Marking Scheme 2023 2NA Paper 1 EOY Exam

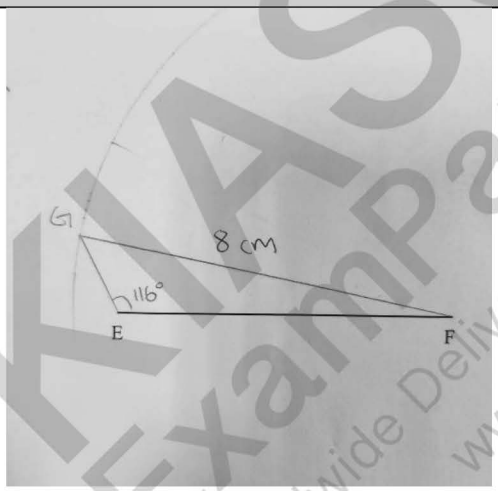
No.	Answer	Marks	Remarks	AOs
1a	$3, -4$	B1		AO1
1b	$\sqrt{3}$	B1		AO1
2a	$2y-14x-8=2(y-7x-4)$	B1		AO1
2b	$x^2-7x-8=(x-8)(x+1)$	M1 A1	Award 1 mark for correct use of multiplication frame. Award full 2 marks if full working is not	AO1
3a	$-3x<-20$ $x>\frac{20}{3}$	 B1	 o.e.	AO1
3b	7	B1		AO2

4	$2x+5y=8 \quad (1)$ $x+3y=6 \quad (2)$ $2\times(2):$ $2x+6y=12 \quad (3)$ $(3)-(1):$ $(2x+6y)-(2x+5y)=12-8$ $2x+6y-2x-5y=4$ $y=4$ Sub $y=4$ into (2): $x+3(4)=6$ $x=-6$ $x=-6, y=4$ *OR* $2x+5y=8 \quad (1)$ $x+3y=6 \quad (2)$ From (2): $x=6-3y \quad (3)$ Sub (3) into (1): $2(6-3y)+5y=8$ $12-6y+5y=8$ $y=4$ Sub $y=4$ into (3): $x=6-3(4)$ $x=-6$ $x=-6, y=4$	M1 M1 A1 [M1] [M1] [A1]	Award M1 for correct subtraction of one eqn from another. Award M1 for substituting y or x into eqn. Award M1 for correct substitution of one eqn into another. Award M1 for substituting y or x into eqn.	AO1
5a	$A(-2,3)$ $B(2,0)$	B1 B1		AO1

5b	Gradient $= \dfrac{3-0}{-2-2}$ $= -\dfrac{3}{4}$	M1 A1	Award M1 for correct substitution Accept rise over run method. Award full 2 marks if working not shown.	AO1
6a	$p = kx$, where is k a constant. When $x = 8, p = 12$ $12 = 8k$ $k = 1.5$ $p = 1.5x$	 M1 A1	Award if student finds k correctly.	AO1
6b	$p = 1.5 \times 25$ $p = 37.5$	B1		AO2
7a	1 cm : 0.25 km 2 km : 8 cm Length on map is 8 cm. OR 1 : 25000 Length on map = 2 km ÷ 25000 = 0.00008 km = 8 cm	M1 A1 [M1] [A1]		AO2

7b	$1\text{ cm}^2 : 0.0625\text{ km}^2$ $14\text{ cm}^2 : 0.875\text{ km}^2$ Actual area on map is 0.875 km^2. OR Area scale: 1 : 625000000 Acutal area $= 14\times 625000000$ $= 8750000000\text{ cm}^2$ $= 0.875\text{ km}^2$	M1 A1 [M1] [A1]		AO2
8a	$\text{Mean} = \dfrac{9+12+13+13+14+14+16}{7}$ $= 13$	M1 A1		AO1
8b	13	B1		AO1
8c	Let the age of new student be x. $13.5 = \dfrac{9+12+13+13+14+14+16+x}{8}$ $108 = 91 + x$ $x = 17$	M1 A1		AO2
9	$OA = \sqrt{10^2 - 6^2}$ $= 8$ $OB = \sqrt{8^2 - 6^2}$ $= \sqrt{28}$ $AOB = \sqrt{28} + 8$ $= 13.3\ (3\ s.f.)$	M1 M1 A1	Award M1 for correct application of Pythagoras' theorem.	AO2
10a	$\dfrac{2}{5}x - 5 = \dfrac{3}{2}x$ $\dfrac{11}{10}x = -5$ $x = -\dfrac{50}{11}$	 M1 A1	 o.e.	AO1

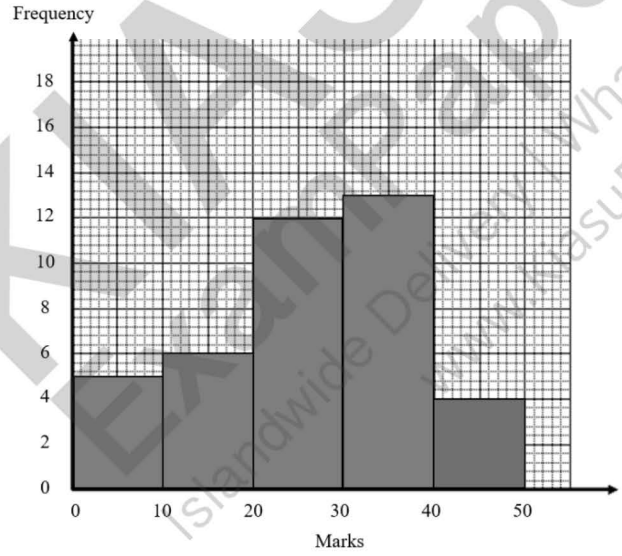
10b	$\frac{3(y-2)}{2}=\frac{y+4}{5}$ $\frac{3y-6}{2}=\frac{y+4}{5}$ $\frac{15y-30}{10}=\frac{2y+8}{10}$ $15y-30=2y+8$ $13y=38$ $y=\frac{38}{13}$ *OR* $\frac{3(y-2)}{2}=\frac{y+4}{5}$ $\frac{15(y-2)}{2}=y+4$ $15(y-2)=2(y+4)$ $15y-30=2y+8$ $y=\frac{38}{13}$	M1 M1 A1 [M1] [M1] [A1]	o.e. o.e.	AO1
11a	No. of yellow markers $= 40-\frac{3}{8}(40)-\frac{2}{5}(40)$ $= 40-15-16$ $= 9$	M1 A1		AO2
11b	0	B1		AO1

12a	$A\hat{B}C = 180° - 30° - 30°$ $= 120°$ Ext. angle $= 180° - 120°$ $= 60°$ *OR* Ext. angle $= 30° + 30°$ (ext. angle of triangle) $= 60°$	M1 A1 [M1] [A1]		AO2
12b	no. of sides $= \frac{360}{60}$ $= 6$	M1 A1	Award M1 only if student applies correct formula with incorrect 12a	AO1
13a	 Refer to diagram shown. B1 – correct length of GF with arc B1 – correct angle GEF		Deduct 1m if student does not draw correct shape with labels.	AO1
13b	1.7 ± 0.1 cm	B1		AO1
13c	$11° \pm 1°$	B1		AO1
14ai	$B\hat{C}D = 36°$ (opp $\angle$ of rhombus)	A1	Overall minus 1m if wrong	AO2

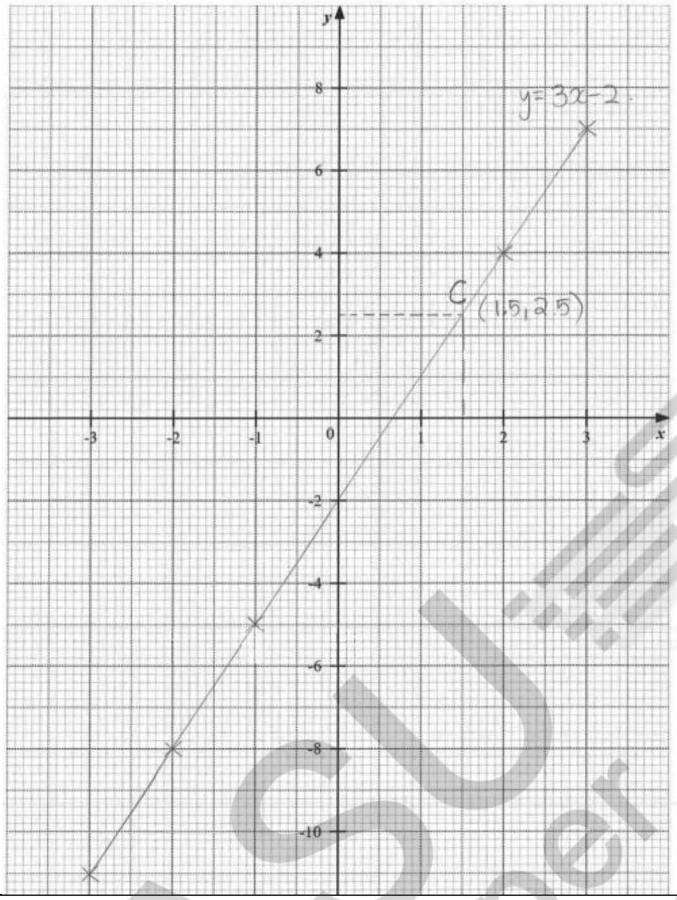
			reasoning given.	
14aii	$D\hat{B}C = (180° - 36°) \div 2$ (base $\angle$ of isos. triangle) $= 72°$ *OR* $A\hat{B}C = 180° - 36°$ (int. $\angle$ AD // BC) $= 144°$ $D\hat{B}C = 144° \div 2$ (rhombus diagonals bisect int. angles) $= 72°$	M1 A1 [M1] [A1]		AO2
14b	Yes. Opposite sides of a rhombus are parallel. OR Both opposite angles are equal.	A1 M1	Award only if reasoning is correct.	AO3

Marking Scheme 2023 2NA Paper 2 EOY Exam

No.	Answer	Marks	Remarks	AOs
1a	$\frac{4mn^2}{9} \div \frac{14m^2}{3}$ $= \frac{4mn^2}{9} \times \frac{3}{14m^2}$ $= \frac{2n^2}{21m}$	M1 A1		AO1
1b	$2(x+3)-3(x+4)$ $= 2x+6-3x-12$ $= -x-6$	M1 A1	o.e.	AO1
2	$\frac{3q^2-12q}{q^2-16}$ $= \frac{3q(q-4)}{q^2-16}$ $= \frac{3q(q-4)}{(q-4)(q+4)}$ $= \frac{3q}{q+4}$	M1 M1 A1		AO1
3a	$x = 56$	B1		AO1
3b	$\frac{AD}{PS} = \frac{CD}{RS}$ $\frac{12}{18} = \frac{3}{y}$ $y = 4.5$	M1 A1		AO2
4a	Sub $h = 9,\ b = 7$: $9 \times 7 = 63$ $k = 63$ $hb = 63$	M1 A1		AO1
4b	k is the area of the rectangle.	B1		AO3

5a	9^2+12^2 $=225$ $=15^2$ Since $AN^2+BN^2=AB^2$, triangle ABN is a right angled triangle.	M1 A1	Also accept "converse of Pythagoras' theorem"	AO3
5b	$71.5=0.5(9)(BC)$ $BC=15.9\,(3\,s.f.)$	M1 A1		AO1
6a	$5x$	B1		AO2
6b	$3(x+4)$	B1	o.e.	AO2
6c	$5x+9=3x+12$ $x=1.5$ Hence, Umairah paid: $3(1.5)+12$ $=\$16.50$	M1 M1 A1	Award 1m for correct eqn	AO2
7ai	$p=40-5-6-12-13$ $=4$	B1	Award 1m if working is shown	AO2
7aii		B1		AO2
7b	$\text{Estimate}=\dfrac{5(5)+6(15)+12(25)+13(35)+4(45)}{40}$ $=26.25\,\text{marks}$	M1, M1 A1	Award M1 for mid values used Award M1 for correct formula used	AO2

8a	Sum of interior angles $= (13-2)\times 180°$ $= 1980°$	M1 A1		AO1
8b	$1980 - 72 = 1908$ $x = \frac{1908}{12}$ $= 159$	M1 A1		AO2
9a	Maximum no. of cans $= 2\times 3\times 1$ $= 6$	B1	Award if student shows both steps.	AO2
9b	No. of large boxes needed $= 216 \div 18$ $= 12$ Total cost for 12 large boxes $= 12(\$1.20) + \$5$ $= \$19.40$ No. of medium boxes needed $= 216 \div 6$ $= 36$ Total cost for 36 medium boxes $= 36(\$0.50)$ $= \$18$ He should use the medium boxes as they are cheaper.	M1 M1 M1 M1 A1		AO3
10a	$a = -8$	B1		AO1
10b	Refer to graph attached. Plotting at least 2 points correctly. Straight line that passes through all plotted points.	B1 B1		AO1
10c	Refer to graph attached. Point *C* labelled correctly at (1.5,2.5).	B1		AO1
10d	$(0,-2)$	B1		AO1

			Graph for Q10.	
	Section B (2 choose 1)			
11ai	21 students	B1		AO1
11aii	57 marks	B1		AO1
11aiii	44 marks	B1		AO1
11bi	$\text{Probability} = \frac{14}{21}$ $= \frac{2}{3}$	B1		AO1
11bii	$\text{Percentage} = \frac{11}{21} \times 100$ $= 52.4\% (3 s.f.)$	M1 A1		AO2
11d	4	B2		AO2
12a	*ABGD*: Trapezium *BEFG*: Kite	B2		AO1

12b	$H\hat{B}C = C\hat{B}J$ (diagonals bisect kite) $= 27°$ $B\hat{G}E = 180° - 27° - 90°$ ($\angle$ sum of triangle) $= 63°$	M1 M1 A1	Award if student subtracts $°90$	AO2
12c	$A\hat{B}J = 90° + 27°$ $= 117°$	B1		AO1
12d	$C\hat{J}B = 360° - 77° - 90° - 117°$ ($\angle$ sum of quad.) $= 76°$ *OR* $H\hat{D}G = 90° - 77°$ $= 13°$ $C\hat{J}B = 13° + 63°$ (ext. $\angle$ of triangle) $= 76°$	M1 A1 [M1] [A1]		AO2