

2025 WASSCE MATHEMATICS 2 SOLUTION

QUESTION	DETAILS	MARKS
1. (a)	$t_1 = \frac{150}{60} = 2.5 \text{hrs}$ $t_2 = \frac{150}{90} = \frac{5}{3} \text{hrs}$ $t_{\text{total}} = 2.5 + \frac{5}{3} = \frac{25}{6} \text{hrs}$ $\text{Average speed} = 300 \div \frac{25}{6}$ $= 72 \text{km/hr}$	M1 for either time A1 for 2.5 A1 for $\frac{5}{3}$ (accept 1.67) B1 for $\frac{25}{6}$ or its equivalent M1 for finding average speed A1 for 72km/hr
(b)	New time for 1st half = $\frac{150}{50} = 3 \text{hrs}$ Change in time = $3 - 2.5$ $= 0.5 \text{hrs}$ Overall time will increase by 0.5hrs or 30mins.	B1 for 3hrs B1 overall time will increase by 0.5hrs or 30mins (-1 ou/wu)
[8 Marks]		
2.	Let x be amount invested at 10% $1.4x$ = amount invested at 11% Interest at 10% = $x \times \frac{10}{100} \times \frac{7}{2}$ $= 0.35x$ Interest at 11% = $(1.4x) \times \frac{11}{100} \times \frac{7}{2}$ $= 0.539x$ $0.35x + 0.539x = 22,580.60$ $0.889x = 22,580.60$ $x = 25,400.00$ Amount invested at 11% = $1.4 \times 25,400$ $= 35,560.00$	B1 for 1.4x M1 for either of the interest A1 for 0.35x A1 for 0.539x M1 for equating interest M1 for solving A1 for 25,400.00 A1 for 35,560.00 (-1 ou/wu)
[8 Marks]		

QUESTION	DETAILS	MARKS
3.	$V = \frac{1}{2} \times \frac{4}{3} \times \frac{22}{7} \times 2^3$ $= 16.76\text{m}^3$ $= 16.76 \times 1000$ $= 16,760 \text{ litres}$ Water required = 50×500 $= 25,000 \text{ litres}$ $16,760 \text{ litres} < 25,000 \text{ litres}$ Full tank of water is not sufficient to irrigate the farm	M1 for finding volume A1 for 16.76m^3 M1 for 16.76×1000 A1 for 16,760 litres M1 for 50×500 A1 for 25,000 litres B1 for the mathematical statement B1 for the conclusion (-1 ou/wu) [8 Marks]
4. (a)		B2 $(-\frac{1}{2}ee)$ (36°, 48°, 100m and 90° at their respective positions)
(b)	Let $HA = x$ and $AB = y$ From $\triangle AHL$ $\tan 48 = \frac{100}{x}$ $x = \frac{100}{1.1106} = 90.0414$ From $\triangle BHL$ $\tan 36 = \frac{100}{x + y}$ $x + y = \frac{100}{0.7265} = 137.6462$ $y = 137.6462 - 90.0414$ $= 47.6048$ $= 48\text{m}$	M1 for tan ratio A1 for 90.0414 (accept 2 d. p.) A1 for 137.6462 (accept 2 d. p.) M1 for subtracting A1 for 47.6048 (accept 2 d. p.) A1 for 48m (-1 ou/wu) [8 Marks]

QUESTION	DETAILS	MARKS
5. (a)	We are to find either r and s or x and y or u and v or a and b $\frac{2a - 4}{2} = 1$ $2a - 4 = 2$ $2a = 6$ $a = 3$ $\frac{3 + b}{2} = 2a - 1$ $3 + b = 4a - 2$ $b = 4(3) - 5$ $b = 7$	M1 for equating either component M1 for solving A1 for $a = 3$ M1 for solving A1 for $b = 7$
(b)	Either YZ or PH or CD or JK $Y(6, 3), \quad Z(-4, 7)$ $ YZ = \sqrt{(6 - (-4))^2 + (3 - 7)^2}$ $= 2\sqrt{29} \text{ units}$ $= 10.77 \text{ units}$	B1 for both <u>coordinates</u> / <u>vector</u> correct M1 for use of Pythagoras A1 for $2\sqrt{29}$ or 10.77 units

[8 Marks]

Smart Learning Tools

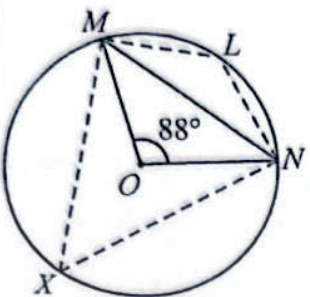
QUESTION	DETAILS	MARKS
6. (a)	Total ratio = $12 + 15 + 5 = 32$ Initial labour cost = $\frac{12}{32} \times 64,000$ $= 24,000.00$ Initial material cost = $\frac{15}{32} \times 64,000$ $= 30,000.00$ Initial contractors charges = $\frac{5}{32} \times 64,000$ $= 10,000.00$ The increase can be p or s or x or r New labour cost = $\left(\frac{100+x}{100}\right) \times 24,000$ New material cost = $\left(\frac{100+2x}{100}\right) \times 30,000$ $\left(\frac{100+x}{100}\right) \times 24,000 = \frac{2}{3} \times \left(\frac{100+2x}{100}\right) \times 30,000$ $240(100+x) = 200(100+2x)$ $24,000 + 240x = 20,000 + 400x$ $160x = 4000$ $x = 25$	B1 for 24,000.00 B1 for 30,000.00 B1 for 10,000.00 B1 for new cost of labour B1 for new cost of material M1 for equating new cost M1 for solving A1 for 25
(b)	New labour cost = $\frac{125}{100} \times 24,000$ $= 30,000$ New material cost = $\frac{150}{100} \times 30,000$ $= 45,000$ New building cost = $30,000 + 45,000 + 10,000$ $= \\$85,000.00$	B1 for 30,000.00 B1 for 45,000.00 M1 for adding <i>at least 1 correct</i> A1 for \$85,000.00 (-1 ou/wu)
		[12 Marks]

QUESTION	DETAILS	MARKS
7. (a)	The unknowns can be r or b or x or q $\frac{1}{2}(3q + 3) \times 7 = 98$ $7(3q + 3) = 196$ $3q + 3 = 28$ $q = \frac{25}{3} \text{ or } 8.3333$	M1 for finding area M1 for solving A1 for $\frac{25}{3}$ or 8.3333 (accept 2 d. p) 8.3 ✓
(b)	Area of pattern: ΔOTL or ΔPNO or ΔTRS or ΔMUV $\text{Area of pattern} = \frac{1}{2} \times \frac{25}{3} \times 7$ $= 29.1667$ $= 29.2m^2$	M1 for finding area A1 for 29.1667 or its equivalent A1 for $29.2m^2$
(c)	We can have RS or ON or TL or UV $ US = 3 \times \frac{25}{3} + 3 = 28$ $ MS = 2 \times \frac{25}{3} + 3 = 19.667$ $ UV = \sqrt{7^2 + 28^2}$ $ UV = \sqrt{833}$ $ UV = 28.8617 \text{ or } 7\sqrt{17}$ $ MV = \sqrt{7^2 + 19.667^2}$ $= \sqrt{435.7909}$ $= 20.8756$ Perimeter = $8.3333 + 28.8617 + 20.8756$ $= 58.0706m$ $= 58.1m$	B1 for either 28 or 19.667 or its equivalent M1 for use of Pythagoras A1 for 28.8617 or $7\sqrt{17}$ (accept 2 d. p) A1 for 20.8756 (accept 2 d. p) M1 for adding A1 for 58.1m (-1 ou/wu)

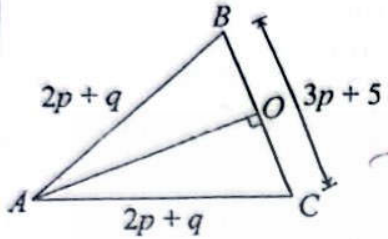
[12 Marks]

QUESTION	DETAILS	MARKS
8. (a) (i)	Let x = planned days to plough Days used to plough = $x + 2$ $120x = 85(x + 2) + 40$ $120x = 85x + 170 + 40$ $35x = 210$ $x = 6$	B1 for $x + 2$ B1 for $120x$, B1 for adding 40 M1 for equating M1 for solving A1 for 6
(ii)	Total area of farmland = 120×6 = 720 acres	M1 for the product A1 for 720 acres
(b)	$\theta = 6.8 - 5 = 1.8$ Distance between them = $\frac{1.8}{360} \times 2 \times \frac{22}{7} \times 6400$ = 201.1 = 201 km	B1 for 1.8 M1 for finding distance A1 for 201.1 A1 for 201 km (-1 ou/wu)
Smart Learning Tools		[12 Marks]

QUESTION	DETAILS	MARKS
9. (a)	Height of the pillar can be SH or CR or XP or GT. Height of the mast can be TG or DP or YE or HS with their centre as O.	B3 ($-\frac{1}{2}ee$) (10m, 28°, 70°, relative positions of S, H, O, G and T)
(b) (i)	Let $OS = OT = x$ From $\triangle OSH$ $\tan 28 = \frac{10}{ OS }$ $ OS = \frac{10}{0.5317} = 18.8076$ From $\triangle OTG$ $\tan 70 = \frac{ TG }{18.8076}$ $ TG = 2.7475 \times 18.8076$ $= 51.6739$ Height of mast = 52m	M1 for tan ratio A1 for 18.8076 (accept 2 d. p.) M1 for tan ratio A1 for 51.6739 (accept 2 d. p.) A1 for 52m
(ii)	From $\triangle HPG$ $ PG = 51.6739 - 10$ $= 41.6739m$ $ HG = \sqrt{(2 \times 18.8076)^2 + (41.6739)^2}$ $= \sqrt{1414.9033 + 1736.7139}$ $= \sqrt{3151.6172}$ $= 56.1393$ $= 56m$	B1 for 41.6739m (accept 2 d. p.) M1 for use of Pythagoras M1 for simplifying A1 for 56m (-1 ou/wu)
		[12 Marks]

QUESTION	DETAILS	MARKS
10. (a) (i)	The points on the circle can be M, N and L or A, T and M or A, B and C or Q, R and S each with centre O.  Handwritten notes: MN, OM, ON, 88°	B2 ($-\frac{1}{2}ee$) (O, M, N, L and 88°)
(ii)	$\angle MXN = \frac{1}{2} \times 88$ $= 44^\circ$ $\angle MLN = 180 - 44$ $= 136^\circ$	M1 for $\frac{1}{2} \times 88$ A1 for 44° M1 for finding $\angle MLN$ A1 for 136°
(b) (i)	The second mason = 1.5×400 = 600 blocks	M1 for the product A1 for 600 blocks
(ii)	First mason's rate = $\frac{400}{8}$ = 50 blocks/hr Second mason's rate = $\frac{600}{8}$ = 75 blocks/hr Total rate = $50 + 75$ = 125 Time = $\frac{2000}{125} = 16$ hours Hence 16 hours would be required	B1 for 50 blocks/hr B1 for 75 blocks/hr B1 for 125 B1 for 16 hours (-1 ou/wu)

[12 Marks]

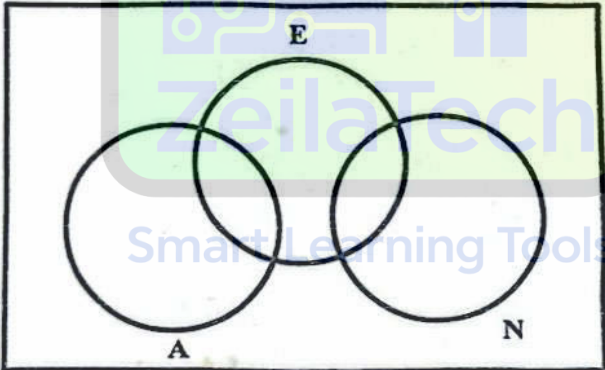
QUESTION	DETAILS	MARKS
11. (a)	The vertices of the triangle can be ABC with variables as p and q or TUV with variables as i and j or SDR with variables as a and b or KLM with variables as u and v. 	B1 $(-\frac{1}{2} ee)$ (at least 2 sides labelled)
(b) (i)	$(2p + q) + (2p + q) + (3p + 5) = 7q + 3$ $7p + 2q + 5 = 7q + 3$ $7p + 2 = 5q$ $\frac{p}{q} = \frac{2}{3}$ $p = \frac{2}{3}q$ $5q = 7\left(\frac{2}{3}q\right) + 2$ $15q = 14q + 6$ $15q - 14q = 6$ $q = 6$ $p = 4$	M1 for equating parameters M1 for simplifying (all correct) B1 for $p = \frac{2}{3}q$ or its equivalent M1 for the equation M1 for solving A1 for 6 A1 for 4
(ii)	$h = \sqrt{14^2 - 8.5^2}$ $= 11.1243$ $\text{Area} = \frac{1}{2} \times 17 \times 11.1243$ $= 94.5566$ $= 94.6 \text{ km}^2$	M1 for the use of Pythagoras A1 for 11.1243 (accept 2 d. p.) M1 for finding area A1 for 94.6 km² (-1 ou/wu)
		[12 Marks]

QUESTION	DETAILS	MARKS																																																							
12. (a)	<table border="1"> <thead> <tr> <th>Class interval</th> <th>Tally</th> <th>f</th> <th>Upper class boundary</th> <th>Cumulative frequency</th> </tr> </thead> <tbody> <tr> <td>1 – 10</td> <td> </td> <td>3</td> <td>10.5</td> <td>3</td> </tr> <tr> <td>11 – 20</td> <td> </td> <td>5</td> <td>20.5</td> <td>8</td> </tr> <tr> <td>21 – 30</td> <td> </td> <td>7</td> <td>30.5</td> <td>15</td> </tr> <tr> <td>31 – 40</td> <td> </td> <td>6</td> <td>40.5</td> <td>21</td> </tr> <tr> <td>41 – 50</td> <td> </td> <td>10</td> <td>50.5</td> <td>31</td> </tr> <tr> <td>51 – 60</td> <td> </td> <td>7</td> <td>60.5</td> <td>38</td> </tr> <tr> <td>61 – 70</td> <td> </td> <td>5</td> <td>70.5</td> <td>43</td> </tr> <tr> <td>71 – 80</td> <td> </td> <td>4</td> <td>80.5</td> <td>47</td> </tr> <tr> <td>81 – 90</td> <td> </td> <td>2</td> <td>90.5</td> <td>49</td> </tr> <tr> <td>91 – 100</td> <td> </td> <td>1</td> <td>100.5</td> <td>50</td> </tr> </tbody> </table>	Class interval	Tally	f	Upper class boundary	Cumulative frequency	1 – 10		3	10.5	3	11 – 20		5	20.5	8	21 – 30		7	30.5	15	31 – 40		6	40.5	21	41 – 50		10	50.5	31	51 – 60		7	60.5	38	61 – 70		5	70.5	43	71 – 80		4	80.5	47	81 – 90		2	90.5	49	91 – 100		1	100.5	50	M1 for any of the two frequencies correct A2($-\frac{1}{2}ee$) for all correct M1 for first two cumulative frequencies correct A1 for all correct
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(b)		B1 for the axes (correct upper class boundary marks, labelling and CF) B2 for CF ($-\frac{1}{2}ee$)																																																							

QUESTION	DETAILS	MARKS
(c)	Position of upper quartile = $\frac{3}{4} \times 50$ $= 37.5$ Upper quartile = 59.5 ± 0.5	M1 evidence from the graph A1 for 59.5 ± 0.5
(d)	$\frac{10}{100} \times 50 = 5$ pupils passed $= 50 - 5 = 45$ Pass mark = 75.5 ± 0.5	M1 evidence from the graph A1 for 75.5 ± 0.5
		[12 Marks]

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QUESTION	DETAILS	MARKS
13. (a) (i)	The required angles can be $\angle EOF$ or $\angle POQ$ or $\angle AOB$ $\angle GJF = 110^\circ$ $\angle EGF = 180 - 30 - 110$ $= 40^\circ$ $\angle EOF = 2 \times 40$ $= 80^\circ$	B1 for 110° M1 for finding $\angle EGF$ A1 for 40° B1 for 80°
(ii)	The required angles can be $\angle JEH$ or $\angle UEH$ or $\angle FAD$ or $\angle TPS$ $\angle EHF = \angle EGF = 40^\circ$ $\angle JEH = 180 - 110 - 40$ $= 30^\circ$	B1 for $\angle EHF$ M1 for finding $\angle JEH$ A1 for 30°
(b) (i)	 $n(U)$	B3 (-1 ee) (correct position of E, A, N and the intersections)
(ii) (α)	Not valid	B1 for Not Valid
(β)	Not valid	B1 for Not Valid
[12 Marks]		