THE WEST AFRICAN EXAMINATIONS COUNCIL, ACCRA

BASIC EDUCATION CERTIFICATE EXAMINATION FOR SCHOOL AND PRIVATE CANDIDATES, 2023

FINAL MARKING SCHEME MATHEMATICS 2

QUESTION NO.	DETAILS	MARKS
1. (a)	$A = \{3, 6, 9\}$	B1
	$B = \{5, 6, 7\}$	B1
	$C = \{4, 5, 7\}$	
(i)	$A \cap B = \{6\}$	M1 A1
(ii)	$(A \cup B) = \{3, 5, 6, 7, 9\}$	M1
	$(A \cup B) \cap C = \{5, 7\}$	M1 A1
(iii)	$A \cap B = \{6\}$	
	$(A \cap B) \cup C = \{4, 5, 6, 7\}$	M1 A1
	oms { } -1 once only	
(b)	$1\frac{3}{4} - 2\frac{5}{6} - 1\frac{9}{10} + 4\frac{7}{8}$	
	$= \frac{7}{4} - \frac{17}{6} - \frac{19}{10} + \frac{39}{8}$	M1 one improper fraction correct
	$= \frac{7}{4} + \frac{39}{8} - \frac{17}{6} - \frac{19}{10}$	
	$= \frac{14 + 39}{8} - \frac{170 + 114}{60}$	M1 A1 One numerator/LCM correct
	$= \frac{53}{8} - \frac{284}{60}$	
	$= \frac{53}{8} - \frac{71}{15}$	M1 M1 Simplification with evidence
	$= \frac{795 - 568}{120}$	
	$= \frac{227}{120}$	A1
		[15 marks]

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QUESTION NO.	DETAILS	MARKS
2. (a)	$15(4-6)\times 49\div 7$	
	$=15(-2)\times\frac{49}{7}$	M1 for either (-2) or $^{49}/_{7}$
	$=-30\times 7$	M1 for multiplication
	$=-210$	A1 for -210
(b)	$b(12a-3)-(a-b)(3+b)$	
	$=12ab-3b-(3a+ab-3b-b^2)$	M1 M1 for expansion (ignore sign)
	$=12ab-3b-3a-ab+3b+b^2$	M1 for one term correct
	$=12ab-3a-3b+3b-ab+b^2$	A1
	$=11ab-3a+b^2$	
(c) (i)	Distance from village to Paamu	
	$=1\frac{1}{2}\times 3$	
	$=\frac{3}{2}\times 3$	M1 for multiplying
	$=\frac{9}{2}\ or\ 4\frac{1}{2}km$	A1 for $\frac{9}{2}\ or\ 4\frac{1}{2}km$
	Distance between Paamu and Quamu	
	$=15\frac{1}{2}\times 2$	
	$=\frac{31}{2}\times 2$	M1 for multiplying
	$=31km$	A1 for $31km$
	Distance from Akosua's village to Quamu	
	$=4\frac{1}{2}+31$	M1 for addition
	$=35\frac{1}{2}km$	A1 for $35\frac{1}{2}km$

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(ii)	Time taken by bicycle rider to travel from Akosua's village to Quamu $= 35\frac{1}{2} \div 5$ $= \frac{71}{2} \times \frac{1}{5}$ $= \frac{71}{10}$ *or* $7\frac{1}{10}$ *or* $7.10hrs$ ***oms (-1) for km/hrs once only***	**M1 for division** **A1 for $\frac{71}{10}$ *or* $7\frac{1}{10}$ *or* $7.10hrs$** **[15 marks]**

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QUESTION NO.	DETAILS	MARKS
3. (a) (i)	$2^m = 8 \times 32 \times 4 \times 2$	
	$2^m = 2^3 \times 2^5 \times 2^2 \times 2^1$	M1 indices (at least two correct)
	$2^m = 2^{3+5+2+1}$	M1 Addition of powers
	$2^m = 2^{11}$	A1
(ii)	$m = 11$	B1
(b) (i)	$\pi n^2 K - \frac{1}{4}\pi n^2 Q$	
	$= \pi n^2 \left(K - \frac{1}{4}Q\right)$	M1 for correct factorization A1
(ii)	$= \frac{22}{7} \times 2^2 \left(19 - \frac{1}{4}(20)\right)$	M1 for correct substitution
	$= \frac{22}{7} \times 4(19 - 5)$	M1 for either 4 or 5
	$= \frac{22}{\cancel{7}_1} \times 4 \times \overset{2}{\cancel{(14)}}$	M1 for simplifying
	$= 22 \times 8$	
	$= 176$	A1 for 176
(c)	Let Justina's share $= x$	
	Then Gifty's share $= x + \frac{20}{100} \times 418$	B1
	$\therefore x + x + \frac{20}{100} \times 418 = 418$	M1 Left-hand side A1
	$100x + 100x + 8360 = 41800$	
	$200x = 41800 - 8360$	M1 for solving
	$x = \frac{33440}{200}$	
	$=$ GH¢167.20	A1

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	OR	
	$100\% - 20\% = 80\%$	**B1 for 80%**
	$\frac{80\%}{2} = 40\%$	**M1 Left-hand side A1**
	$\therefore$ Justina's share $= \frac{40}{100} \times 418$	**M1**
	$= GH¢167.20$	**A1**
	~~ALITER~~ ANY OTHER	
	Let Justina's share be J then Gifty's share	
	$= J + \frac{20}{100} J \text{ or } \frac{120J}{100}$	**B1 for $\frac{120J}{100}$ or $\left(J + \frac{20J}{100}\right)$**
	$\frac{120J}{100} + J = 418$	**L. S. M1 A1 for equation**
	$120J + 100J = 41800$	
	$220J = 41800$	**M1 for simplifying**
	$J = \frac{41800}{220}$	
	$J = GH¢190.00$	
	J Justina's share = GH¢190.00	**A1**
		[15 marks]

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<table>
<tr><th>QUESTION NO.</th><th>DETAILS</th><th>MARKS</th></tr>
<tr><td>4. (a)</td><td>$4m - 2(3 + 2m) + m(2m + 4) = 0$
$4m - 6 - 4m + 2m^2 + 4m = 0$
$2m^2 + 4m - 6 = 0$
$2m^2 + 6m - 2m - 6 = 0$
$2m(m + 3) - 2(m + 3) = 0$
$(2m - 2)(m + 3) = 0$
$m - 2 = 0 \quad m + 3 = 0$
$2m = 2 \quad m = -3$
$m = 1$</td><td>Attempting +5</td></tr>
<tr><td>(b)</td><td>$240 + 200 + 160 + 120 = 720$
<table><tr><th>Group</th><th>Angle</th></tr><tr><td>Women</td><td>$\frac{360}{720} \times 240$
$= 120°$</td></tr><tr><td>Men</td><td>$\frac{360}{720} \times 200$
$= 100°$</td></tr><tr><td>Boys</td><td>$\frac{360}{720} \times 160$
$= 80°$</td></tr><tr><td>Girls</td><td>$\frac{360}{720} \times 120$
$= 60°$</td></tr></table></td><td>B1 for 720
M1 for ratio
A2 $\left(-\frac{1}{2}ee\right)$</td></tr>
</table>

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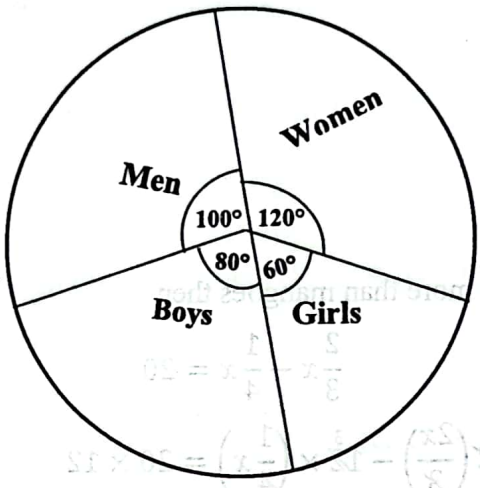
(c) (i)	 **NOT DRAWN TO SCALE**	**M1 circle with correct centre** **A2** $\left(-\frac{1}{2}ee\right)$
(ii)	Number of females 240 + 120 = 360 or 60 +120 =180	**B1 for 360 or 180**
	Percentage of females $= \frac{\cancel{360}^{1}}{\cancel{720}_{2}} \times \cancel{100}^{50}$	**M1 for simplifying**
	$= 50\%$	**A1**
	ALITER	
	$\frac{\cancel{180}^{1}}{\cancel{360}_{2}} \times \cancel{100}^{50}$	**M1**
	$= 50\%$	**A1**
		[15 marks]

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QUESTION NO.	DETAILS	MARKS
5. (a) (i)	$\frac{1}{4}x$	B1
(ii)	$\frac{2}{3}x$	B1
(b)	If orange is 20 more than mangoes then	
	$\frac{2}{3}x - \frac{1}{4}x = 20$	M1 A1
	$^{4}12\left(\frac{2x}{3_1}\right) - ^{3}12 \times \left(\frac{1}{4_1}x\right) = 20 \times 12$	M1 for clearing fraction
	$8x - 3x = 240$	
	$\frac{5x}{5} = \frac{^{48}240}{5_1}$	M1 for simplifying
	$x = 48$	A1
(c)	Land used to cultivate mangoes: $\frac{1}{4}x = \frac{1}{4_1} \times {}^{12}48$	M1 for simplifying either
	$= 12$ acres	A1
(d)	Land used to cultivate oranges $= \frac{2}{3_1} \times {}^{16}48$	
	$= 32$ acres	A1
	Unused land $= 48 - (12 + 32)$	M1 for addition
	$= 48 - 44$	M1 for subtraction
	$= 4$ acres	A1
	Percentage of land not used $= \frac{^{1}4}{^{12}48} \times 100$	M1 for simplifying
	$= 8.333\%$	
	$= 8\%$	A1
		[15 marks]

$1-\left(\frac{1}{4}+\frac{2}{3}\right)$

$1-\frac{11}{12}$

$\frac{1}{12} \times 100\% = 8.33$

$= 8\%$

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QUESTION NO.	DETAILS	MARKS
6. (a)	Well labelled axes with correct scale and interval	B1 $\left(-\frac{1}{2}ee\right)$
(b) (i)	Drawing quadrilateral ABCD with A (2, 4), B (2, 8), C (8, 8) and D (8, 4)	B3 $(-1ee)$
(ii)	Drawing $A_1 B_1 C_1 D_1$ with A_1 (-3, 2), B_1 (-3, 6), C_1 (3, 6) and D_1 (3, 2)	B4 $(-1ee)$
(iii)	Drawing $A_2 B_2 C_2 D_2$ with A_2 (-2, 4), B_2 (-2, 8), C_2 (-8, 8) and D_2 (-8, 4)	B4 $(-1ee)$
(c) (i)	Rectangle	B1
(ii)	From the graph, A_2 (-2, 4) and B_1 (-3, 6) Gradient $A_2 B_1 = \frac{6-4}{-3-(-2)}$	M1
	$= \frac{2}{-1}$ $= -2$	A1
		[15 marks]

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