QN	SOLUTION	MK.	SREMARKS
1. The second of	$ \left(\log x \right)^{2} + \log x^{2} + 1 = 0 $ $ \left(\log x \right)^{2} + 2 \log x + 1 = 0 $ $ \left(\log x \right)^{2} + 2 \log x + 1 = 0 $		for log 22 = 2/09 22
QN	$y^{2} + 2y + 1 = 0$; $y = \log x$		Connect molling
	$(y+1)^2 = 0$ or equivalent		Correct method
	y+1=0 $y=-1$	1	$\int_{\mathbb{R}^{n}} y = -1$
	$\Rightarrow \log^{\chi} = -1$	MI	
	$\mathcal{X} = 2^{-1} = \frac{1}{2}$	AI	Land Control of the C
		0.5	10 miles
2.	1) $P(AUB) = P(A) + P(B) - P(A) \times P(B)$	BI	
	1) $P(AUB) = P(A) + P(B) - P(A) \times P(B)$ = $\frac{1}{5} + \frac{1}{2} - \frac{1}{5} \times \frac{1}{2}$	MI	Correct Subshhihin
	= 3/5 P(AMB)=PM	AI	Accept 0.6
	P(AUB) = P(A) + P(B) $= + + + + + + + + + + + + + + + + + + +$	Pay !	Cant Gahchtution
2.		A Sc	anned by CamScanner

/ . .

$\begin{array}{cccccccccccccccccccccccccccccccccccc$				Page 2
3. $y = (x-1)(x^2-2)$ $y = x^3-x^2-2x+2$ $y = 3x^2-2x-2$ $y = 3(x^2)-2(x)-2$ $y = 3($	5N	SOLUTION	MKS	REMARKS
$\frac{dy}{dx}(x=2) = 3(2^{2})-2(2)-2$ $= 12-4-2$ $= 6$ $\frac{1}{4} = \frac{1}{4} = $	3.	$y = x^3 - x^2 - 2x + 2$	BI	expansion
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		$\frac{dy}{dx}(x=2) = 3(2^2) - 2(2) - 2$	MI	Substitution
4. $Cos \theta = Sin \theta$ $\frac{Cos \theta}{Start} = \frac{Sin \theta}{Cos \theta}$ $I = tan \theta$ $\theta = tan^{-1}I$ $\theta = 45^{\circ}, 225^{\circ}$ MI Simplification MI Simplification MI At for each augle Cornect 05 S. \times Y Rx Ry θ θ 81 $22 70 29 83 - 6436$ $25 72 38 92 - 6436$ $28 60 47 74 - 339$ $31 35 56 38 2 - 24$ $33 57 65 65 0 0 0$ $36 30 74 1.595 5.5.530.25$		= 6	AI	CAO
$\frac{\cos \theta}{\sec \theta} = \frac{\cos \theta}{\cos \theta}$ $ = \tan \theta$ $\theta = + \sin^{-1} $ $\theta = + 45^{\circ}, 225^{\circ}$ $\frac{\cos \theta}{\sin \theta}$ $\frac{\cos \theta}{\sin \theta} = \frac{\cos \theta}{\cos \theta}$ $\frac{\sin \theta}{\sin \theta} = \frac{\sin \theta}{\sin \theta}$ $\frac{\sin \theta}{\sin \theta} = \frac{\sin \theta}{\sin \theta}$ $\frac{\sin \theta}{\sin \theta} = \frac{\sin \theta}{\sin \theta}$ $\frac{\sin \theta}{\sin \theta} = \frac{\cos \theta}{\sin \theta}$ $\frac{\sin \theta}{\sin \theta} = \frac{\sin \theta}{\sin \theta}$ $\frac{\sin \theta}{\sin \theta} = \frac{\cos \theta}{\sin \theta}$ $\frac{\cos \theta}{\sin \theta} = \frac{\cos \theta}{\sin \theta}$ $\frac{\sin \theta}{\sin \theta} = \cos \theta$			0.5	· ·
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	4.			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			MI	
## A for lack augle Cornect S X Y RX RY A A B			MI	Simplification
5. X Y RX RY d B B for both Rx and Ry 15 75 1 10 101 -9 9 81 22 70 2 9 8 3 -6 6 36 25 72 3 8 9 2 -6 6 36 28 60 4 7 7 4 -3 3 9 31 35 5 6 3 8 2 -2 4 33 57 6 5 65 0 0 0 36 30 7 4 1.595 5.5-5 30.25		0 = tan-1	M	Simplification
5. X Y RX RY d A? S	4.	A = 45°, 225°	MA	A for each augle Correct
15 75 1 10 10 1 - 9 9 81 Columns Correct 22 70 2 9 8 3 -6 6 36 B for d ² Column 25 72 3 8 9 2 -6 6 36 28 60 4 7 7 4 -3 3 9 31 35 5 6 3 8 2 - 2 4 33 57 6 5 65 0 0 0 0 36 30 7 4 1.595 5.5-5 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25 30.25			05	
25 72 3 8 9 2 -6 6 36 28 60 4 7 7 4 -3 3 9 31 35 5 6 3 8 2 -2 4 33 57 6 5 65 0 0 0 36 30 7 4 1.595 5.5-5 30.25	5. 8	15 75 1 10 10 1 -9 9 81	BI	Columns Correct
31 35 5 6 3 8 2 - 2 4 33 57 6 5 6 5 0 0 0 36 30 7 4 1.595 5.5-5 30.25		25 72 3 8 9 2 -6 6 36	B_1	for d2 Column
36 30 7 4 1.595 5.5-5 30.25		31 35 56 38 2-24		
	5.	36 30 7 4 1.595 5.5-5 30.25		

		· · · · · · · · · · · · · · · · · · ·	page 3
Qi	SOLUTION	MKI	REMARUS
	$r_s = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$		
	$\sqrt{s} = 1 - \frac{6 \times 302.5}{10(10^2 - 1)}$	MI	31c2-
	$V_s = - .8333$	A	- Attack Control
	These Indicate a high nega relationship blu the rands.	twe B1	
\$N		05	
6	M = n(n-1) - 2(3-n)	MI	— वर्षेष्ठ हु -
	$ M = n^2 + n - 6$	AI	
سعدين و يواند	$\Rightarrow 0 = n^2 + n - 6$	MI	Equating [M] to 0.
	0 = (n-2)(n+3)	MI	for any mellocal
	$\Rightarrow n=2 \text{ or } n=-3$	AI	for Values Correct
		0.5	
7.	i) $0.1 + 0.2 + a + 0.2 + a = 1$	MI	
	2a + 0.5 = 1		$\mathcal{J}_{m,n}$
	2a = 0.5 $a = 0.25$	AI	

	Bis Comment of the Co		Page 4:
QN	10117070		REMARKS:
7(11)	$Mean(\bar{X}) = 0x0.1 + 1x0.2 + 2x0.25 + 3x0.2$	1+4x03 M	HE
•	= 0+0.2+0.5+0.6+1	MI	
	= 1+1.3		~4
Qw	= 2.3	AI	
7		05	* N ₁ - N ₂ - N ₃ -
80	$U = 0 m s^{-1}, a = 12 m s^{-2}, t = 24 s$		Alex
	V = u + at	BI	
	$V = 0 + 12 \times 24$	MI	E Type
	$V = 288 m s^{-1}$	AI	
8(1)	$S = ut + \frac{1}{2}at^2$		
	$S = 0x24 + \frac{1}{2}x12x24^2$	MI	
	S = 3516m	AI	
		D5	
:			
The state of the s			

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91	7.		1	4710			1	1KS	REMI	ARKS	
9	70-75	- 8 - 4	72.S	580		+2,050				Column	
	75 - 80 80 - 85	20	77.5 82.5	1550 2145	6 006-25	120,421				Cohumn .	
	-85-90	30	87.5	2625	1 1	176,962. 229,687.	1.	A1/	for Z	$f\chi = 8415$	
NN	90-95	9	92.5	832.5	1 1	77,006.2				Chumn	
	95-100	7	97.5		1 1	, 543.75 66, 543.75	1	11/	for fx	2 Column	
		100			()	712,375	j	. 1'		$x^2 = 7/2,375$	
	Mean	(\bar{x})	=	8415 100		114	M		Cowect	buks phoping	
		:	= 84	1.15			A		CAO	1 1 1 + 0	
11)	Standar	1 dei	ratur	574						沙	
	N N	Ξ	1-7	12375 - 100	84.152	7	M	G	sweet.	Subst Julin	
		=	V7121	3. 3-708	31,2225		MI	Si	mplif	Substitution calum	
		_	V42.	5275					, ,	The state of the s	
	ari Li	=	6.52	13			A	C	40		
										he floor	
To the same of the										e e e e e e e e e e e e e e e e e e e	
										** * .	
1											

, way	The second secon		0
-			Pageb
Qu	SOLUTION	MK	S REMARKS
b)	Both axes correctly labelled	B	. See "
	Six borrs Correctly drawn	BI	.HPL
	Process of determining the mode on agry	"4 B1	
Secretaria	Mode = 85.8 ± 0.2	$ \beta $	Aront
(M)	٧.	15	03.6 - 20.0
10	a)(i) $f(x) = 2x^{3} + 3x^{2} + ax + b$		K. 271.2
3	x=1, f(-1)=-2+5-a+b=0		
	$\Rightarrow b-a=-3 - 1)$	MI	Correct equation
	$x=2$, $f(2) = 2(2^3)+5(2)^2+2a+b=36$		
		MI	Covect equation
See Anderson	$\Rightarrow 2a+b=0 (1)$	Mi	
The Control of the Co	1) $-(11)$; $-3a = -3$		Correct mellion used
ere en la	a = 1	All	
	From (1), $b = -3+1 = -2$	A-1	
	ii) $f(x) = 2x^3 \cdot (x^2 + x - 2)$		()
	11) $f(x) = 2x^{3} + 5x^{2} + x - 2$ $2x^{2} + 3x - 2$		L. P. C.
100	$x+1$ $2x^3+5x^2+x-2$ $2x^3+2x^2$	MI	Correct used of
	3x ² +x-2 3x ² +3K	١٨٠٨ .	Correct used of long division.
	-2x-2 $-2x-2$	P9	1.5 kg
	0 0		

			Page 7
QN	SOLUTION	MKS	REMARKS.
	$\Rightarrow f(x) = (x+1)(2x^2+3x-2)$	MI	
	= (x+1)(x+2)(2x-1)	AI	n N
	7		
00)	$\chi^2 - 3\chi + 5 = 0$		
	$\alpha+\beta=3$, $\alpha\beta=5$	BI	for both convect
	$aim of the = \alpha^3 - \alpha^2 + \beta^3 - \beta^2$ $rooti$		
	$= \left(\alpha^{3} + \beta^{3}\right) - \left(\alpha^{2} + \beta^{2}\right)$		
	$= (\alpha + \beta)^{3} - 3\alpha p(\alpha + \beta) - (\alpha + \beta)^{2} + 2\alpha p$		
	$= 3^{3} - 3(5)(3) - (3)^{2} + 2(5)$	MI	:
	= 27 - 45 - 9 + 10		
	= -17	A1	
Pro	duct of the rook		
	$= \left(\alpha^{3} \alpha^{2}\right) \left(\beta^{3} \beta^{2}\right)$		
	$= (\alpha \beta)^3 - \alpha^3 \beta^2 - \alpha^2 \beta^3 + (\alpha \beta)^2$		
	$= (\alpha \beta)^{3} - \alpha \beta^{2} (\alpha + \beta) + (\alpha \beta)^{2}$		u n e
	$= (\alpha \beta)^2 (\alpha \beta - (\alpha + \beta) + 1)$		

^	•
Page	8

							•		rage	۵
Q/	J	2	OLUTI	ON			MK	SREM	ARU	-5
			52(5-	3+	<i>i)</i>		MI			
		=	25 X 3							ا الواجع: الواجع: المثل الأواجع:
		=	7 <i>5</i>				A			
(j)	→	x2-(-17)x +	75	=0:		MI			er viege.
7.4		2 +17	1X +75	= c)		AI			37187
							15			
11.	2018 (Po)	2020 (Pn)	$\frac{\rho_n}{\rho_o}\chi_{100}(\rho)$	4	EPW		BI	for EP.		
	2200	2800	127.273 4	,	509.092		<i>r</i>	for ZPn		
	1200	2000	166.867 9	5	833.335	1	31	for 127.27.	3	1 W
	4000	3600	90 B 2	}	180.000			for 166.66°	7	appear of the
	3600	4000	111.111 9 6	,	666.666	j	. [fr 90		
ngang panan bigin ga Parini	1000	1500	150 By 7		1050	- 1	1	for 111.111		
11			EP = 12900		ZPW=3239.0		1	for PM a	Humn	
-	ii) Sır	iple a	ggregale	p	nce undex		An 1	for ZPW =	= 3239.0	13
ing say.	<u>.</u>	= 13	700 X10	0	nce mdex	/	41/	for Convect	Subsh	mmi
		12	000							2.04.00
	* ************************************	: 115.	833			F	1	CAO		Angelein Speed
		• ,		_	· 1. do 0			•		
	ni) Sv	nple	average	P	no Index					£
	: =	= =	P						_	· ·
	<u>=</u>	64	5.051			M	11/5	w Cowect	- Fubsh	mh
de en en en de destatement espes			5 0102 <u>4</u>	- 12	9.01	A	1 0	AO.		u A
II.						ł	1	11	a	

		Page 9
an SOLUTION	MKS	REMARKS
11. (IV) Weighted average price index = ZPW		
$=\frac{270}{50}$		anc.
= 3239.093	MI	Cowect Subshhrhim
	A1	Coo
	15	•
$\frac{12}{dx} = 2(2-x)$ $\frac{dy}{dx} = 2(2-x) dx$ $\int dy = 2(2-x) dx$ $\int dy = 2(2-x) dx$	MI	$dy = 4 - 2x \cdot dx$ $\int dy = \int 4 - 2x \cdot dx$ $y = 4x \cdot x^{2} + C$
$y = 2(2x - \frac{1}{2}x^{2}) + c$ $AH(1,8) 8 = 2((2x_{1}) - \frac{1}{2}x_{1}^{2}) + c$ $8 = 4 - 1 + c$	MI	$8 = 4x2 - 2^{2} + C$ 8 = 8 - 4 + C $C = S^{-}$
$\Rightarrow C = 5$ $\Rightarrow y = 4x - x^2 + 5$	AT AI	$\Leftrightarrow Y = 4x - x^2 + 5^2$
(11) when $x=0$, $y=5$, $(0,5)$	BI	
when $y = 0$, $x^2 + 4x - 5 = 0$ (x-5)(x+1) = 0 x=5 or x=-1 (510) (510) .	Sc	anned by CamScanner
		Commoduline

-			Page 10
Q	N SOLUTION	MKS	REMARKS:
	: (5,0); (-,0)	1	bfor each point correct.
	(III) At afarming point, dy =0		
(i).	= 2(2-x) = 0 4-2x = 0 $x = 2$ $x = 2$	MI	Equating to zero
<u>Q</u> ,	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	A	for both values
	$\frac{d^2y}{dx^2} = -2 \text{ (max)}$	商	
	: (2,9) maximum point	AI	Correct hiring
	$ \begin{array}{c c} & & & & \\ & & & & \\ & & & & \\ & & & &$		By for blothing indicating the horning point at intercepts
	Area = $\int_{(5+4x-x^2)}^{5} dx$ = $\int_{(5+2x^2-\frac{1}{3}x^3)}^{5}$	MI	Correct julganhi
	$= (25+50-\frac{125}{3}) - (-5+2+\frac{1}{3})$ $= 75 - \frac{125}{3} + 3 + \frac{1}{3}$	MI	Correct Subshlutin
	= 36 sq. units	AI	CAO mah.
		15	

				page 11
6	Piu	SOL11710N	MKS	REM ARKS
13	3 9)	X~ N(120; 16)		
	in the second se	$P(X \angle 125) = P(Z \angle 125 - 120)$	MI	Correct Conversion
	A Commence of Figure 1	$= p(z \angle 1.25)$		
<u> 10</u> 13		= 0.5 + P(0 < z < 1.25)	MI	Simplification
		= 0.5 + 0.3944		E. (4)
		= 0.8944 (tab)	AT	CAO
	lii)	P(X7128) = P(Z > 128-120)	Mil	
		$= \rho(z \ge 2)^4$		283 1
		=0.5-P(0<2<2)		
1		=0.5-0.4772	MI	
		= 0.0228 (7ab)	A1	
		$P(118 \angle X \angle 127) = P(118-120 \angle Z \angle 127-120)$	МП	•
a. 		$= \rho\left(-0.5\angle z\angle 1.75\right)$		
1		$= \rho(0<2<0.5) + \rho(0<2<1.75) \wedge$	11	
		= 0.1915 + 0.4599 $= 0.6514 (7a6)$	H	
	**		1	

		Page 12
an SOLUTION	MKI	
$\begin{array}{ll} 13b)(1) & \int_{-\infty}^{\infty} f(n) dn = 1 \end{array}$		
$\frac{k}{3}\int_{-\infty}^{3} x dx = 1$	MI	
$\frac{K}{3}\left[\frac{1}{2}x^2\right]^3 = 1$	M	Correct inlegation
$\frac{9K - K}{6} = 1$		# 1.474 h
$8K = 6$ $K = \frac{3}{4}$	A	Accept K=0.75
$(ii) E(x) = \frac{1}{4} \int_{-\infty}^{3} x \cdot x dx$	MI	Think of
$= \frac{1}{4} \int_{1}^{3} x^{2} dx$		
$= \frac{1}{4} \left[\frac{1}{3} x^{3} \right]_{1}^{3}$ $= \frac{1}{4} \left(\frac{1}{3} \cdot \frac{27}{3} - \frac{1}{3} \right)$	M	Alacs of
$=\frac{1}{4} \times \frac{26}{3}$ $=\frac{13}{6}$	A	
	15	
	12	

 $a = \frac{5}{2} \times 98 = 3.92 \,\text{ms}^{3} \,\text{A}_{1}$

	t.	page 14
JN SOLUTION	MILS	
From (ii), $T - 9.8 = 2(3.92)$		
=> T = 17.64 M	AI	
1) The System Snaps when it = 35.		ر معمد منظوم المساور ا معمد المساور ا
V=ut+at		
$V_1 = 0 + 3.92 \times 3 = 11.76 \text{m/s}^{-1}$	MI	
$S_1 = ut_1 + t_2 at_1^2$		e egypteter to
$S_1 = \frac{1}{2} \times 3.92 \times 3^2$		Sec. 24
S, = 17.84 m	M	
$\Rightarrow V^2 = U^2 - 2aS_2$		
$0 = 11.76^2 - 2x3.92 \int_2^{\infty}$		s de se de serve
$=) S_2 = 17.64 M$	MI	
Total distance Covered = 17.64X2	H	
= 35·28m	M	
c) Force exerted on the pulley		
FA		. SF &

			Page 15
<u>Qi</u>	SOLUTION	MKI	REM BRKS
c)	$F = \sqrt{T^2 + T^2}$		3.30%
	$F = \sqrt{27^2}$		
	$F = \sqrt{2 \times 17.64^2}$	MI	.e.,
Qi	F = 24.9467N	A	A Processing
	Direction: Oztan (1)		
	D=45°	A	
	The force exterted on the pulley is of magnifude 24.9467N aching at 45° to the horizontal	BI	e de la companya de l
		15	
	END		
The second secon			
			Service and the service of the servi
			•