KRANJI SEC SCHOOL 4NA PRELIMS 2023 PAPER 2 (SOLUTIONS)

		1		1						
1	(a)	$\sqrt[3]{3147} = 14.7$	(b)	$\frac{8 \times 600}{0.08} = 60000$						
2	(a)	$0.000\ 987 = 9.87\ \times\ 10^{-4}$	(b)	$\frac{5.642 \times 10^6}{7.18 \times 10^2} = 7.86 \times 10^3 \text{ people / } \text{km}^2$						
		1								
3	(a)	Total interior angle of Pentagon $= 180($	5) – 36	$00 = 540^{\circ}$						
		1 interior angle $=\frac{540}{2}=108^{\circ}$								
		$_{5}$ $_{5}$ $_{5}$ $_{5}$ $_{6}$ $_{6}$ $_{7}$								
		2600 - 300 - 100 - 102								
	(U)	1 exterior alight = 100 - 102 = 10	711 -	$\frac{18^{\circ}}{18^{\circ}} = 20$						
	T		1	· · · · · · · · · · · · · · · · · · ·						
4	(a)	13 students	(b)	$SD = \frac{\sqrt{1638.95}}{20} = 9.05 \ kg$						
5	(a)	$T_3 = -\frac{3}{3} + 7 = 6$	(b)	$ \begin{vmatrix} -\frac{n}{3} + 7 + \left(-\frac{n+1}{3} + 7\right) = 9 \\ n & n+1 \end{vmatrix} $						
				$\frac{-\frac{n}{3} - \frac{n+1}{3} + 14 = 9}{\frac{-2n-1}{3} = -5 \rightarrow n = 7}$						
6	$KBS: \$400000 + \frac{400000 \times 2.2 \times 15}{100} = \$532000 ; \ KCBC: 400000 \left(1 + \frac{2.5}{100}\right)^5 = 452563.2852$									
	1020									
-	(-)	90	1	20						
	(a)	$94900 \times \frac{33}{100} = \85410 \$85410 + \$30000 = \$115410	(b)	(i) $\$115410 \times \frac{20}{100} = \23082						
				(ii) $23082 + 60 \times 1700 = 125082						
	1-		1							
8			9a(i)	(m-2y)(m+2y)						
			9a(ii)	(x-5)(2x-1)						
		P	9(a)	12ax - 8bx + 9ay - 6by						
			(iii)	=4x(3a-2b)+3y(3a-2b)						
		B		= (3a - 2b)(4x + 3y)						
		\vee	0(b)	5hk - k + 2						
			9(0)	5hk - k + 2 5hk - k - 2						
		. A		5nk - k - 2 k(5h - 1) - 2						
				$\begin{bmatrix} \kappa(3n-1)-2\\ 2 \end{bmatrix}$						
				$k = \frac{2}{5h - 1}$						
1										

10	(a)	350	0					(b)		210		
	(0)	<u>X</u>	<u> </u>						x	+ 10	2522 1/22/1552	
	(0)	$\frac{350}{x}$	$\frac{1}{x} + \frac{1}{x}$	$\frac{10}{10} =$	6			(u)	x	$x = \frac{-(-250) \pm \sqrt{(-250)^2 - 4(3)(-1750)}}{2(3)}$		
		350	$\Im(x+1)$	10) + 2	$\frac{210x}{210x} =$	= 6						
		35(x(x+10) = 0				x	$x = \frac{6}{6}$ or $\frac{6}{6}$				
		$350(x + 10) + 210x = 6x(x + 10)$ $350x + 3500 + 210x = 6x^{2} + 60x$ $6x^{2} - 500x - 3500 = 0$				x	$x = 89.83 \ km/h \text{ or } -6.494 \ km/h$					
						S	peed of	f the car from Singapore to Kuala				
		$3x^2$	$3x^2 - 250x - 1750 = 0$					L	umpur	= 89.8 km/h		
11	(a)	x	0.5	1	1.5	2	2.5	3	3.5	4		
											-	
		У	4.05	1.20	0.45	0.30	0.45	0.80	1.31	1.95		
	(b)											
	(~)		-									
			$\backslash \backslash$									
		(0,	, 3)						/			
				K								
			-2									
			(1, 1.2)	\backslash							
				(1.338, 0.6)		X	(2.745, 0.6))	_			
			0	1	2	2	3	4				
	(c)	Gra	idient =	= -2.62	7			(d)	x	= 1.35	or 2.75	
12	1				. 1						2	
12 (a)	$\frac{1}{3} \times \pi \times (3.6)^2 \times 11.1 - \frac{1}{3} \times \pi \times (2.4)^2 \times 7.4 = 106.0099 cm^3 = 106 cm^3 (3 \text{s.f.})$							$m^3 = 106 \ cm^3 \ (3 \ s.f.)$				
(b)	Volume of the cylinder = $\pi \times 7^2 \times 30 = 4618.1412 \ cm^3$						256					
	ſ	Total number of cups possible = $4618.1412 \div 106.0099 = 43.56 cups \approx 43 cups$										
(c)	I	Assuming Mr Aziz orders 2 batches of tea for 11 am to 5 pm (6 hours),										
	1	Total number of filled cups = $43.56 \times 2 = 87$ cups, meaning most guest may drink about 3 cups										
	e	ach.			P	100		5.0	r-,	B		
	Cost of 2 batches:											

The Tea Bros: $(\$57 + \$57 + \$2 \times 6 + \$12) \times 0.9 = \$124.20$ Tarik King: $\$46 + \$46 + \$3 \times 6 + \$10 = \$120$

Miss Teh Tarik: $$52 + $52 + $2 \times 6 = 116

	A sensible budget is \$130 as this will cover the cost of tea from all companies.
	Assumptions:
	• Mr Aziz orders 2 batches of Teh Tarik
	• Each guest will come in and drink three cups (i.e. Take a refill).
	• No spillage of tea
	• Tea is filled to the brim of the dispenser.
	• Each guest dispense tea into their cups to the brim.
10	
	Median (50^{m} Percentile) = 8.7 mins
(a)(1)	
(a)(11)	Lower quartile = 7.6 mins
	Upper quartile = 9.6 mins Intergraphic range = $0.6 = 7.6 = 2$ mins
	Interquartine range = $9.0 - 7.0 = 2$ mins
(a)(iii)	60^{th} Percentile = 9.0 mins
(b)(i)	P(first person chosen is a boy who passed and the second person is a girl who passed)
	$=\frac{30}{30} \times \frac{24}{30} = \frac{9}{30}$
	80 79 79
(b)(ii)	P(both people chosen are girls) = $\frac{34}{20} \times \frac{33}{70} = \frac{561}{2160}$
	80 /9 3100
(b)	P(at least one of the person chosen is a boy who failed)
(iii)	= $P(1^{st} boy failed, 2^{nd} others OR 1^{st} others, 2^{nd} boy failed OR 1^{st} boy failed, 2^{nd} boy failed)$
, í	16 64 64 16 16 15 143
	$ =\frac{1}{80}\times\frac{1}{79}+\frac{1}{80}\times\frac{1}{79}+\frac{1}{80}\times\frac{1}{79}=\frac{1}{395}$
14(a)(i)	$\angle AOD = 55^{\circ} \times 2 = 110^{\circ} (\angle \text{ at centre} = 2 \angle \text{ at circumference})$
(a)(ii)	$\angle AED = \frac{360^\circ - 110^\circ}{10} = 125^\circ (\angle \text{ at centre} = 2 \angle \text{ at circumference})$
	2
(a)(iii)	$\angle OBA = 55^{\circ}$ (\angle in same segment)
(u)(iii)	$20000 - 55^{\circ} - 21^{\circ} - 21^{\circ}$
	20AC = 55 = 24 = 51
(a)(iv)	$\angle BAT = 90^\circ - 55^\circ = 35^\circ$ (Tangent radius)
(4)(1))	$2Dm = 70$ $35 = 55$ (Tangent \pm Taulus)
(b)(i)	$180 - (360 - 83 - 161) - 64^{\circ} \rightarrow \text{Bearing of } O \text{ from } P = 0.64^{\circ}$
	100 (300 03 - 101) - 04) Dearing of Q from $r = 004$
(b)(ii)	$PR^2 = 500^2 + 300^2 - 2(500)(300)\cos 161^\circ$
	$PR^2 = 62365557$
	$PR = \sqrt[2]{623655.57} - 789.719 - 790 \ bm (3 \ sf)$
L	$11.1 - \sqrt{023033.37 - 707.17 - 770 \text{km} (3.3.1)}$