NAME…….. INDEX NO. ……

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MATHEMATICS PAPER 1
AUGUST 2021
2 ½ HRS
FORM 4 MARKING SCHEME

CASPA AMUKURA PARISH EXAM
Kenya Certificate of Secondary education
MATHEMATICS PAPER 1
MARKING SCHEME

INSTRUCTIONS TO CANDIDATES

1. *Write your name, Admission number and class in the spaces provided.*
2. *Sign and write date of the examination in the spaces provided.*
3. *The paper contains TWO sections: Section A and B*
4. *Answer ALL questions in section I and **STRICTLY ANY FIVE** questions from section II.*
5. *All working and answers must be written on the question paper in the spaces provided below each question.*
6. *Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.*
7. *Marks may be awarded for correct working even if the answer is wrong.*
8. *Non-programmable silent electronic calculators and KNEC Mathematical tables may be used except where stated otherwise.*

FOR EXAMINERS USE ONLY

SECTION A

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL

SECTION B

17	18	19	20	21	22	23	24	25	26	27	TOTAL

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SECTION I - 50 MARKS

1 $\left(\frac{12}{7}-\frac{5}{8}\right)+\frac{2}{3}$ of $\frac{4}{5}$

$=\frac{80-35}{56}+\frac{4}{5}$

$=\frac{45}{56}+\frac{4}{5}$

$=\frac{225+224}{280}$

$=\frac{449}{280}$ ✓

$\frac{3}{4}+\frac{13}{7}\div\frac{4}{7}$ of $\frac{3}{4}$

$=\frac{3}{4}+\frac{13}{7}\times\frac{7}{4}$ of $\frac{3}{4}$

$=\frac{3}{4}+\frac{13}{7}\times\frac{3}{4}$

$=\frac{21+36}{28}$

$=\frac{57}{28}$ ✓

$\therefore \frac{449}{280}\times\frac{28}{57}=\frac{449}{570}$ ✓

TOTAL 04

2 $2a+5b=16$ B1

$3a+7b=16$

$6a+15b=48$ ✓

$6a+14b=32$ M1

$b=16$ ✓

$a=-32$ ✓ A1

TOTAL = 03

3 $2-x-x^2=2-2x+x-x^2$

$=2(1-x)+x(1-x)$

$=(2+x)(1-x)$ ✓ B1

$3x^2-3x+2x+1$

$=3x(x-1)+1(x-1)$

$=(3x+1)(x-1)$ ✓ B1

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

$=-\frac{2+x}{3x+1}$ ✓ B1

TOTAL = 03

4 $2x+x-30=90$ ✓ M1

$3x=120$

$x=40$ ✓ A1

TOTAL = 02

5 $2x-4\leq 3x+2$ B1

$-6\leq x$ ✓

$3x+2\leq 10-x$

$4x\leq 8$

$x\leq 2$ ✓ B1

B1

TOTAL = 03

6 LSF $=\frac{18}{24}=\frac{3}{4}$ ✓ B1

VSF $=\left(\frac{3}{4}\right)^3=\frac{27}{64}$ ✓ B1

$\frac{27}{64}=\frac{x}{320}$ ✓ M1

$x=135\,cm^3$ ✓ A1

TOTAL = 04

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7. $2^{3(3x-2)} \times 2^{4(2x)} = 4$

$2^{3(3x-2)} \times 2^{4(2x)} = 2^{-2}$ ✓ M1

$9x - 6 + 8x = -2$ ✓ M1

$11x = 4$

$x = 4/11$ ✓ A1

TOTAL 03

8. $P \propto \frac{Q}{\sqrt{R}}$

$P = \frac{kQ}{\sqrt{R}}$ ✓ B1

New $P = \frac{k}{\sqrt{0.81}} P$

$= \frac{k}{0.9} P = 1.2222P$ ✓ B1

% Increase $= 0.2222 \times 100\%$

$= 22.22\%$ ✓ B1

TOTAL 03

9. Sales $= \frac{100-2}{100} \times$ sh 340,000

$= 98/100 \times$ sh 340,000

$=$ sh 333,200 ✓ B1

% Commission $= \frac{16660}{333200} \times 100\%$ M1

$= 5\%$ ✓ A1

TOTAL 03

10. Let ext angle $= x$.

$3.5x + x = 180°$ ✓ M1

$4.5x = 180$

$x = 40°$ ✓ A1

TOTAL 02

11. $AC = B$

$C = A^{-1}B$

$= \frac{1}{5}\begin{pmatrix} 4 & -3 \\ 1 & 2 \end{pmatrix}\begin{pmatrix} -1 & 3 \\ 2 & -1 \end{pmatrix}$ ✓

$= \frac{1}{5}\begin{pmatrix} -10 & 15 \\ 5 & -5 \end{pmatrix} = \begin{pmatrix} -2 & 3 \\ 1 & -1 \end{pmatrix}$ ✓ M1 A1

03

12. $2x + 5y = 275$

$4x + 7y = 415$ ✓ B1

$8x + 20y = 1100$

$8x + 14y = 830$ ✓ M1

$6y = 270$

$y = 45$ ✓ A1

$x = 25$ ✓ A1

TOTAL 04

13. W : S : D

4 : 3 : 2

Let total amount $= x$

$(4/9 - 2/9)x =$ sh 120,000 ✓ M1

$2/9 x = 120000$

$x =$ sh 540,000 ✓ A1

02

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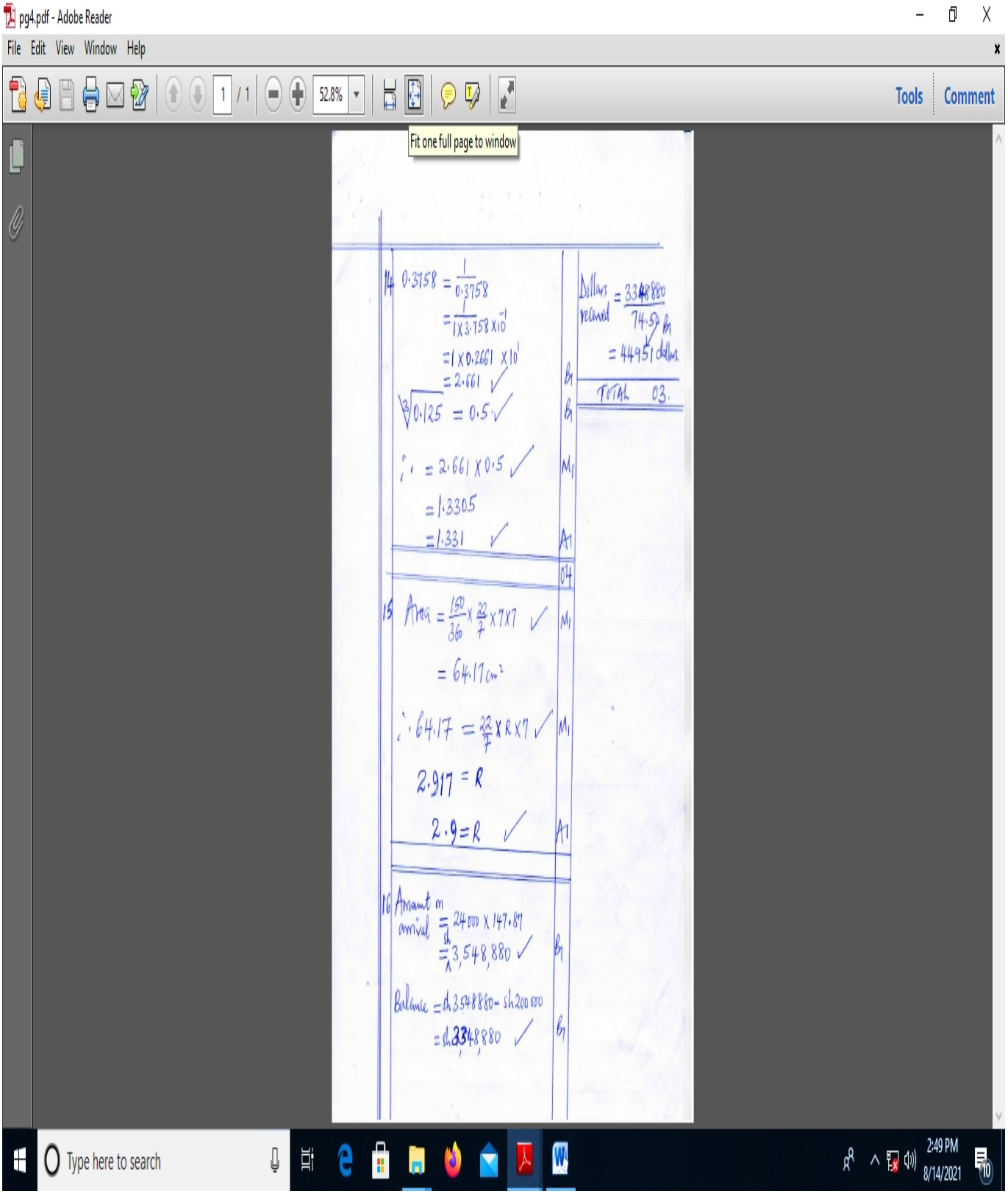

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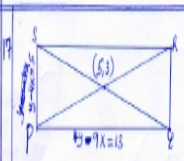
SECTION II – 50 MARKS

17. 

a) $y-4x=5$ ..... (i)
$4y-9x=13$ ..... (ii)

$4y-16x=20$ ✓M1
$4y-9x=13$
$-7x=7$
$x=-1$ ✓A1
$y=1$
Hence $P(-1,1)$ ✓B1

b) $X=2(5)-(-1)=11$
$y=2(3)-1=5$ ✓B1
Hence $R(11,5)$ ✓B1

c) SP ⊥ RQ
Hence $M_1=M_2=4$
$\therefore 4=\frac{y-11}{x-5}$ ✓M1
$y-11=4(x-5)$
$y=4x-20+11$
$y=4x-9$ ✓A1

18. (a) PR : P(-1,1) and (5,3)
Grad $=M_1=\frac{3-1}{5+1}=\frac{2}{6}=\frac{1}{3}$
$M_2=-3$ ✓B1

Hence: $-3=\frac{y-3}{x-5}$ ✓M1
$y-3=-3(x-5)$
$y=-3x+15+3$
$y=-3x+18$ ✓A1

TOTAL 10 MARKS

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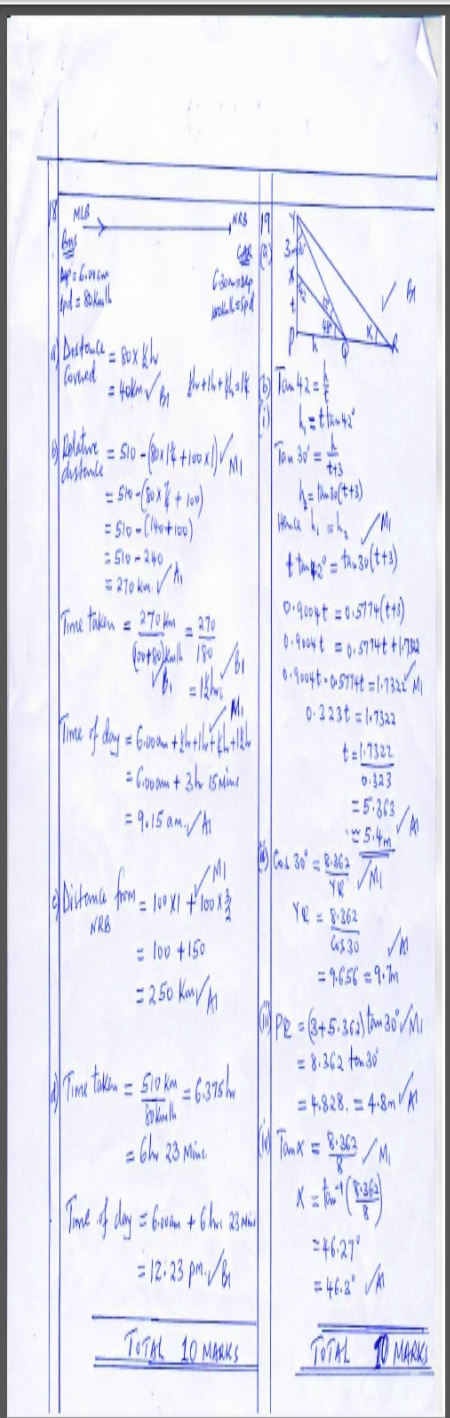

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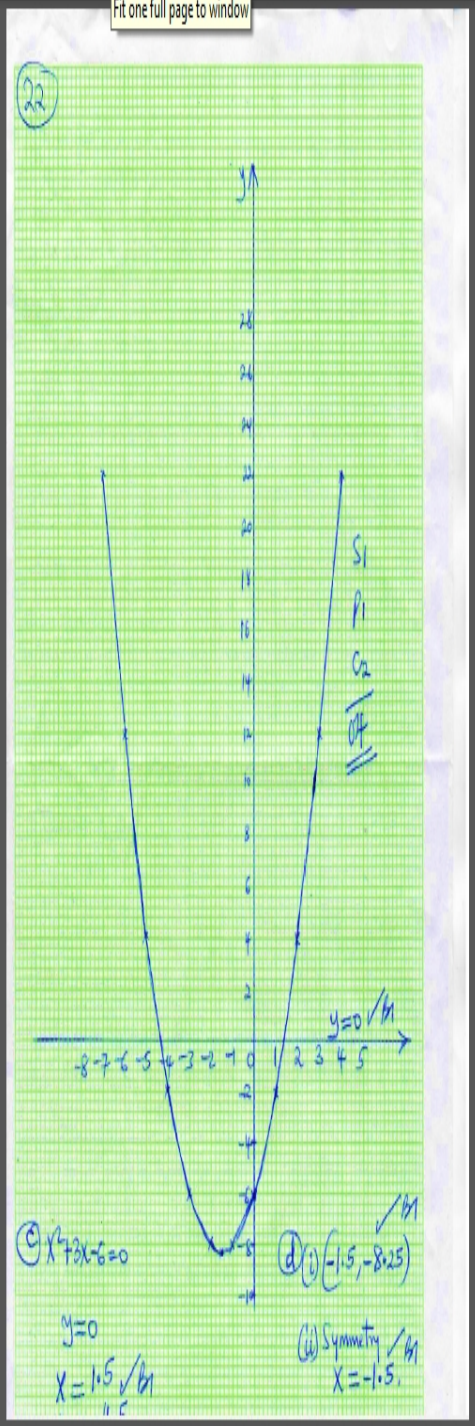

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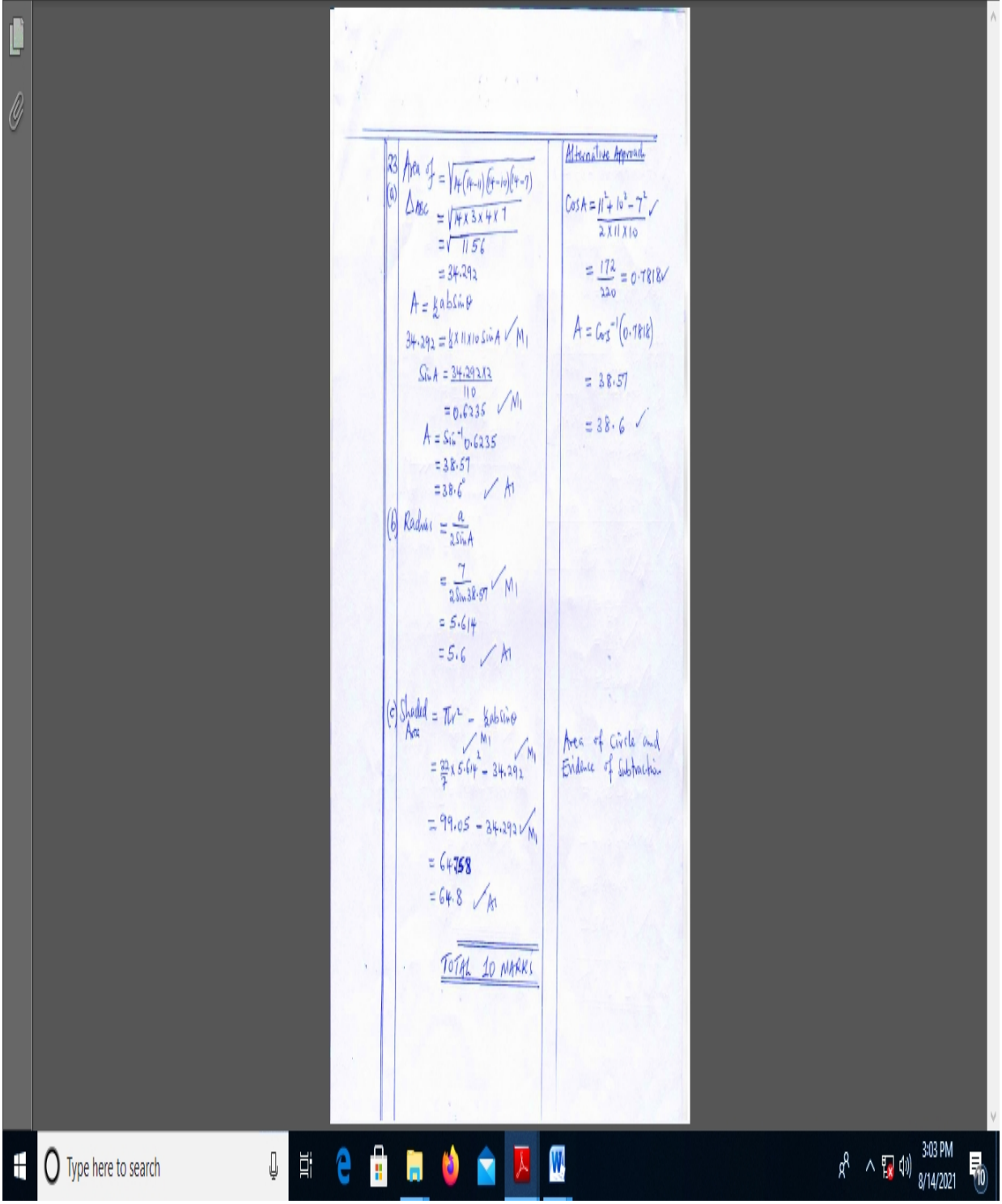

23 (a) Area of $\triangle = \sqrt{14(14-11)(14-10)(14-7)}$

$= \sqrt{14 \times 3 \times 4 \times 7}$

$= \sqrt{1176}$

$= 34.292$

$A = \frac{1}{2}ab\sin\theta$

$34.292 = \frac{1}{2} \times 11 \times 10 \sin A$ ✓ M_1

$\sin A = \frac{34.292 \times 2}{110}$

$= 0.6235$ ✓ M_1

$A = \sin^{-1} 0.6235$

$= 38.57$

$= 38.6°$ ✓ A_1

(b) Radius $= \frac{a}{2\sin A}$

$= \frac{7}{2\sin 38.57}$ ✓ M_1

$= 5.614$

$= 5.6$ ✓ A_1

(c) Shaded Area $= \pi r^2 - \frac{1}{2}ab\sin\theta$

✓ M_1 ✓ M_1

$= \frac{22}{7} \times 5.614^2 - 34.292$

$= 99.05 - 34.292$ ✓ M_1

$= 64.758$

$= 64.8$ ✓ A_1

TOTAL 10 MARKS

Alternative Approach

$\cos A = \frac{11^2 + 10^2 - 7^2}{2 \times 11 \times 10}$ ✓

$= \frac{172}{220} = 0.7818$ ✓

$A = \cos^{-1}(0.7818)$

$= 38.57$

$= 38.6$ ✓

Area of circle and Evidence of Subtraction

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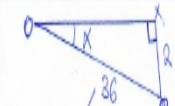

$\sin X = \frac{2}{36} = 0.05556$ ✓ M1 Ratio

$X = \sin^{-1}\left(\frac{2}{36}\right)$ A1 Angle X 6 XOR

$= 3.185°$ ✓

$\angle AOQ = 90 + 3.185$ B1 Angle AOQ

$= 93.185 = 93.2°$ ✓

$\angle AOE = 360 - 2 \times 93.185$ B1 Obtuse angle AOE

$= 360 - 186.37$

$= 173.63 \approx 173.6$ ✓

Arc Length $= \frac{\theta}{360} \times 2\pi r$ B1 Arc AFE

$= \frac{173.63}{360} \times 2 \times \frac{22}{7} \times 5$

$= 15.16 = 15.2$ ✓

Arc Length $= \frac{186.37}{360} \times 2 \times \frac{22}{7} \times 7$ B1 Reflex angle BOD

$= 22.78 = 22.8$ ✓ B1 Arc BCD

$AB = \sqrt{36^2 - 2^2}$

$= \sqrt{1292}$

$= 35.94 = 35.9$ ✓ B1 Tangential length

Total Length $= 15.16 + 22.78 + 2 \times 35.94$ ✓ M1 Addition

$= 109.82$ ✓ A1 CAO

TOTAL MARKS 10