Seminas	Solution	Marks	Remarks
$\frac{(a^{-1}b)^3}{a^2} = \frac{a^{-3}b^3}{a^2}$	*	134	c / \n n n
$\frac{(a^{-1}b)^3}{b^2} = \frac{a^{-3}b^3}{b^2}$		1M	for $(xy)^n = x^n y^n$
			and can be absorbed
$= a^{-3}b$ $= \frac{b}{a^3}$		1M	for $\frac{x^m}{x^n} = x^{m-n}$ or $x^{-n} = \frac{1}{x^n}$
h			and can be absorbed
$=\frac{b}{3}$		1A	
а		(3)	
			Selfer to the linguis.
			100 100 100
2			
$y = \frac{2}{a - x}$			9.77.9
y(a-x)=2		AND SHALLOW	Time, the bearing of 'P free
ay - xy = 2		1M	for expanding
		1M	for putting $x$ on one side
-xy = 2 - ay		TIVI	
$x = \frac{ay - 2}{y}$		1A	accept $x = a - \frac{2}{y}$ or $x = \frac{2 - ay}{-y}$
y			у - у
2			
$y = \frac{2}{a - x}$ $y(a - x) = 2$			
y(a-x)=2			Mary To the Figure
$a-x=\frac{2}{}$			=08
V		1M	for making $a-x$ the subject
2			
$-x = \frac{2}{y} - a$		1M	for putting $x$ on one side
2			m-2 2 2
$x = a - \frac{2}{y}$		1A	accept $x = \frac{ay - 2}{y}$ or $x = \frac{2 - a}{-y}$
		(3)	,
			Managara de la constitución de l
			(0.44)(2.44)
The amount			ers from the
$=$ \$ 5000 $(1+2\%)^3$		1A	u-1 for missing unit r.t. \$5306
The required interest			
$=5000(1+2\%)^3-5000$		1M	for $5000 (1+r\%)^n - 5000 (n \ge 2)$
= 306.04		and of the set of the	A require to retirement to a
≈\$306		1A	u-1 for missing unit
		(3)	Nov. 2x + 3(20 - o) w 46
			Sold on July 108
Since $(a, 0)$ lies on $y = -x$	$^{2} + 10x - 25$ , we have	and the selected	assume he redeement multi-
$-a^2 + 10a - 25 = 0$		1M	for putting $y = 0$
$-(a-5)^2=0$		- manu sar bar ezgusia ia	CONTROL OF THE X IS A
a = 5		1A	min ew many construction
a = 5 $b = -25$		1A	
(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)		(3)	The street of
			THE WALL STORY
			The state of the s
004 GR MATU 1 2	125		
2004-CE-MATH 1-3	G#		Aug Stille

Solution	Marks	Remarks
В		Tail to
North 130 m		
60 m		
$\downarrow$		
East		
Refer to the figure,		
$\sin\theta = \frac{60}{130}$	1M	pp-1 for any undefined symbo
$\theta \approx 27.48642625^{\circ}$		
<i>θ</i> ≈ 27.5°	1A	u-1 for missing unit r.t. 27.5°
Thus, the bearing of $B$ from $A$ is N62.5°E.	1M	accept 063, 062.5° or N62°31'1
B		
North		
130 m		
θ / 00 111		
East		* * * * * * * * * * * * * * * * * * * *
A		
Refer to the figure,		
$\cos\theta = \frac{60}{130}$	1M	pp-1 for any undefined symb
$\theta \approx 62.51357375^{\circ}$ $\theta \approx 62.5^{\circ}$	1A	u-1 for missing unit r.t. 27.5
Thus, the bearing of $B$ from $A$ is N62.5°E.	1M	accept 063, 062.5° or N62°31
Z-10	(3)	
A S Lab Area S Maller Maller		
(a) $a^2 - ab + 2a - 2b$		
= a(a-b) + 2(a-b) = $a(a+2) - b(a+2)$	1M	for taking out a common factor or using cross-meth
=(a+2)(a-b)	1A	
(b) $169y^2 - 25$		None and I
$=(13y)^2-5^2$		- 168 in 6022-
=(13y+5)(13y-5)	1M+1A	
	(4)	Material Regulators and Co.
		10021 THE THEOLE
Let the number of oranges bought be $x$ .	100	pp-1 for any undefined symbo
Then, the number of apples bought will be $20-x$ .	1A	
Now, $2x + 3(20 - x) = 46$	1M+1A	1M for $2x + 3(20 - x)$
Solving, we have $x = 14$ .	1A	
Thus, the number of oranges bought is 14.	- 3-2017	-Committee (0.4) starts
Let x and y be the number of oranges and the number of apples bought		pp-1 for any undefined symbo
respectively. Then, we have		
$\int x + y = 20$	1A+1A	
2x + 3y = 46	171.171	
Then, we have $2x + 3(20 - x) = 46$ .	1M	for leaving $x$ or $y$ only
Solving, we have $x = 14$ .	1A	
Paragraph of the second of the		
Thus, the number of oranges bought is 14.	(4)	

	Solution	Marks	Remarks
(a)	The required probability $= \frac{5}{9}$	1A	r.t. 0.556
(b)	The required probability	(a	fedient
	$=1-(\frac{5}{9})^2$	IM+IM+IA	1M for $1-p$ where $0 M for p = (a)^2$
	$=\frac{56}{81}$	(5) 1A	r.t. 0.691
	The required probability $= (1 - \frac{5}{9})(\frac{5}{9}) + (\frac{5}{9})(1 - \frac{5}{9}) + (1 - \frac{5}{9})(1 - \frac{5}{9})$	IM+IM+IA	***.(kk.liste (1) gradiest
	$= (\frac{4}{9})(\frac{5}{9}) + (\frac{5}{9})(\frac{4}{9}) + (\frac{4}{9})(\frac{4}{9})$		Marian .
	$=\frac{56}{81}$	1A	r.t. 0.691
	The required probability	- I I I I I I I I I I I I I I I I I I I	water profession
	$= (1 - \frac{5}{9})(1) + (1 - \frac{5}{9})(\frac{5}{9})$ 4 .4 .5	1M+1M+1A	1 = 13 - 23 - 32 3 > (3 - 1)(7 + 12)
	$= \frac{4}{9} + (\frac{4}{9})(\frac{5}{9})$		3535
	$=\frac{56}{81}$	(5)	r.t. 0.691
(a)	Let $r$ cm be the radius of the sector. Then, we have	E tant i	pp-1 for any undefined symbol
	$(\pi r^2)(\frac{80}{360}) = 162\pi$	1M+1A	1M for $\frac{80}{360}$
	r = 27 Thus, the radius of the sector is 27 cm.	1A	u-1 for missing unit
	Let $r$ cm be the radius of the sector. Then, we have		pp-1 for any undefined symbo
	$\left(\frac{1}{2}r^2\right)\left(\frac{80\pi}{180}\right) = 162\pi$	1M+1A	1M for $\frac{80\pi}{180}$
	r = 27 Thus, the radius of the sector is 27 cm.	1A	u-1 for missing unit
(b)	The perimeter of the sector		80
	$= ((2)(27))(\pi)(\frac{80}{360}) + (2)(27)$ $= (12\pi + 54) \text{ cm}$	1M 1A	for $((2)(a))(\pi)(\frac{80}{360}) + (2)(a)$ u-1 for missing unit
	The perimeter of the sector		
	$= (27)(\frac{80\pi}{180}) + (2)(27)$	1M	for $(a)(\frac{80\pi}{180}) + (2)(a)$
	$=(12\pi+54) \mathrm{cm}$	1A	u-1 for missing unit
	The perimeter of the sector $= \frac{2(162\pi)}{27} + (2)(27)$	1M	for $\frac{2(162\pi)}{(a)} + (2)(a)$
	$= (12\pi + 54) \mathrm{cm}$	1A	u-1 for missing unit

. (a)		Solution		Marks	Remarks	
	Let $y = ax^2 + bx$ , when	ere $a$ and $b$ are non-zero constan	nts.	1A	pp-1 for writing $y \propto ax^2$	+bx
	When $x = 3$ , $y = 3$ , so	we have				
	9a + 3b = 3			100	objection removes off 7	
	3a+b=1	(1)		134	f	
	When $x = 4$ , $y = 12$ , so	o we have		1M	for substitution (either)	
	16a + 4b = 12	5 we have			36	
	4a+b=3	(2)				
	Solving (1) and (2), we			1M	for solving	
	$\int a = 2$	navo	۱			
	$\begin{cases} b = -5 \end{cases}$			1A	for both correct	
	$y = 2x^2 - 5x$					
	$y = 2x^2 - 5x$			(4)	Sandal State of the State of th	
				(4)	56	
(b)	When $y < 42$ , we have					
		(by (a))		1M	Haran balance (1)	
	Therefore, we have	, , , , ,				
	$2x^2 - 5x - 42 < 0$				St. Indian in	
	(2x+7)(x-6) < 0			1A	for factorization or finding	g root
	$\frac{-7}{2} < x < 6$			1M	L. d. d. R.	
				*4.5	18	
	Series and the control of the contro					
	Thus, all the possible va	0, 1, 2, 3, 4 or 5.	Welley 1987	1A (4)	andersal of marking to	
	x = -3, $-2$ , $-1$ , Thus, all the possible va	0, 1, 2, 3, 4 or 5. lues of x are	Taca, valuv			
	x = -3, $-2$ , $-1$ , Thus, all the possible va	0, 1, 2, 3, 4 or 5. lues of x are	ovodaw post i		miles out of many out of a principle of the color of the	
	x = -3, $-2$ , $-1$ , Thus, all the possible va	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.			miles out of an artist of the sector	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.	walaw seet i		anternation or could be added to the second of the second	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.			and a fill	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.			and a fill	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.		(4)	nisel a 2 mil x a fr 0 mil x a free free free free free free free fr	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.		(4)	MSAL A CARD A TEXT	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.		(4)	nisel a 2 mil x a fr 0 mil x a free free free free free free free fr	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.		(4)	The process of the second seco	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.		(4)	min a manual part of the manual	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.		(4)	The process of the second seco	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.		(4)	minimal and a service of the service	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.		(4)	media and and and and and and and and and an	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.		(4)	minimal and a service of the service	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.		(4)	The property of the country of the c	
	x = -3, $-2$ , $-1$ , Thus, all the possible va -3, $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.		(4)	media and and and and and and and and and an	
	x = -3, $-2$ , $-1$ , Thus, all the possible va $-3$ , $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.		(4)	The process of the country of the co	
	x = -3, $-2$ , $-1$ , Thus, all the possible va $-3$ , $-2$ , $-1$ , $0$ ,	0, 1, 2, 3, 4 or 5. lues of x are 1, 2, 3, 4 and 5.		(4)	The process of the country of the co	

	Elmins/I	Solution	Mari	ks Remarks
(a)	The standard score of Pa	per I		35 ± CO 11 6) 6
	_ 54-46.1		1A	ACED = 4020 X
	= 15.2		IA CALL	
	79		No. 200 - 100 - 100	100 - 2000 - 2000 - 600
	= 152			
	≈ 0.519736842		The state of the s	either one
	≈ 0.520		1A	r.t. 0.52
				100 m 300 m
	The standard score of Pa	per II		
	$=\frac{66-60.3}{100}$			, 73.4 to 11 = (0) (0
	= 11.6		( V 20 7 TG)	
			714	Z= 38F=38F=Z
	$=\frac{57}{116}$		(laupa e s. seal)	" " " " " " " " " " " " " " " " " " "
	≈ 0.49137931			
	≈ 0.491		1A	r.t. 0.49
	~ 0.471		12	1.1. 0.49
	: the standard score of	of Paper II < the st	andard score of Paper I	- The same of the same
	John did not perfor	The second of th	Control of the Contro	181
				(4)
(b)	After the mark adjustmen	nt,	Mary	day's and Wilder and T
	the new mean $= 50$ .		1A	
	the new median $= 5$		1A	
	the new range $= 91$	marks.	1A	
				(3)
				A STATE OF THE REAL PROPERTY.
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				Total Control of the
			( BL=0E *)	TOTAL TOTAL STREET
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				The state of the s
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			3) - 3) Less	36 a 10 acr
			Company and the second	Total Control of the
				ion becaper still
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			( \$5,000 00) 199	Remote Of the
				April 1
				HOTELSTEEL AND THE
				The State of the S

			Solution	Marks	Remarks
2.	(a)	(i)	$CD = CE$ $CED = \angle CDE = 36^{\circ}$ So, we have $\angle AEF = \angle CED = 36^{\circ}$	1A	u-1 for missing unit
		(ii)	$\angle ACB = \angle CDE + \angle CED = 36^{\circ} + 36^{\circ} = 72^{\circ}$ $\therefore AB = AC$ $\therefore \angle ABC = \angle ACB = 72^{\circ}$ $\therefore \angle BAC = 180^{\circ} - 72^{\circ} - 72^{\circ}$ $\therefore \angle BAC = 36^{\circ}$	1M 1A	u–1 for missing unit
	(b)	(i)	In $\triangle AEF$ ,	(3)	The standard server of T
			$\angle BFE = 36^{\circ} + 36^{\circ} = 72^{\circ}$ (ext. $\angle$ of $\triangle$ ) $\therefore \angle AEF = 36^{\circ} = \angle EAF$		[△的外角]
			$\therefore AF = EF $ (base $\angle$ s equal)		[底角相等] [等角對邊相等] [等角對等邊] [等腰 Δ 底角(等)的逆頭
			AF = FB $EF = FB$		
			$\angle FEB + \angle FBE + 72^{\circ} = 180^{\circ}$ ( $\angle$ sum of $\Delta$ )		[Δ内角和]
			$\angle FEB = \angle FBE = \frac{180^{\circ} - 72^{\circ}}{2} = 54^{\circ}$ (base $\angle$ s, isos. $\triangle$ )	ei villad en	[等腰△底角]
			$\angle AEB = 54^{\circ} + 36^{\circ} = 90^{\circ}$		pp-1 for missing unit
			Thus, ∠AEB is a right angle.  Marking Scheme:		in a many on the many adjusted in
			Case 1 Any correct proof with correct reasons.  Case 2 Any correct proof without reasons.	3 2	- endlan wan tal' Document store out
			Case 3 Incomplete proof with any one correct step and correct reason.	1	
		(ii)	$\cos 36^{\circ} = \frac{10}{AB}$	1M	
			$AB = \frac{10}{\cos 36^{\circ}}$ $AB \approx 12.36067977$ The required area		
			$=\frac{1}{2}(AB)(AC)\sin 36^{\circ}$		
			$= \frac{1}{2} \left( \frac{10}{\cos 36^{\circ}} \right)^{2} \sin 36^{\circ} \qquad (:: AC = AB)$	1M	
			$\approx \frac{1}{2} (12.36067977)^2 \sin 36^\circ$ $\approx 44.9027966$		
			$\approx 44.9 \text{ cm}^2$	1A	u-1 for missing unit
			$\tan 36^\circ = \frac{BE}{10}$ and $\cos 36^\circ = \frac{10}{AB}$ $BE \approx 7.26542528$ and $AB \approx 12.36067977$ The required area	1M	either
			$=\frac{1}{2}(AC)(BE)$		
			$= \frac{1}{2} \left( \frac{10}{\cos 36^{\circ}} \right) (10 \tan 36^{\circ})  (\because AC = AB)$	1M	
			$\approx \frac{1}{2}(12.36067977)(7.26542528)$		
			≈ 44.90279764 ≈ 44.9 cm <sup>2</sup>	1A	u-1 for missing unit
			The state of the s	THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TO THE PERSON NA	The state of the s

		Solution	Marks	Remarks
3. (a)	(i)	Let the coordinates of $E$ be $(x, y)$ . Then, we have $\begin{cases} x = \frac{2+8}{2} = 5 \\ y = \frac{9+1}{2} = 5 \end{cases}$	of O be d, it) The	tentitypos par (0.1) c + str = 0.1 (3 + 3.7 + x.)
		So, the coordinates of $E$ are $(5, 5)$ .	1A	pp-1 for missing '(' or ')'
	(ii)	: ABCD is a rhombus.		C to diguest of F
	(11)	$\therefore BD \perp AC$		8)+1(8,-2)/-
		The slope of $AC = \frac{9-1}{2-8} = \frac{-4}{3}$		a-\-
		The slope of $BD = \frac{-1}{\frac{-4}{3}} = \frac{3}{4}$	1M	had Select
		The equation of $BD$ is		
		$y - 5 = \frac{3}{4}(x - 5)$	1M	for point-slope form
		3x - 4y + 5 = 0	1A (4)	or equivalent
(b)	(i)	The slope of $BC$ = the slope of $AD$		•
		$= \frac{-1}{7}$ The equation of <i>BC</i> is	1M	
		$y-1=\frac{-1}{7}(x-8)$		
		x + 7y - 15 = 0	1A	or equivalent
		$BC \parallel AD$ let the equation of $BC$ be $x + 7y + c = 0$ , where $c$ is a constant.	1M	
		Since $C(8, 1)$ lies on $x + 7y + c = 0$ , we have $8 + 7(1) + c = 0$ c = -15	1A	
		Thus, the equation of BC is $x + 7y - 15 = 0$ .	IA	
	(ii)	Let the coordinates of B be $(h, k)$ . Then, we have $\begin{cases} 3h - 4k + 5 = 0 \\ h + 7k - 15 = 0 \end{cases}$		
		Therefore, we have $h=1$ and $k=2$ . Thus, the coordinates of $B$ are $(1, 2)$ . The length of $AB$	1A	for both correct
		$=\sqrt{(2-1)^2+(9-2)^2}$	1M	for distance formula
		$=\sqrt{50}$	1A	r.t. 7.07
		$=5\sqrt{2}$ units		
2004-CI	E-MATI	H 1–9		and the last

ishmedi	Solution	Marks	Remarks
$\begin{cases} 3h - 4k + 5 = \\ h + 7k - 65 = \end{cases}$	0 $h = 9$ and $k = 8$ . es of $D$ are $(9, 8)$ .	1A	for both correct
$= \sqrt{(9-8)^2 + (8-1)^2}$		1M	for distance formula
$=\sqrt{(9-8)^{2}+(8-1)^{2}}$ $=\sqrt{50}$		1A	r.t. 7.07
$=5\sqrt{2}$ units		1-2	
	MT 1	(5)	GB To squarenT
			10 nothing a set y
			1 - 3 - 4
			Adapted L
			(b) (d) This shows of the La. In equip end at
			to notice reposition of
			Part I - I
			Short ex
			0.110
		Grangfile of Dictors	appearance of the same
		position of the state of the state of	(1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
		Contain the section and	2 - U)1 - 2
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		. n = 31 - q1 + x (1 50 fee	dupo ed pulls.
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			+ A1 - AC
			A MAR
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		- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	-0)+3(1-X)(-4
			08,-0
			MIN YOUR STATE

Soluti	n		Marks	Remarks
$(2r)^2 + h^2 = ((12)(2))^2$ $4r^2 + h^2 = 576$	$4r^2 + h^2 = 576$			pp-1 for any undefined symbol or equivalent
$r^2 = 144 - \frac{h^2}{4}$ $V = \pi r^2 h$			-000720	(c) = 0 + (c) (c) = (c)
$V = \pi (144 - \frac{h^2}{4})h$			1M	with $r^2$ substituted
$V = 144\pi h - \frac{\pi}{4}h^3$			1	
stary amazani ya 1-34			(3)	Manager (a)
(b) (i) $600\pi = 144\pi h - \frac{\pi}{4}h^3$			serence of A must R	ing ad teatroise (i)
$h^3 - 576h + 2400 = 0$				
Let $f(h) = h^3 - 576h + 240$				ST. PATEN
: $f(4) = 160 > 0$ and f : a value of h lies between			1	accept omitting the conclusion
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$m = \frac{a+b}{2}$	f(m)	ub at 10 . 15 to	Thur, the volume
(f(a) > 0) $(f(b) < 0$	4.5	- 101	1M	for testing sign of $f(m)$
4 4.5	4.25	+28.8	1M	for choosing the correct interval
4.25 4.5	4.375	- 36.3	as little for	Marin Appellad f
4.25 4.375 4.25 4.3125	4.3125	- 3.80	N-YU-VI	distributed to
		,		TOWN IN THE PARTY OF THE PARTY
$\therefore 4.25 < h < 4.3125$ Thus, $h \approx 4.3$ (correct to	decimal place)		1A	f.t.
			(4)	
(c) $286\pi = 144\pi h - \frac{\pi}{4}h^3$				4- (H) - 4
$h^3 - 576h + 1144 = 0$				for the last
Let $g(h) = h^3 - 576h + 1144$				Asset Section 1
$g(2) = (2)^3 - 576(2) + 1144$ $= 0$			1M	for attempting to find a root by substituti
$\therefore 2 \text{ is a root of } h^3 - 576h + 1$			(A) to play temp (	1145 (1. 2)(12. 11
Therefore, we have $(h-2)(h^2 +$	ENVERTMENT OF THE PROPERTY OF		1M+1A	1M for $(h-2)(ah^2 + bh + c) = 0$
So, we have $h = 2$ or $h = \sqrt{57}$ . Thus, the height of the cylinder is	Targetting on the Parketting Cons.	Committee of the Commit	. 1A	for both correct u-1 for missing unit
rius, the height of the cylinder is	2 cm or (4373	1) (111)	(4)	
			2 S	durant and
004-CE-MATH 1-11				national and

		Solution	Marks	Remarks
5. (a	) (i)	The perimeter of $F_{10}$ = 8 + (10 - 1)(4) = 44 cm	1A 1A	u-1 for missing unit
	(i	$\frac{n}{2}(2(8) + (n-1)(4)) \le 1000$	1A	for correct sum of AP
		$n^2 + 3n - 500 \le 0$ -23.91093483 \le n \le 20.91093483 Thus, the required number of distinct square frames is 20.	1M 1A (5)	
(b		t $V_1 \text{ cm}^3$ , $V_2 \text{ cm}^3$ and $V_3 \text{ cm}^3$ be the volumes of $S_1$ , $S_2$ and $S_3$ pectively.		pp-1 for any undefined symbo
	(i	Note that the perimeters of $F_2$ and $F_3$ are 12 cm and 16 cm respectively. So, we have		
		$\frac{V_1}{V_2} = \left(\frac{8}{12}\right)^3 = \left(\frac{2}{3}\right)^3  \text{and}  \frac{V_2}{V_3} = \left(\frac{12}{16}\right)^3 = \left(\frac{3}{4}\right)^3$	1A	for either one
		$\frac{V_1}{V_2} = \frac{8}{27}$ and $\frac{V_2}{V_3} = \frac{27}{64}$	A box 0	
		$\frac{V_1}{V_2} \neq \frac{V_2}{V_3}$ Thus, the volumes of $S_1$ , $S_2$ , $S_3$ do not form a geometric sequence.	1M	f.t.
	(i			
		The length of each diagonal of the base of $S_1 = \sqrt{2^2 + 2^2} = 2\sqrt{2}$ cm	1.1	//
		The height of $S_1 = \sqrt{5^2 - (\sqrt{2})^2} = \sqrt{23} \text{ cm}$	1M	5 cm /
		$V_1 = \frac{1}{3}(2)^2 \sqrt{23}$	1M	2 cm
		$V_1 = \frac{4}{3}\sqrt{23}$		
		$\frac{V_3}{V_1} = \left(\frac{16}{8}\right)^3 = 8$	1A	can be absorbed
		$V_3 = 8\left(\frac{4}{3}\sqrt{23}\right) = \frac{32}{3}\sqrt{23}$	1A	Diffe - Nadia - sal
		Thus, the volumes of $S_3$ is $\frac{32}{3}\sqrt{23}$ cm <sup>3</sup> .		u-1 for missing unit
		The length of each slant edge of $S_3 = 5\left(\frac{16}{8}\right) = 10 \text{ cm}$	1A	can be absorbed
		The length of each side of the base of $S_3 = \frac{16}{4} = 4 \text{ cm}$	ere, ere	of 5 of someway.
		The length of each diagonal of the base of $S_3 = \sqrt{4^2 + 4^2} = 4\sqrt{2}$ cm		
		The height of $S_3 = \sqrt{10^2 - (2\sqrt{2})^2} = 2\sqrt{23}$ cm	1M	
		$V_3 = \frac{1}{3}(16)(2\sqrt{23}) = \frac{32}{3}\sqrt{23}$	1M+1A	
		Thus, the volumes of $S_3$ is $\frac{32}{3}\sqrt{23}$ cm <sup>3</sup> .	(6)	u-1 for missing unit

	Solution		Marks	Remarks
	g Scheme for (a) and (b):			The survey on the said of
Case 1	Any correct proof with correct		3 2	1.00
Case 2 Case 3	Any correct proof without rea	e correct step and one correct reason.	1 1	THE DIS OC - "THE
				20 01 = 150 · · · · · · · · · · · · · · · · · · ·
	$\triangle ADE$ and $\triangle BOE$ ,	(alt /a OD//PC)		[錯角, <i>OD</i> // <i>BC</i> ]
	$ADE = \angle DBC$	(alt. $\angle$ s, $OD//BC$ )		[交錯弓形的圓周角][弦切角定理
	$= \angle BOE$	(∠ in alt. segment)		
	$CDAE = \angle OBE$	( ext. ∠, cyclic quad. )		[圓內接四邊形外角]
	AD = BO	(given)		[已知]
Δ	$\triangle ADE \cong \triangle BOE$	(ASA)	(2)	= 100 cal
			(3)	
(b)	AE = BE	(by (a))		- 7h
7 - 7	$\angle AOE = \angle BOE$	( equal chords, equal ∠s )		[等弦對等角]
	$\angle BEO = \angle AED$	(by (a))		
	= ∠AOB	( ext. ∠, cyclic quad. )		[圓內接四邊形外角]
	$= \angle AOE + \angle BOE$			
	= 2∠BOE		5/71 / 19	201, L
	DE = OE	( by (a) )		
	$\angle ADE = \angle AOE$	(base $\angle$ s, isos. $\triangle$ )		[等腰△底角]
	$\angle ADE = \angle BOE$	(by (a))		
Hend	ce, $\angle AOE = \angle BOE$	( 23 (2) )		
	s, $\angle BEO = \angle AOE + \angle ADE$	$(\text{ext.} \angle \text{ of } \triangle)$		[△的外角]
	$=2\angle BOE$	(		
(c) (i)	$OE$ is a diameter of the cir $\angle OBE = 90^{\circ}$ By (b), $\angle BEO = 2\angle BOE$ $\angle BOE + \angle BEO + \angle OBE = 18$	0°	1A	
	∴ OE is a diameter of the cir. ∴ ∠OBE = 90°  By (b), ∠BEO = 2∠BOE ∠BOE + ∠BEO + ∠OBE = 18 ∠BOE + 2∠BOE + 90° = 180°  Thus, ∠BOE = 30°  Note that $E = (6, 6 \tan 30^\circ) = (6+0)$ $E = (6+0)$	$(6, 2\sqrt{3})$ . Then, e of the circle <i>OAEB</i>	1A 1A 1A	either one
	∴ OE is a diameter of the cir. ∴ ∠OBE = 90°  By (b), ∠BEO = 2∠BOE ∠BOE + ∠BEO + ∠OBE = 18 ∠BOE + 2∠BOE + 90° = 180°  Thus, ∠BOE = 30°  Note that $E = (6, 6 \tan 30^\circ) = 6$ the coordinates of the centre $= (\frac{6+0}{2}, \frac{2\sqrt{3}+0}{2}) = (3, \sqrt{3})$ Also, the radius of the circle of	$0^{\circ}$ $(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$	1A	
	∴ $OE$ is a diameter of the cir. ∴ $\angle OBE = 90^{\circ}$ By (b), $\angle BEO = 2\angle BOE$ $\angle BOE + \angle BEO + \angle OBE = 18$ $\angle BOE + 2\angle BOE + 90^{\circ} = 180^{\circ}$ Thus, $\angle BOE = 30^{\circ}$ Note that $E = (6, 6 \tan 30^{\circ}) = 10$ the coordinates of the centre $E(\frac{6+0}{2}, \frac{2\sqrt{3}+0}{2}) = (3, \sqrt{3})$ Also, the radius of the circle of the centre, the equation of the circle	$(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$ cle $OAEB$ is	1A 1A 1A	
	∴ $OE$ is a diameter of the circle ( $CE$ ). $\angle OBE = 90^{\circ}$ By (b), $\angle BEO = 2\angle BOE$ $\angle BOE + \angle BEO + \angle OBE = 18$ $\angle BOE + 2\angle BOE + 90^{\circ} = 180^{\circ}$ Thus, $\angle BOE = 30^{\circ}$ Note that $E = (6, 6 \tan 30^{\circ}) = 0$ the coordinates of the centre $E = (\frac{6+0}{2}, \frac{2\sqrt{3}+0}{2}) = (3, \sqrt{3})$ Also, the radius of the circle of the centre ( $EE$ ). Hence, the equation of the circle ( $EE$ ).	$(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$ cle $OAEB$ is	1A 1A 1A	
	∴ $OE$ is a diameter of the cir. ∴ $\angle OBE = 90^{\circ}$ By (b), $\angle BEO = 2\angle BOE$ $\angle BOE + \angle BEO + \angle OBE = 18$ $\angle BOE + 2\angle BOE + 90^{\circ} = 180^{\circ}$ Thus, $\angle BOE = 30^{\circ}$ Note that $E = (6, 6 \tan 30^{\circ}) = 10$ the coordinates of the centre $E(\frac{6+0}{2}, \frac{2\sqrt{3}+0}{2}) = (3, \sqrt{3})$ Also, the radius of the circle of the centre, the equation of the circle	$(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$ cle $OAEB$ is	1A 1A 1A	
	∴ $OE$ is a diameter of the cir. ∴ $\angle OBE = 90^{\circ}$ By (b), $\angle BEO = 2\angle BOE$ $\angle BOE + \angle BEO + \angle OBE = 18$ $\angle BOE + 2\angle BOE + 90^{\circ} = 180^{\circ}$ Thus, $\angle BOE = 30^{\circ}$ Note that $E = (6, 6 \tan 30^{\circ}) = 10$ the coordinates of the centres $E(\frac{6+0}{2}, \frac{2\sqrt{3}+0}{2}) = (3, \sqrt{3})$ Also, the radius of the circle of the circle of the equation of the equation of the circle of the equation of	$(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$ cle $OAEB$ is $\sqrt{3}$ ) <sup>2</sup>	1A 1A 1A	
	∴ OE is a diameter of the cir. ∴ ∠OBE = 90°  By (b), ∠BEO = 2∠BOE ∠BOE + ∠BEO + ∠OBE = 18 ∠BOE + 2∠BOE + 90° = 180°  Thus, ∠BOE = 30°  Note that $E = (6, 6 \tan 30^\circ) = 6$ the coordinates of the centre $= (\frac{6+0}{2}, \frac{2\sqrt{3}+0}{2}) = (3, \sqrt{3})$ Also, the radius of the circle of the centre (x-3)² + (y - $\sqrt{3}$ )² = (2 $x^2 + y^2 - 6x - 2\sqrt{3}y = 0$ ∴ the circle OAEB passes	$(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$ cle $OAEB$ is $\sqrt{3}$ ) <sup>2</sup> through the origin.	1A 1A 1A 1M 1A	
	∴ $OE$ is a diameter of the cir. ∴ $\angle OBE = 90^{\circ}$ By (b), $\angle BEO = 2\angle BOE$ $\angle BOE + \angle BEO + \angle OBE = 18$ $\angle BOE + 2\angle BOE + 90^{\circ} = 180^{\circ}$ Thus, $\angle BOE = 30^{\circ}$ Note that $E = (6, 6 \tan 30^{\circ}) = 6$ the coordinates of the centre $= (\frac{6+0}{2}, \frac{2\sqrt{3}+0}{2}) = (3, \sqrt{3})$ Also, the radius of the circle of the circle of the equation of the circle $(x-3)^2 + (y-\sqrt{3})^2 = (2x^2 + y^2 - 6x - 2\sqrt{3}y = 0)$ ∴ the circle $OAEB$ passes ∴ let the equation of the circle of the circle of the equation of the equation of the circle of the equation of the circle of the equation of the circle of the equation of the equation of the	$(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$ cle $OAEB$ is $\sqrt{3}$ ) <sup>2</sup> through the origin. The color of the circle $OAEB$ be $x^2 + y^2 + ax + by = 0$	1A 1A 1A	
	∴ OE is a diameter of the cir.  ∴ ∠OBE = 90°  By (b), ∠BEO = 2∠BOE  ∠BOE + ∠BEO + ∠OBE = 18  ∠BOE + 2∠BOE + 90° = 180°  Thus, ∠BOE = 30°  Note that $E = (6, 6 \tan 30^\circ) = 6$ the coordinates of the centre $= (\frac{6+0}{2}, \frac{2\sqrt{3}+0}{2}) = (3, \sqrt{3})$ Also, the radius of the circle of the equation of the circle $(x-3)^2 + (y-\sqrt{3})^2 = (2x^2 + y^2 - 6x - 2\sqrt{3}y = 0)$ ∴ the circle OAEB passes ∴ let the equation of the circle of the coordinates of $B = (6, 6 \tan 30^\circ) = 6$	$(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$ cle $OAEB$ is $\sqrt{3}$ ) <sup>2</sup> through the origin. rcle $OAEB$ be $x^2 + y^2 + ax + by = 0$ $(5, 0)$	1A 1A 1A 1M 1A	
	∴ OE is a diameter of the cir.  ∴ ∠OBE = 90°  By (b), ∠BEO = 2∠BOE  ∠BOE + ∠BEO + ∠OBE = 18  ∠BOE + 2∠BOE + 90° = 180°  Thus, ∠BOE = 30°  Note that $E = (6, 6 \tan 30°) = (6 + 0)$ $= (6 + 0)$ Also, the radius of the circle of the equation of the circle $(x - 3)^2 + (y - \sqrt{3})^2 = (2x^2 + y^2 - 6x - 2\sqrt{3}y = 0)$ ∴ the circle OAEB passes  ∴ let the equation of the circle of the coordinates of $B = (6 + 0)$ ∴ the coordinates of $B = (6 + 0)$ ∴ the coordinates of $B = (6 + 0)$	$(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$ cle $OAEB$ is $\sqrt{3}$ ) <sup>2</sup> through the origin. rcle $OAEB$ be $x^2 + y^2 + ax + by = 0$ $(5, 0)$	1A 1A 1A 1M 1A	
	∴ $OE$ is a diameter of the cir. ∴ $\angle OBE = 90^\circ$ By (b), $\angle BEO = 2\angle BOE$ $\angle BOE + \angle BEO + \angle OBE = 18$ $\angle BOE + 2\angle BOE + 90^\circ = 180^\circ$ Thus, $\angle BOE = 30^\circ$ Note that $E = (6, 6 \tan 30^\circ) = 6$ the coordinates of the centres of the contres of the contres of the circle of the	$(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$ cle $OAEB$ is $\sqrt{3}$ ) <sup>2</sup> through the origin. The color $OAEB$ be $x^2 + y^2 + ax + by = 0$ $OAEB$ be $OAEB$ be $OAEB$ be $OAEB$ be $OAEB$	1A 1A 1A 1M 1A	
	∴ OE is a diameter of the cir.  ∴ ∠OBE = 90°  By (b), ∠BEO = 2∠BOE  ∠BOE + ∠BEO + ∠OBE = 18  ∠BOE + 2∠BOE + 90° = 180°  Thus, ∠BOE = 30°  Note that $E = (6, 6 \tan 30°) = (6 + 0)$ $= (6 + 0)$ Also, the radius of the circle of the equation of the circle $(x - 3)^2 + (y - \sqrt{3})^2 = (2x^2 + y^2 - 6x - 2\sqrt{3}y = 0)$ ∴ the circle OAEB passes  ∴ let the equation of the circle of the coordinates of $B = (6 + 0)$ ∴ the coordinates of $B = (6 + 0)$ ∴ the coordinates of $B = (6 + 0)$	$(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$ cle $OAEB$ is $\sqrt{3}$ ) <sup>2</sup> through the origin. The color $OAEB$ be $x^2 + y^2 + ax + by = 0$ $OAEB$ be $OAEB$ be $OAEB$ be $OAEB$ be $OAEB$	1A 1A 1A 1M 1A	
	∴ $OE$ is a diameter of the cir. ∴ $\angle OBE = 90^{\circ}$ By (b), $\angle BEO = 2\angle BOE$ $\angle BOE + \angle BEO + \angle OBE = 18$ $\angle BOE + 2\angle BOE + 90^{\circ} = 180^{\circ}$ Thus, $\angle BOE = 30^{\circ}$ Note that $E = (6, 6 \tan 30^{\circ}) = 6$ the coordinates of the centre $= (\frac{6+0}{2}, \frac{2\sqrt{3}+0}{2}) = (3, \sqrt{3})$ Also, the radius of the circle of the circle of the equation of the circle $= (x-3)^2 + (y-\sqrt{3})^2 = (2x^2 + y^2 - 6x - 2\sqrt{3}y = 0)$ ∴ the circle $= OAEB$ passes ∴ let the equation of the circle of the circle of the equation of the equation of the circle of the equation of the circle of the equation of the circle of the equation of the equation of	$(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$ $cle\ OAEB$ is $\sqrt{3})^2$ through the origin. $ccle\ OAEB\ be\ x^2 + y^2 + ax + by = 0$ $(6, 6 \tan 30^\circ) = (6, 2\sqrt{3})$	1A 1A 1A 1M 1A	
	∴ OE is a diameter of the cir. ∴ ∠OBE = 90°  By (b), ∠BEO = 2∠BOE ∠BOE + ∠BEO + ∠OBE = 18 ∠BOE + 2∠BOE + 90° = 180°  Thus, ∠BOE = 30°  Note that $E = (6, 6 \tan 30°) = 6$ the coordinates of the centre $= (\frac{6+0}{2}, \frac{2\sqrt{3}+0}{2}) = (3, \sqrt{3})$ Also, the radius of the circle of the equation of the circle $(x-3)^2 + (y-\sqrt{3})^2 = (2x^2 + y^2 - 6x - 2\sqrt{3}y = 0)$ ∴ the circle OAEB passes ∴ let the equation of the circle of the coordinates of $B = (6 + 6) + 6 + 6 + 6 + 6 + 6 + 6 + 6 + 6 +$	$(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$ cle $OAEB$ is $\sqrt{3}$ ) <sup>2</sup> through the origin. rcle $OAEB$ be $x^2 + y^2 + ax + by = 0$ (5, 0)	1A 1A 1M 1A 1M	
	∴ $OE$ is a diameter of the cir. ∴ $\angle OBE = 90^{\circ}$ By (b), $\angle BEO = 2\angle BOE$ $\angle BOE + \angle BEO + \angle OBE = 18$ $\angle BOE + 2\angle BOE + 90^{\circ} = 180^{\circ}$ Thus, $\angle BOE = 30^{\circ}$ Note that $E = (6, 6 \tan 30^{\circ}) = 6$ the coordinates of the centres of the contres of the contres of the circle of the circ	$(6, 2\sqrt{3})$ . Then, e of the circle $OAEB$ $OAEB = \sqrt{3^2 + (\sqrt{3})^2} = 2\sqrt{3}$ cle $OAEB$ is $\sqrt{3}$ ) <sup>2</sup> through the origin. rcle $OAEB$ be $x^2 + y^2 + ax + by = 0$ (5, 0)	1A 1A 1A 1M 1A	

	Solution	Marks	Remarks
7 () ()	:- 200 FF'	1M	(p) so emula und pit l
7. (a) (i)	$\sin 30^{\circ} = \frac{FF'}{20}$	11VI	
	$FF' = 20 \sin 30^{\circ}$	amesa innine i	either one
	<i>FF'</i> = 10 m	1A	u-1 for missing unit
			014 A SHETNELL 11 (0)
	$\cos 30^{\circ} = \frac{EF'}{20}$	(14E 45, (101, 10	!
	$EF' = 20\cos 30^{\circ}$	ovegou Sirini- 5. )	1027-
	$EF' = 10\sqrt{3}$	(est.uc., coduc)	<i>EF</i> ′≈ 17.32050808
		Lendy I	L1 ~ 17.52050000
	$\tan 60^{\circ} = \frac{FF'}{AF'}$	1M	with FF' substituted
	$AF' = \frac{10}{\tan 60^{\circ}}$	DOMEST .	
	tan 60°	to Target Service 1	2000 - 2000
	$AF' = \frac{10\sqrt{3}}{3}$		AF' ≈ 5.773502692
	$AF = \frac{1}{3}$		AI ~ 3.773302092
	$AE^2 = AF'^2 + EF'^2$	The state of the s	
	$AE^2 = \left(\frac{10\sqrt{3}}{3}\right)^2 + (10\sqrt{3})^2$	1 1	1000
	$AE^2 = (\frac{10\sqrt{3}}{2})^2 + (10\sqrt{3})^2$	1M	
		Land Control	
	$AE = \frac{10\sqrt{30}}{3} \mathrm{m}$	1A	u−1 for missing unit
	3	Design of	
			r.t. 18.3 m, $AE \approx 18.25741858$
		( \$30 y yes) 300 yes	The state of the s
(ii)	$\sin 60^{\circ} = \frac{FF'}{AF}$		
	$AF = \frac{10}{\sin 60^{\circ}}$	- FERS also an in terms	THE RESERVE OF THE PARTY OF THE
	sin 60°		NO. TENEST
	$AF = \frac{20\sqrt{3}}{3}$	10000	AF ≈ 11.54700538
		700 - 1000	Ar ~ 11.54700556
	By cosine formula, we have	797 - 700 s	CHELCH PROPERTY.
	$EF^2 + AE^2 - AF^2$		official position
	$\cos \angle AEF = \frac{EF^2 + AE^2 - AF^2}{2EF \cdot AE}$		
	$(10\sqrt{50})^2 (20\sqrt{5})^2$	mark street has factoring	
	$20^2 + \left(\frac{10\sqrt{30}}{2}\right)^2 - \left(\frac{20\sqrt{3}}{2}\right)^2$	Middle shall ad by all large all by	and position and the same of t
	$\cos \angle AEF = \frac{2}{3} \left( \frac{3}{3} \right)$	1M	$\cos \angle AEF \approx \frac{20^2 + 18.25741858^2 - 11.54700538^2}{2(20)(18.25741858)}$
	$(2)(20)\left(\frac{10\sqrt{30}}{3}\right)$	****	2(20)(18.25/41858)
	$(2)(20)[\frac{1}{3}]$	White Was made a second	
		Color of the second sec	
	$\cos \angle AEF = \frac{3\sqrt{30}}{20}$	a take the party	cos ∠AEF ≈ 0.821583836
		TENS - TOLER	
	∠AEF ≈ 34.75634244°	100000	and the second
	∠ <i>AEF</i> ≈ 34.8°	1A	u−1 for missing unit
		and the population of the property of	r.t. 34.8°
		4 - an man or alim(7	legro reta ust
		(BOH I II In the	and the state of t
		0.000	Life Country
			and the same of th
		or of or our or or or or	transport -
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		ALL A RESPONDED TO A	Charles of Sales

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### FOR TEACHERS' USE ONLY

Solution	Marks	Remarks
b) Let $t_{\text{red}}$ s and $t_{\text{yellow}}$ s be the time required for the red toy car and the yellow toy car to reach $B$ respectively. Then, we have $BE = 2t_{\text{red}}$ and $BF = 3t_{\text{yellow}}$		
By sine formula, we have	1116	
$\frac{BE}{\sin 20^{\circ}} \approx \frac{BF}{\sin(180^{\circ} - 34.75634244^{\circ})}$ $2t_{\text{red}} \qquad 3t_{\text{yellow}}$	1M	
$\frac{2t_{\text{red}}}{\sin 20^{\circ}} \approx \frac{3t_{\text{yellow}}}{\sin 34.75634244^{\circ}}$ $t_{\text{yellow}} = 2\sin 34.75634244^{\circ}$	1M	for attempting to find $\frac{t_{\text{yellow}}}{t_{\text{yellow}}}$
$\frac{t_{\text{yellow}}}{t_{\text{red}}} \approx \frac{2\sin 34.75634244^{\circ}}{3\sin 20^{\circ}}$	TIVI	$t_{ m red}$
$\frac{t_{\text{yellow}}}{t_{\text{red}}} \approx 1.111216642$		$\frac{t_{\text{red}}}{t_{\text{yellow}}} \approx 0.899914528$
$\frac{t_{\text{yellow}}}{t_{\text{red}}} \approx 1.11$	1A	accept $\frac{t_{\rm red}}{t_{\rm yellow}} \approx 0.900$ and can be absorbed
$\frac{t_{\text{yellow}}}{t_{\text{red}}} > 1$		$\frac{t_{\text{red}}}{t_{\text{yellow}}} < 1$
Thus, $t_{\text{yellow}} > t_{\text{red}}$ So, the yellow toy car will not reach the point B before the red toy car.	1A	$t_{\text{red}} < t_{\text{yellow}}$ f.t.
∠EBF ≈ 34.75634244° – 20° ≈ 14.75634244°		
By sine formula, we have $\frac{BE}{\sin 20^{\circ}} = \frac{20}{\sin \angle EBF} \text{ and } \frac{BF}{\sin(180^{\circ} - 34.75634244^{\circ})} \approx \frac{20}{\sin \angle EBF}$	1M	either with $\angle EBF$ substituted
$BE \approx \frac{20 \sin 20^{\circ}}{\sin 14.75634244^{\circ}}$ and $BF \approx \frac{20 \sin 34.75634244^{\circ}}{\sin 14.75634244^{\circ}}$ $BE \approx 26.85575694$ and $BF \approx 44.76384605$		
Let $t_{\rm red}$ s and $t_{\rm yellow}$ s be the time required for the red toy car and the yellow toy car to reach $B$ respectively. Then, we have $BE = 2t_{\rm red}$ and $BF = 3t_{\rm yellow}$		
$t_{\text{red}} \approx \frac{26.85575694}{2}$ and $t_{\text{yellow}} \approx \frac{44.76384605}{3}$	1M	for both
$t_{\rm red} \approx 13.42787847$ and $t_{\rm yellow} \approx 14.92128202$ $t_{\rm red} \approx 13.4$ and $t_{\rm yellow} \approx 14.9$	1A	for either (can be absorbed)
Thus, $t_{\text{yellow}} > t_{\text{red}}$ So, the yellow toy car will not reach the point B before the red toy car.	1A	f.t.
	(4)	