

(i) BDM

$\angle BDM = 180° - 68°$

$\angle BDM = 112°$

(ii) $\frac{1}{4}$ of BMN

$\angle BMN = 112°$

$\frac{1}{4} \times \overset{28}{\cancel{112}}°$

$28°$

(a) Convert 18km/hr. to metres per second. (02 Marks)

1km ⟶ 1000m

18km ⟶ 18 × 1000m

18,000m

1hour ⟶ 3600s

18km/h ⟶ $\frac{\overset{5}{\cancel{18,000}}m}{\underset{1}{\cancel{3600}}s}$

18km/h ⟶ 5m/s

(b) A bus driver covered a distance of 200km at an average speed of 80km/hr. If he reached her destination at 4:05p.m., At what time did he start the journey? (03 Marks)

Duration ⟶ $200km \div \frac{80km}{1h}$

$\cancel{200}^{2\frac{1}{2}} \times \frac{1h}{\cancel{80}}$

$2\frac{1}{2}h$ ⟶ 2h 30min

S.T = E.T − Duration

H	M
~~4~~ 3	60 05
− 2	30
1	35

1 : 35pm

5. The table shows the rate at which Bamuda forex bureau buys and sells United States dollars and Kenya shillings in Uganda shillings. Use it to answer questions that follow.

Currency	Buying rate	Selling rate
1 Us dollar	Ug sh 3500	Ug shs 3650
1 ksh	Ug sh 30	Ug shs 32

a) Abigail had Ksh. 18250 and bought a fridge using US dollars. How many US dollars did she pay for the fridge? (03 Marks)

1 Ksh → Ugsh. 30

Ksh. 18250 → Ugsh. 30 × 18250

→ Ugsh. 547,500

Ugsh. 3650 → 1 US dollar

Ugsh. 547,500 → $\frac{547,500}{3650}$ USD

$\begin{array}{r} 10950 \\ 3650\overline{)547,500} \\ 73 \\ 1\,8\,2\,5\,0 \\ +\,0\,9\,5\,0 \\ \hline 73,1 \end{array}$ = 150 US dollars.

$\begin{array}{r} 2\,1 \\ 1825 \\ \times\ 3 \\ \hline 5475 \end{array}$

(b) Jason had US dollars 400. He exchanged the dollars for Uganda shillings and bought a home theater sh. 1,035,000. What was his balance in US dollars? (03 Marks)

1 US dollar → Ugsh. 3500

400 US dollars → Ugsh. 3500 × 400

→ Ugsh. 1,400,000

Balance in Ugsh

Ugsh. 1,400,000

− Ugsh. 1,035,000

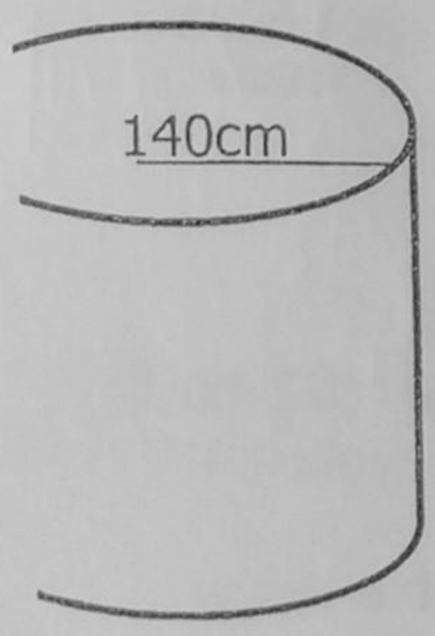
Ugsh. 365,000

Balance in dollars

$\frac{365,000}{3650}$ = 100 US dollars.

Mr. Katiko has a juice tank at his factory as shown below. Study it carefully and use it to answer questions that follow.

(a) Calculate the capacity of the tank when it is full of juice. (03 Marks)



$V = \pi r^2 \times h$

$V = \frac{22}{7} \times 140cm \times 140cm \times 400cm$

$V = 24640000cm^3$

$C = \frac{V}{1000cm^3}$

$C = \left(\frac{24640000cm^3}{1000cm^3}\right)$ Litres

$\begin{array}{r} 6\,1\,6 \\ \times\ 4 \\ \hline 2464 \end{array}$

C = 24640 litres.

(b) If juice from the tank is packed in 20 litre jerrycans for selling, find the number of jerrycans which were obtained from the juice tank? (02 Marks)

No of jerrycans → $\frac{24640}{20}$

$\begin{array}{r} 1\,2\,3\,2 \\ 20\overline{)24640} \\ 20 \\ \hline 44 \\ 40 \\ \hline 40 \\ 40 \\ \hline 0 \end{array}$

1232 jerrycans.

28. (a) Convert 223_{four} to base six. (02 Marks)

$(2 \times 4^2) + (2 \times 4^1) + (3 \times 4^0)$

$2 \times 4 \times 4 + 2 \times 4 + 3 \times 1$

$32 + 8 + 3$

43_{ten}

B	N	R
6	43	1 1 1
6	7	1
6	1	1
	0	1

111_{six}

$223_{four} = 111_{six}$

(b) Work out $123_{five} \times 23_{five}$ (03 Marks)

123_{five} × 23_{five}

324_{five}

$+3010_{five}$

3334_{five}

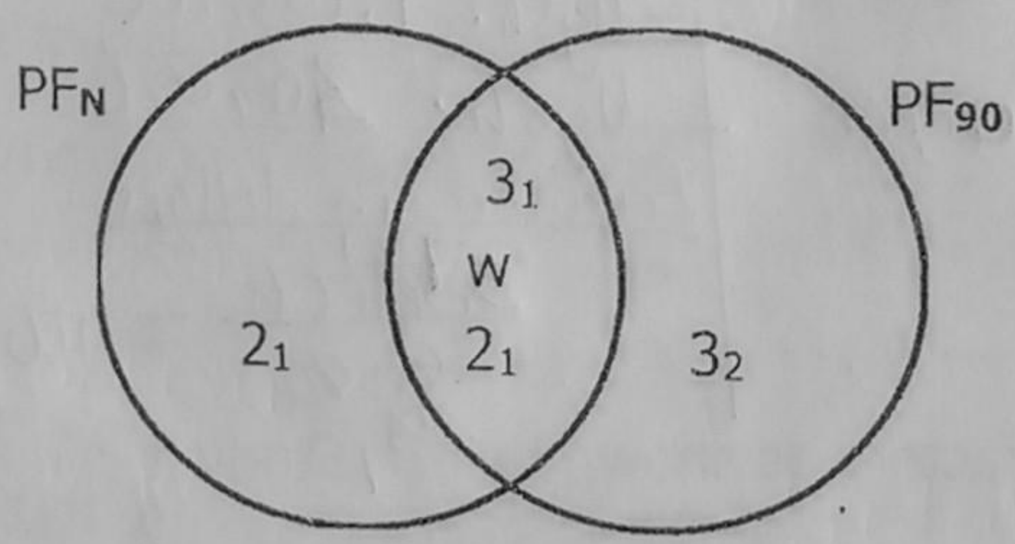
$9 \div 5 = 1r4$

$7 \div 5 = 1r2$

$6 \div 5 = 1r1$

$5 \div 5 = 1r0$

29. The Venn diagram below shows the prime factors of N and 90.



(a) Find the value of w. (02 marks)

$3 \times 2 \times w \times 3 = 90$

$\frac{18w}{18} = \frac{90}{18}5$

$w = 5_1$

(b) Find the HCF of N and 90. (02 marks)

$HCF = 3 \times w \times 2$

$HCF = 3 \times 5 \times 2$

$HCF = 30$

30. Candidates sat for a mathematics test and performed as shown on the table below.

Number of candidates	///	/	//	///
Marks scored	60	90	40	S

(a) How many candidates sat for the test? (01 mark)

$3 + 1 + 2 + 3$

9 candidates

10

(b) If the mean mark was 50, find the value of S.

Sum of marks → $50 \times 9 = 450$

$(60 \times 3) + 90 + 40 \times 2 + S \times 3 = 450$

$180 + 90 + 80 + 3S = 450$

$350 + 3S = 450$

$350 - 350 + 3S = 450 - 350$

$\frac{3S}{3} = \frac{100}{3} = 33\frac{1}{3}$

$S = 33\frac{1}{3}$

(02 marks)

(c) How many candidates scored above the average mark? (01 mark)

3 + 1 + 2

6 candidates

(a) Using a ruler, a pencil and a pair of compasses only construct a quadrilateral **MODE** inside a circle of radius 3.5cm

(04 marks)

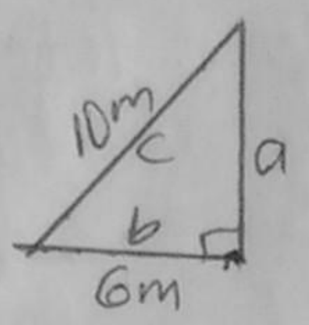
A square in a circle

(b) Calculate the perimeter of the quadrilateral formed. (02 marks)

Below is house plan for Mr. Odongo's house. Study it carefully and use it to answer the questions that follow.

Turn Over

(a) How high is the top of the roof from the ring beam? (02 marks)



$a^2+b^2=c^2$

$a^2+6^2=10^2$

$a^2+6\times6=10\times10$

$a^2+36=100$

$a^2+36-36=100-36$

$\sqrt[2]{a^2}=\sqrt[2]{64}$

$a=8m$

It is 8m high.

(b) If **AB** is half of **BC**, find the total area of the house plan to be constructed. (04 marks)

AB → 25m

BC → 50m

Area of A

$A=50m\times25m$

$A=1250m^2$

Area of B.

$A=\frac{1}{2}\times h(a+b)$

$A=\frac{1}{2}\times8m(25m+37m)$

$A=4m\times62m$

$A=248m^2$

Total area

$1250m^2$

$+\ 248m^2$

$1498m^2$

END