Suggested Marking Scheme 4NA Prelim P2 2023

1		Int \angle of $B = \frac{(6-2) \times 180^\circ}{100}$
		6
		$= 120^{\circ}$ Int $\angle \text{ of } 4 = 360^{\circ} - 120^{\circ} - 90^{\circ}$
		$= 150^{\circ}$
		Ext. \angle of $A = 180^{\circ} - 150^{\circ}$
		$=30^{\circ}$
		$n = \frac{360^{\circ}}{2000}$
		=12
2	(a)(i)	190 - 156 = 34 cm
	(a)(ii)	Median
		$=\frac{171+172}{2}$
		-1715cm
		- 1 / 1.50m
	(h)	Since the range is increased by 1, this means John is either 155 or 191 but since
	(0)	the median is decreased, this means that John's height is lower than the median
		thus he is 155 cm.
3		Area of water in contact with the bowl
		$=\frac{1}{2}(2\pi(15)^{2})+\frac{1}{2}(\pi(15)^{2})$
		=1060.286625
		$=1060 \text{ cm}^2$
4	(a)	$\sqrt{(-6)^2 + 4(-7)^2}$
		=15.2315
		=15.2
<u> </u>	(b)	$\frac{22}{2}$ 2142 2.2
		$\frac{1}{7}$, 3.142, $-\pi$, -3.2
	(ci)	$10994 = 1.0994 \times 10^4$
	(cii)	10994-3750
		= 7244
		$= 7.244 \times 10^3 \text{ m}$

5	(ai)	1:200000
		1 <i>cm</i> : 2 <i>km</i>
		Length of cycling path
		$=3.5 \div 2$
		=1.75cm
	(aii)	1cm: 2km
		$1cm^2:4km^2$
		Actual Area
		$=8\times4$
		$=32km^2$
	(b)	$\frac{80}{100} \times 200000 = 160000$
		1:160000
6	(a)	$m = \frac{1}{2}$
		$m^{-}2$
		$v = \frac{1}{x} - 1$
	(b)	Draw horizontal line $y = 3$
	(c)(i)	(6, 5)
	(0)(11)	$AX = \sqrt{10} + 5$
		$=\sqrt{125}$
		=11.2 units
	(d)(i)	(0, -6)
	(d)(11)	Area = $2 \times \frac{1}{2}(10)(4)$
		$=40 \text{ units}^2$
7	(a)	3 minutes
	(b)	Average speed
		$=\frac{3600 \text{ m}}{20 \text{ cm}}$
		30 min
		$=\frac{(3600 \div 1000) \text{ km}}{(2200 \times 1000) \text{ km}}$
		$(30 \div 60)$ h
		= 7.2 km/h



9	(a)	$h = \frac{2a}{m + n^2}$ $h = \frac{2(0.5)}{-0.238 + (-1.1)^2}$ h = 1.03
	(b)	$h = \frac{2a}{m + n^2}$ $hm + hn^2 = 2a$ $hn^2 = 2a - hm$ $n^2 = \frac{2a - hm}{h}$
	(c)	$n = \pm \sqrt{\frac{2a - hm}{h}}$ $x(2x + 1) = 5$ $2x^{2} + x - 5 = 0$ $x = -1 \pm \sqrt{1 - 4(2)(-5)}$
		$x = \frac{1}{2(2)} = -1.85 \text{ or } 1.35$
10	(ai)	Total volume of one Bloobox = $30 \times 30 \times 30$
		$= 27000 \text{ cm}^3$
	(aii)	$= 27000 \text{cm}^{3}$ Total SA of Bloobox $= (30 \times 30 \times 5) + (30 \times 25)$ $= 5250 \text{cm}^{2}$

		John should request for 1 Type B Bloobin as it is enough to collect all the recyclables from the households in his block.
11	(ai)	Median = \$320
	(aii)	Online bookshop A because it has a greater median than online bookshop B .
	(aiii)	Lower quartile = 120 Upper quartile = 520 Inter-quartile range = $520 - 120 = 400
	(aiv)	For online bookshop <i>B</i> , lower quartile = 120 upper quartile = 440 Inter-quartile range = $440 - 120 = 320 Online bookshop <i>B</i> has a more consistent amount of sales because it has a lower interquartile range.
	(bi)	<u>1st Draw</u> 2nd Draw
		$\begin{pmatrix} \frac{6}{10} \\ \frac{4}{10} \\ \frac{4}{10} \\ \frac{3}{9} \\ \frac{3}{9} \\ \frac{5}{9} \\ \frac{7}{9} \\ \frac{7}{9} \\ \frac{5}{9} \\ \frac{7}{9} \\ \frac{7}{9} \\ \frac{7}{9} \\ \frac{5}{9} \\ \frac{7}{9} \\$
	(bii)	P (at least 1 green) = 1 - P (no green) = $1 - \frac{6}{10} \times \frac{5}{9}$ = $\frac{2}{3}$

12	(a)	$\cos \angle ABC = \frac{257^2 + 185^2 - 236^2}{2(257)(185)}$
		2(237)(183)
		$\angle ABC = \cos^{-1}\left(\frac{44578}{95090}\right)$
		$= 62.0^{\circ}$
	(b)	$DX = \frac{3}{4} \times 236$
		$\frac{1}{\sin 19^\circ} = \frac{1}{\sin 78^\circ}$
		DV 177 . 100
		$DX = \frac{1}{\sin 78^\circ} \times \sin 19^\circ$
		= 58.9 m
	(c)	$\angle ADN = 78^\circ - 56^\circ$
		= 22°
		$\angle NAD = 180^\circ - 22^\circ$ (int. $\angle s$)
		=158°
		Bearing of C from $A = 158^{\circ} - 19^{\circ}$
		=139°