Marking Scheme for 4NA Prelim Paper 1 – 2022

Qn	Working	Marks	Remarks			
1	$\sqrt{5.07 \times 76.1}$					
	2.32					
	$\sqrt{5 \times 80}$	M1				
	$\approx \frac{1}{2}$	1111				
	=10	A1				
2	-3x < 20					
	$x > \frac{20}{2}$	M1				
	-3	1011				
	$x > -6\frac{2}{2}$					
	3 Smallast integer is 6	A1				
	Smanest meger is -0					
3(a)						
	Substitute $(-2, 6)$ into $3x + 4y = 12$					
	$3(-2) + 4(6) \neq 12$		Charry that the equation is not help and			
	Hence, $(-2, 6)$ does not lie on the line $3y + 4x = 12$	B 1	Snow that the equation is not balanced.			
3(b)	3x + 4y = 12					
	4y = 12 - 3x					
	$y = 3 - \frac{3}{2}r$					
	y=3 4 x					
	Hence, coordinates of y-intercept is $(0,3)$	B1				
4						
4	А					
	"					
	$B \xrightarrow{2} C$					

	$8+5+2=15$ $15u = 180^{\circ}$ $5u = \frac{180}{15} \times 5$ $=60^{\circ}$ $\therefore b = 60^{\circ}$	M1 A1	Find 1 unit
5		B2	B1 – Correct horizontal & vertical length B1 – Correct slanting length
6	Gradient		
	$=\frac{11+3}{2}$	M1	
	-6-8		
7(a)	=-1 P(number 3)	Al	
/(a)		B1	
	$=\frac{1}{8}$		
7(b)	P(prime number) = $\frac{5}{8}$	B1	
7(c)	P(number 6) = 0	B1	

8(a)						
	sin 90°	π	120%	$\frac{20}{8}$		
	1	3.1415	1.2	2.5		
	Smallest :	sin 90° , 1209	$6, \frac{20}{8}, \pi$		B2	Minus 1 mark for any 2 incorrect order.
8(b)	$\tan A = 0.5$					
	$A=\tan^{-1}0.$	5				
	= 26.6° ((1 dp)			B1	
9(a)	$49y^2 - 1$					
	=(7y-1)(7)	7 <i>y</i> +1)			B1	
9(b)	8ax + 4ay -	-2bx-by				
	=4a(2x+2)	(y) - b(2x + y)			M1	
	=(2x+y)((4a-b)			A1	
10(a)	<i>a</i> < 0				D1	
	Hence, acc	ept any values	of <i>a</i> that is lease	ss than zero	BI	
10(b)	Line of syr	nmetry is				
	$x = \frac{-2+8}{2}$					
	r=3				B1	
	$\lambda - J$					
11	0<€5	20°	2			

	OA = OB (radii)		
	Hence, ΔAOB and ΔBOC are both isosceles Δ		
	$\angle ABO = \frac{180^\circ - 20^\circ}{2}$		
	= 80°		
	$\therefore \angle ABC = 80^{\circ} \times 2$		
	=160°		
	Exterior $\angle = 180^\circ - 160^\circ$		
	=20°		
	No of sides = $\frac{360^{\circ}}{20^{\circ}}$	M1	
	=18	A1	
	Alternatively,		
	Number of sides = $\frac{360^{\circ}}{20^{\circ}}$ (angles at a point)	M1	
	= 18	A1	
12(a)	-7x - 11y + 10x - 2y		
	=3x-13y	B1	
12(b)	$\frac{5x}{8y^2} \div \frac{20xy}{6}$		
	$=\frac{5x}{8y^2} \times \frac{6}{20xy}$	M1	
	$=\frac{3}{16y^3}$	A1	

13	Perimeter of major sector $=\frac{240^{\circ}}{360^{\circ}} \times 2\pi(6) + 2(6)$ $= 8\pi + 12$	M1 A1	Award mark for finding length of major arc
14	$\angle ABC = 121^{\circ} - 30^{\circ}$		
	= 91°	M1	Workings for $\angle ABC = 91^{\circ}$
	No because $\angle ABC = 91^{\circ}$ not 90°		
	(angle at semicircle is 90°).	A1	Explain angle at semicircle is 90°
15	Total Distance from A to C		
	= 120 + 180		
	= 300 km	M1	Total Distance
	Total Time from A to C		
	$=1\frac{45}{60}h + \frac{180}{75}h + \frac{20}{60}h$	M1	Total Time
	Average Speed		

	300	A1	
	$=\frac{1}{1+1} + \frac{180}{1+1} + \frac{20}{1+1}$		
	60 75 60		
	= 66.9144		
	≈ 66.9 km/h (3 sf)		
16		N/1	Demon di seden bise sten
	<i>p</i>	IVI I	Perpendicular disector
		M1	Angle bisector
		A1	Shaded region
	$2^{\frac{p+1}{p}}$		
	\mathbf{X}		
17(a)	Number of hospitalized patients in April		
	100°		
	$=\frac{1}{360^{\circ}} \times 1330^{\circ}$		
	= 375		
		M1	
		MI A1	
17(b)	Mr Tay might be wrong because the <u>number of</u>		
	patients in the month of May might be different		

	from the month of April (Eg. Number of patients in		
	the month of May is 3600). Hence, the number of		
	hospitalized patients in the month of May might be		
	more than the hospitalized patients in the month of		
	April although the angle represented in the pie chart	B1	Accept any other logical reasoning.
	is lesser $(500 > 340 \text{ patients})$.		
	Eg. $\frac{50^{\circ}}{360^{\circ}} \times 3600 = 500 \text{ patients}$		
18(a)	- T		
	$\sum_{\substack{22\\ 110^{\circ}\\ P} Q}^{5^{\circ}} \frac{R}{Q} + \frac{110^{\circ}}{75^{\circ}} \frac{110^{\circ}}{62^{\circ}} z$		
	PQRS is similar to TXYZ		
	Hence, $\angle ZTX = 110^{\circ}$ and $\angle XYZ = 75^{\circ}$		
	$\angle TXY = 360^{\circ} - 110^{\circ} - 62^{\circ} - 75^{\circ}$	M1	
	= 113°	A1	
18(b)	$\frac{XY}{11} = \frac{33}{22}$		
	14 22		
	$XY = \frac{33}{22} \times 14$	M1	
	= 21	A1	
19	For answer (p)		

	$95\% \rightarrow \$10080 + 560$		
	95% → \$10640		
	∴ 5% = $\frac{10640}{95} \times 5$ = \$560	B1	
	$\frac{\text{For answer } (q)}{10080 + 560 + 560} \times 100\%$ = 5%	B1	
	For answer (<i>r</i>)		
	$100\% \rightarrow \$1120$		
	· 800% · 1120 × 800	D 1	
	$\frac{100}{100} \times 300$	BI	
	= \$8960		
	For answer (s)		
	= <u>1120</u> ×100%	D 1	
	8960+1120+1120	BI	
	=10%		
20(a)	•		
	•		
	• • • •		
	• • • • • •		
·1			·
	35 36 37 38 39 40 41		
	Sizes of Shoes (in cm)		

	Modal shoe size is 36	B1	
20(b)	Middle position is 8 th and 9 th		
	Hence, median shoe size is		
	_ 37 + 38		
	- 2	B 1	
	= 37.5	DI	
20(c)	He should stock up the shoe size 36 because it is the		
	modal shoe size which is most commonly sold in the		
	shop.	B 1	Explain using statistical evidence of mode.
21(a)	4x + y = 100 - 18 - 26		
	4x + y = 56	B1	Evidence of showing subtracting values from the total figure of 100.
	(shown)		
21(b)	$\frac{3(18) + 4(4x) + 5(26) + 6(y)}{100} = 4.56$	M1	Form equation involving mean
	$100 \\ 184 + 16x + 6y = 456$	1711	
	16x + 6y = 272		
	8x + 3y = 136	A1	
	(Shown)		



	Area of side surface (right) = 15×20 = 300 Area of side surface (left) = $PQ \times 20$ = 18.02775×20 = 360.555 Area of top surface = 35×20 = 700	M1	For side surfaces (right and left) For area of top and bottom surface
	= 900 Total surface area of prism		
	$= 2 \times 600 + 300 + 360.555 + 700 + 900$ $= 3460.555$	M1	
	\approx 3460 cm ² (3 sf)	A1	
23(a)	60 min	B1	

23(b)	Rate		
	\$9		
	$=\frac{4}{3}$		
	= \$3 / h	B1	
23(c)	The horizontal line represents a fixed cost of \$9		
	from the 4 th hour onwards.	B1	Accept any other logical reasoning
23(d)	Cost of parking (\$)		
	11 - Carpark B		
	10 9 Carpark A		
		R 1	
		DI	
	Number of hours		
23(e)	Carol should park at Carpark <i>B</i> because she can save	R 1	Or explains that carpark B is cheaper
	\$1 on the cost of parking.	DI	
24(a)	$T_1 = 2 + \overline{1 = 3}$		
	$T_2 = 4 + 1 = 5$		
	$T_3 = 6 + 1 = 7$		
	$T_4 = 8 + 1 = 9$		
	$T_5 = 10 + 1 = 11$	B 1	

24(b)	n th term		
	$T_n = 2n + 1$	B1	
24(c)	From observation,		
	1000 is a even number, hence 1000 is not a term in		
	the sequence which will always give an odd number.	B1	Accept any logical reasoning
24(d)	2n+1=55	M1	
	2n = 154		
	n = 77	A1	
25(a)	Speed (m/s) 20 0 0 30 85 100 Time (s)		
	Deceleration		
	$=\frac{20}{15}$	M1	
	1.1		
	$=1-m/s^{2}$	A1	

