	Solution	Marks	Remarks
(2	2	J. D. A. S. C.	
x	$(xy)^2 - 5y^6$		
	$ \frac{x^{2}y^{2}}{x^{-5}y^{6}} $ $ \frac{2^{-(-5)}}{y^{6-2}} $		
$=\frac{x}{x}$	-5 ₁₀ 6	1M	for $(ab)^m = a^m b^m$
2	<i>y</i> 2-(-5)		_m
$=\frac{x}{x}$	6-2	1M	for $\frac{a^m}{a^n} = a^{m-n}$
)	7	pottour en la firma	a
$=\frac{x}{}$	<u> </u>	1A	Line DEDARROSS A. I.
y	The second section for the left on the	(3)	Land the second second
		(3)	
a(b -	+7) = a + b		
	-7a = a + b	N/F	
7a -	-a = b - ab	1M	for putting b on one side
	=b(1-a)	1M	for factorization
b = -	$\frac{6a}{1-a}$	1A	
	1 – a		
b + 7	$7 = \frac{a+b}{a}$		
, 1	$7 = \frac{a+b}{a}$ $\frac{b}{a} = 1-7$	1M	for putting b on one side
b	$\frac{a}{a} = 1 - 7$		
b(1-	$(-\frac{1}{2}) = -6$	1M	for factorization
-	a^{j-2}		
$b(\frac{a}{})$	$\frac{a}{-\frac{1}{a}} = -6$ $\frac{-1}{a} = -6$ $\frac{-6a}{a-1}$		
	a -6a	to the second buy the	Later Hallman of
$b = -\frac{1}{6}$	$\frac{-6a}{a-1}$	1A .	
		(3)	
()	- 2 - 2		
(a)	$3m^2 - mn - 2n^2$ $= (3m + 2n)(m - n)$	1A	
	= (3m + 2n)(m - n)	IA.	
(h)	$3m^2 - mn - 2n^2 - m + n$	Bar Marian Internet	
(0)	3m - mn - 2n - m + n = $(3m + 2n)(m - n) - m + n$	1M	for using (a)
	=(3m+2n)(m-n)-(m-n)	indicació article la	101 0010
	= (m-n)(3m+2n-1)	1A	
	- (************************************	(3)	
(a)	Let x be the cost of the handbag.	management and and	
(a)	Let $$x$$ be the cost of the handbag. x(1+40%) = 560	1M	
	560		
	$x = \frac{300}{1 + 40\%}$		
	x = 400	1A	
	Thus, the cost of the handbag is \$400.		u-1 for missing unit
4.1			
(b)	The percentage profit		
	$= \left(\frac{460 - 400}{400}\right) 100\%$	1M	accept without 100%
	= 15%	1A	
	- 13 /0	1 1	
		(4)	

Solution	Marks	Remarks
Let x be the number of games that the champion wins. Then, the number of games drawn will be $36-x$. Now, we have $3x + (36-x) = 84$. Solving, we have $x = 24$. Thus, the required number of games is 24 .	1A 1M+1A 1A	1M for $3x + (a - x)$
Let x be the number of games that the champion wins and y be the number of games that the champion draws. $\begin{cases} x + y = 36 \\ 3x + y = 84 \end{cases}$ Solving, we have $x = 24$. Thus, the required number of games is 24 .	1A 1M + 1A 1A	1M for $3x + y$
	(4)	Shi to path off
(a) $\frac{1}{3}\pi r^2(12) = 2\left[\frac{1}{2}\left(\frac{4}{3}\pi r^3\right)\right]$	1M	for $V_1 = 2V_2$
r=3	1A	u−1 for having unit
(b) The required volume $= \frac{1}{2} \left(\frac{4}{3} \pi r^3 \right) + \frac{1}{3} \pi r^2 (12)$ $= \frac{2}{3} \pi (3^3) + 4\pi (3^2)$	1M	
$= 54\pi \text{ cm}^3$	1A	u-1 for missing unit
The required volume $= \frac{3}{2} \left(\frac{4}{3} \pi r^3 \right)$ $= 2\pi (3^3)$	1M	
$= 54\pi \text{ cm}^3$	1A	u-1 for missing unit
	(4)	
Note that $\angle ABD = 90^{\circ}$.	1A	1 18k = p
Also note that $\angle COD = \angle BAD = 38^{\circ}$.	1M	erroll-fildettisetti yildi. Len
Further note that $\angle ADB = 180^{\circ} - 90^{\circ} - 38^{\circ} = 52^{\circ}$. Since $OC = OD$, we have $\angle ODC = \angle OCD$. So, we have $\angle ODC = \frac{180^{\circ} - 38^{\circ}}{2}$. Therefore, we have $\angle ODC = 71^{\circ}$.	1M	
$\angle BDC$ = $\angle ODC - \angle ADB$	ton of an art or	entint at join of come! senting to it injured?
$=71^{\circ} - 52^{\circ}$ = 19°	1A	u-1 for missing unit
Join O and B . Since $OA = OB$, we have $\angle OBA = \angle OAB = 38^{\circ}$. So, we have $\angle BOC = \angle OBA = 38^{\circ}$. Thus, $\angle BDC = \frac{1}{2} \angle BOC$ $= \frac{1}{2} (38^{\circ})$	1A 1M 1M	
= 19°	1A	u-1 for missing unit
	(4)	

		Solution	Marks	Remarks
8. (a)	The coordinates of A' = $(5,2)$	1A	pp-1 for missing '(' or ')
		The coordinates of A'' = $(2,5)$	1A	pp–1 for missing '(' or ')
(b)	The slope of AA' $= \frac{5-2}{-2-5}$ $= \frac{-3}{7}$	1M	either one
		The slope of OA'' $= \frac{5-0}{2-0}$ $= \frac{5}{2}$		
		Note that the product of the slope of AA' and the slope of OA'' is negual to -1 . Thus, AA' is not perpendicular to OA'' .	1M 1A	f.t.
		alargh-oran I-v Ar-		
				Limited by majors of E
9. ((a)	x(1+20%) = 72	1M	, "G]76 -
		$x = \frac{72}{1 + 20\%}$ $x = 60$	1A	u-1 for having unit
((b)	Let y be the angle subtended at the centre for the sector representing District C .	g	
		y = 360° - 72° - 120° - 30° - 60° = 78°	1M 1A	Self a Self to send any of
		Since the angle subtended at the centre for the sector representing District C is greater than that for District A , the number of traffic accidents occurred in District A is not greater than that in District A	C. 1M	1011 - CANY 2
			16	76.84 2 016 5 200
		97	- 1-12	

(a) The quotient $= 5x + 2$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	(i) $a = 2$ and $b = -1$ (ii) $g(x) = 0$ $(5x+2)(x^2+2x-3) = 0$ (5x+2)(x+3)(x-1) = 0 Thus, we have $x = \frac{-2}{5}$, $x = -3$ or $x = 1$.	1A 1M 1A 1M(4)	for both correct
(ii) $g(x) = 0$ $(5x + 2)(x^2 + 2x - 3) = 0$ (5x + 2)(x - 3)(x - 1) = 0 Thus, we have $x = \frac{-2}{5}$, $x = -3$ or $x = 1$. (a) Let $C = as + bs^2$, where a and b are non-zero constants. $\begin{cases} a(2) + b(2^2) = 356 \\ a(5) + b(5^2) = 1250 \end{cases}$ Solving, we have $a = 130$ and $b = 24$. The required cost $= 130(6) + 24(6^2)$ $= 1644 (b) $130s + 24s^2 = 539$ $24s^2 + 130s - 539 = 0$ $(4s - 11)(6s + 49) = 0$ $s = \frac{11}{4}$ or $s = \frac{-49}{6}$ (rejected) Thus, the perimeter of the carpet is 2.75 metres.	(ii) $g(x) = 0$ $(5x + 2)(x^2 + 2x - 3) = 0$ (5x + 2)(x + 3)(x - 1) = 0 Thus, we have $x = \frac{-2}{5}$, $x = -3$ or $x = 1$. 1M Thus, we have $x = \frac{-2}{5}$, $x = -3$ or $x = 1$. 1A $\begin{cases} a(2) + b(2^2) = 356 \\ a(5) + b(5^2) = 1250 \end{cases}$ Solving, we have $a = 130$ and $b = 24$. The required cost $= 130(6) + 24(6^2)$ $= 1644 1A (b) $130s + 24s^2 = 539$ $24s^2 + 130s - 539 = 0$ $(4s - 11)(6s + 49) = 0$ $s = \frac{11}{4}$ or $s = \frac{-49}{6}$ (rejected) Thus, the perimeter of the carpet is 2.75 metres.	(ii) $g(x) = 0$ $(5x+2)(x^2+2x-3) = 0$ (5x+2)(x+3)(x-1) = 0 Thus, we have $x = \frac{-2}{5}$, $x = -3$ or $x = 1$.	1M 1A 1M (4)	e end so at illegal (
$(5x+2)(x^2+2x-3) = 0 \\ (5x+2)(x+3)(x-1) = 0 \\ \text{Thus, we have } x = \frac{-2}{5}, x = -3 \text{ or } x = 1.$ $(a) \text{ Let } C = as + bs^2, \text{ where } a \text{ and } b \text{ are non-zero constants.}$ $\begin{cases} a(2) + b(2^2) = 356 \\ a(5) + b(5^2) = 1250 \end{cases}$ $\text{Solving, we have } a = 130 \text{ and } b = 24.$ The required cost $= 130(6) + 24(6^2)$ $= \$1644$ $(b) 130s + 24s^2 = 539$ $24s^2 + 130s - 539 = 0$ $(4s-11)(6s+49) = 0$ $s = \frac{11}{4} \text{ or } s = \frac{-49}{6} \text{ (rejected)}$ $\text{Thus, the perimeter of the carpet is } 2.75 \text{ metres.}$ $1M$ $1M$ $1A$ $1M$ $1A$ $1A$ $1A$ $1A$ $1A$ $1A$ $1A$ $1A$	$(5x+2)(x^2+2x-3) = 0 \\ (5x+2)(x+3)(x-1) = 0 \\ \text{Thus, we have } x = \frac{-2}{5}, x = -3 \text{ or } x = 1.$ $\begin{bmatrix} a(2) + b(2^2) = 356 \\ a(5) + b(5^2) = 1250 \\ \text{Solving, we have } a = 130 \text{ and } b = 24. \\ \text{The required cost} \\ = 130(6) + 24(6^2) \\ = $1644 \end{bmatrix}$ $(b) 130s + 24s^2 = 539 \\ 24s^2 + 130s - 539 = 0 \\ (4s-11)(6s+49) = 0 \\ s = \frac{11}{4} \text{ or } s = \frac{-49}{6} \text{ (rejected)} \\ \text{Thus, the perimeter of the carpet is } 2.75 \text{ metres.} \end{bmatrix}$ $\begin{bmatrix} 1M \\ 1A \\ 1M \\ 1M \\ 1A \\ 1M \\ 1A \\ 1A \\$	$(5x+2)(x^2+2x-3) = 0$ (5x+2)(x+3)(x-1) = 0 Thus, we have $x = \frac{-2}{5}$, $x = -3$ or $x = 1$. Let $C = as + bs^2$, where a and b are non-zero constants.	1A 1M (4)	for using (a)
$\begin{cases} a(2) + b(2^2) = 356 \\ a(5) + b(5^2) = 1250 \end{cases}$ Solving, we have $a = 130$ and $b = 24$. The required cost $= 130(6) + 24(6^2)$ $= \$1644$ $(b) 130s + 24s^2 = 539$ $24s^2 + 130s - 539 = 0$ $(4s - 11)(6s + 49) = 0$ $s = \frac{11}{4} \text{ or } s = \frac{-49}{6} \text{ (rejected)}$ Thus, the perimeter of the carpet is 2.75 metres. IM for substitution $1A$ $u-1 \text{ for missing unit}$	$\begin{cases} a(2) + b(2^2) = 356 \\ a(5) + b(5^2) = 1250 \end{cases}$ Solving, we have $a = 130$ and $b = 24$. The required cost $= 130(6) + 24(6^2)$ $= \$ 1644$ $(b) 130s + 24s^2 = 539$ $24s^2 + 130s - 539 = 0$ $(4s - 11)(6s + 49) = 0$ $s = \frac{11}{4} \text{ or } s = \frac{-49}{6} \text{ (rejected)}$ Thus, the perimeter of the carpet is 2.75 metres. $1M \text{for substitution}$ $1A \text{for both correct}$ $u-1 \text{ for missing unit}$		1A	
Solving, we have $a = 130$ and $b = 24$. The required cost $= 130(6) + 24(6^{2})$ $= 1644 1A (4) (b) $130s + 24s^{2} = 539$ $24s^{2} + 130s - 539 = 0$ $(4s - 11)(6s + 49) = 0$ $s = \frac{11}{4} \text{ or } s = \frac{-49}{6} \text{ (rejected)}$ Thus, the perimeter of the carpet is 2.75 metres.	Solving, we have $a = 130$ and $b = 24$. The required cost $= 130(6) + 24(6^{2})$ $= \$ 1644$ 1A $= 130$ (b) $130s + 24s^{2} = 539$ $24s^{2} + 130s - 539 = 0$ $(4s - 11)(6s + 49) = 0$ $s = \frac{11}{4} \text{ or } s = \frac{-49}{6} \text{ (rejected)}$ Thus, the perimeter of the carpet is 2.75 metres.		1M	for substitution
$= \$ 1 644$ (b) $130s + 24s^2 = 539$ $24s^2 + 130s - 539 = 0$ $(4s - 11)(6s + 49) = 0$ $s = \frac{11}{4} \text{ or } s = \frac{-49}{6} \text{ (rejected)}$ Thus, the perimeter of the carpet is 2.75 metres. $u-1 \text{ for missing unit}$ $1A$ $u-1 \text{ for missing unit}$	$= \$ 1 644$ (b) $130s + 24s^2 = 539$ $24s^2 + 130s - 539 = 0$ $(4s - 11)(6s + 49) = 0$ $s = \frac{11}{4} \text{ or } s = \frac{-49}{6} \text{ (rejected)}$ Thus, the perimeter of the carpet is 2.75 metres. 1A u-1 for missing unit u-1 for missing unit	Solving, we have $a = 130$ and $b = 24$. The required cost		
$24s^{2} + 130s - 539 = 0$ $(4s - 11)(6s + 49) = 0$ $s = \frac{11}{4} \text{ or } s = \frac{-49}{6} \text{ (rejected)}$ Thus, the perimeter of the carpet is 2.75 metres. 1A u-1 for missing unit	$24s^{2} + 130s - 539 = 0$ $(4s - 11)(6s + 49) = 0$ $s = \frac{11}{4} \text{ or } s = \frac{-49}{6} \text{ (rejected)}$ Thus, the perimeter of the carpet is 2.75 metres. 1A $u-1 \text{ for missing unit}$			u−1 for missing unit
Thus, the perimeter of the carpet is 2.75 metres. u-1 for missing unit	Thus, the perimeter of the carpet is 2.75 metres. u-1 for missing unit	$24s^2 + 130s - 539 = 0$ $(4s - 11)(6s + 49) = 0$		
		Control of the Contro	(2)	u-1 for missing unit
			The required cost = $130(6) + 24(6^2)$ = $$1644$ $130s + 24s^2 = 539$ $24s^2 + 130s - 539 = 0$ (4s - 11)(6s + 49) = 0 $s = \frac{11}{4}$ or $s = \frac{-49}{6}$ (rejected)	The required cost $= 130(6) + 24(6^{2})$ $= \$ 1644$ $1A$ $130s + 24s^{2} = 539$ $24s^{2} + 130s - 539 = 0$ $(4s - 11)(6s + 49) = 0$ $s = \frac{11}{4} \text{ or } s = \frac{-49}{6} \text{ (rejected)}$ Thus, the perimeter of the carpet is 2.75 metres.

		Solution	Marks	Remarks
2.	(a)	Note that the slope of a line segment in the graph represents the average speed of that part of the journey. Since the slope of the line segment for Part I is the least, John drives at the lowest speed for Part I of the journey.	1M 1A (2)	can be absorbed
	(b)	Let x h be the time required to drive from B to C. $\frac{18-4}{x} = 56$ $x = \frac{1}{4}$	1M	n seed on the
		Thus, John will reach C at 8:26.	1A (2)	
	(c)	The average speed $= \frac{27}{\frac{30}{60}}$ $= 54 \text{ km/h}$	1M	for $\frac{27}{30}$
		$=\frac{(54)(1000)}{3600}$	1M	
		=15 m/s	1A (3)	
			198	

(a) Note that the equation of L_1 is $4x-3y+12=0$. So, the slope of L_1 is $\frac{4}{3}$. Therefore, the slope of L_2 is $\frac{-3}{4}$. The equation of L_2 is	1M	
Therefore, the slope of L_2 is $\frac{-3}{4}$.	1M	P _ www. Table week
7	1M	
The equation of L_2 is		
$y - 9 = \frac{-3}{4}(x - 4)$	1M	E 10 27 YE 10
3x + 4y - 48 = 0	1A (3)	=8,00 (F) (dV)
(b) (i) Note that Γ is the perpendicular bisector of AB . Also, AB is perpendicular to L_2 .	1M	accept Γ is a straight line
Thus, Γ is parallel to L_2 .	1A	=
(ii) The slope of Γ is $\frac{-3}{4}$.	1M	to a diament
Putting $x = 0$ in $4x - 3y + 12 = 0$, we have $y = 4$. So, we have $B = (0, 4)$. Note that L_2 cuts the y-axis at $C(0, 12)$.	1A	
The mid-point of BC is $(0,8)$. The required equation is	1M	
$y = \frac{-3}{4}x + 8$ $3x + 4y - 32 = 0$	1A	eren a suite si auriti
By solving $\begin{cases} 4x - 3y + 12 = 0 \\ 3x + 4y - 48 = 0 \end{cases}$, we have $A = \left(\frac{96}{25}, \frac{228}{25}\right)$. Putting $x = 0$ in $4x - 3y + 12 = 0$, we have $y = 4$.	1M	either one
So, we have $B = (0, 4)$. The required equation is	1A	
$\sqrt{(x-0)^2 + (y-4)^2} = \sqrt{\left(x - \frac{96}{25}\right)^2 + \left(y - \frac{228}{25}\right)^2}$	1M	
3x + 4y - 32 = 0	1A	
The slope of Γ is $\frac{-3}{4}$.	1M	
By solving $\begin{cases} 4x - 3y + 12 = 0 \\ 3x + 4y - 48 = 0 \end{cases}$, we have $A = \left(\frac{96}{25}, \frac{228}{25}\right)$.	- Y	either one
Putting $x = 0$ in $4x - 3y + 12 = 0$, we have $y = 4$. So, we have $B = (0, 4)$.	1A	
The mid-point of AB is $\left(\frac{48}{25}, \frac{164}{25}\right)$.	1M	
The required equation is $y - \frac{164}{25} = \frac{-3}{4} \left(x - \frac{48}{25} \right)$ $3x + 4y - 32 = 0$	1A	
-	(6)	

			Solution		Marks	Remarks
4.	(a)	The median = 62%			1A	
		The mean $= \frac{55\% + 58\% + 62\% + 6}{12}$	52% + 63%			
		5 = 60%			1A (2)	y 3 - Armadoniya nd P
	(b)	(i) 58%			1A	Walter than 1
		(ii) $a = 63$ b = 57			1M 1M	1M for either one of the following conditions satisfied:
					or placificaci into entroll son	(1) $a+b=120$ (2) $\begin{cases} a \ge 62 & \text{or } \begin{cases} 0 \le a < 6, \\ b \ge 62 \end{cases} \end{cases}$
					(3)	A towns of the
	(c)	Note that the data are co Also note that the week Thus, the claim is disagr	may not be randomly se		1M 1M	accept any suitable reason
		Note that the number of Also note that the stall m Further note that the wee Thus, the claim is agreed	nay be randomly selected ek may be randomly selected	d.	1M	accept any suitable reason
				<u> </u>	(2)	
						The state of the s
						t trade entirely
					2002	in mendember 1922 again karagan 1933
				(#-)-18-		e (or all
					0 -	The April at 1
						To be seen will
					her legs	
					100	a firmular de
						to fring the set
				101		
				101		

Solution	Marks	Remarks
Let n be the number of rows of seats.		
$\frac{\pi}{2}(2(12) + (n-1)3) \le 930$	1M	for sum of arithmetic sequence
$\frac{3m^2}{2} + \frac{21n}{2} - 930 \le 0$		
	1M	for quadratic inequality in n
$m^2 + 7n - 620 \le 0$		
$\frac{-7 - \sqrt{2529}}{2} \le n \le \frac{-7 + \sqrt{2529}}{2}$	1A	accept $-28.6 \le n \le 21.6$
Therefore, the greatest value of n is 21.	1A	Servide -
Thus, the greatest number of rows of seats is 21.	(4)	ATT OF THE STATE O
The required probability		
$=\frac{C_2^5 C_2^4}{C_4^9}$	1M + 1A	1M for numerator using C_2^n , $n=4$
	IMTIA	1A for denominator
$=\frac{10}{21}$	1A	r.t. 0.476
The required probability		
$= 6\left(\frac{5}{9}\right)\left(\frac{4}{8}\right)\left(\frac{4}{7}\right)\left(\frac{3}{6}\right)$		1M for $\left(\frac{r}{r}\right)\left(\frac{r-1}{r}\right)\left(\frac{r-1}{r}\right)\left(\frac{r-2}{r}\right)$
	1M + 1A	$\begin{cases} 1M & \text{for } \left(\frac{r}{n}\right)\left(\frac{r-1}{n-1}\right)\left(\frac{r-1}{n-2}\right)\left(\frac{r-2}{n-3}\right) \\ 1A & \text{for } 6p, 0$
$=\frac{10}{21}$	1A	r.t. 0.476
	(3)	
(b) The required probability		
$=1-\frac{10}{21}$	1M	for $1 - (a)$
$=\frac{11}{21}$		
21	1A	r.t. 0.524
The required probability		
$=\frac{C_4^5 + C_4^4 + C_1^5 C_3^4 + C_3^5 C_1^4}{C_4^9}$	1M	for considering 4 cases
		tor considering 4 cases
$=\frac{11}{21}$	1A	r.t. 0.524
The required probability		
$= \left(\frac{5}{9}\right)\left(\frac{4}{8}\right)\left(\frac{3}{7}\right)\left(\frac{2}{6}\right) + \left(\frac{4}{9}\right)\left(\frac{3}{8}\right)\left(\frac{2}{7}\right)\left(\frac{1}{6}\right) + 4\left(\frac{5}{9}\right)\left(\frac{4}{8}\right)\left(\frac{3}{7}\right)\left(\frac{2}{6}\right) + 4\left(\frac{5}{9}\right)\left(\frac{4}{8}\right)\left(\frac{3}{7}\right)\left(\frac{4}{6}\right)$) 124	6
$(9 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	1M	for considering 10 cases
$=\frac{11}{21}$	1A	r.t. 0.524
	(2)	

Macur	Solutio	on	Marks	Remarks
Note that $6.4 = \log_8 E$	₹ .		grieng for a	197 N TO THE REST OF THE
Therefore, we have E			1A	10.23116 - 10.1616
Also note that $M = 10$				
$M = \log_4(8^{6.4})$			1A	uswy-T2
$4^M = 8^{6.4}$				
$(2^2)^M = (2^3)^{6.4}$			1M	
$2^{2M} = 2^{19.2}$				
2M = 19.2			1M	the same a second
M = 9.6			1A	period invited electric
Thus, the magnitude o	f the explosion o	n Scale A is 9.6.	111111111111111111111111111111111111111	
M				
$=\log_4 E$				
$-\log_8 E$			1A	
$= \frac{\log_8 E}{\log_8 4}$			IA	
6.4			1M + 1A	
$= \frac{2}{\log_8(8^{\frac{2}{3}})}$			IIVI - IA	
64				
$=\frac{6.4}{\frac{2}{3}}$			1M	for denominator
$\frac{-}{3}$				
= 9.6	N-House		1A	
Thus, the magnitude of	f the explosion or	n Scale A is 9.6.	(5	
			()	1
				pedatel artigues and
				mility breed in the
			21-12	
			A STATE OF THE STA	
				-
		8		
		103		

		Solution	Marks	Remarks
(2)	sin 4 BC BI	$\frac{45^{\circ}}{45^{\circ}} = \frac{1}{\sin 30^{\circ}}$ $= 20\sqrt{2} \text{ cm}$	1M 1A	accept finding CD and using sine twice
		$0\sqrt{2}\cos 30^{\circ}$ $0\sqrt{6}$ cm	1A (3)	
(b)	(i)	Note that the required angle is $\angle ADB$.	1A	
		Also note that $AD = 20 \cos 45^\circ = 10\sqrt{2} \text{ cm}$.		
		By cosine formula, $\cos \angle ADB = \frac{(10\sqrt{6})^2 + (10\sqrt{2})^2 - 18^2}{2(10\sqrt{6})(10\sqrt{2})}$ $\angle ADB \approx 46.60320866^{\circ}$	1M	accept using Pythagoras' theorem twice
		∠ <i>ADB</i> ≈ 46.6°	1A	- our a
	(ii)	Note that $AD = CD = 10\sqrt{2}$ cm. Also note that $\angle ADC = 90^{\circ}$. The volume of the tetrahedron $ABCD$		
		$=\frac{1}{3}\left(\frac{1}{2}(AD)(BD)\sin\angle ADB\right)(CD)$	1M	
		$= \frac{1}{3} \left(\frac{1}{2} (10\sqrt{2})(10\sqrt{6})(\sin \angle ADB) \right) (10\sqrt{2})$		either one
		$=\frac{1000\sqrt{6}\sin\angle ADB}{3}$		
		So, the volume of the tetrahedron varies directly as $\sin \angle ADB$.		
		When $\angle ADB$ increases from 40° to 90°, the volume of the	1	
		tetrahedron $ABCD$ increases. When $\angle ADB$ increases from 90° to 140°, the volume of the tetrahedron $ABCD$ decreases.	} 1A	ingeredian or 1% and
		The volume of the tetrahedron ABCD		
		$=\frac{1}{3}$ (The area of $\triangle ACD$)(BD sin $\angle ADB$)	1M	
		Since the area of $\triangle ACD$ and the length of BD are constants,		either one
		the volume of the tetrahedron varies directly as $\sin \angle ADB$.		
		When $\angle ADB$ increases from 40° to 90°, the volume of the		
		tetrahedron $ABCD$ increases. When $\angle ADB$ increases from 90° to 140°, the volume of the	} 1A	control of the turb of the
		tetrahedron ABCD decreases.	(5)	,
				Calebra of Calebra
		104		

(0)		. Historia	Solution	Marks	Remarks
r. (a)	(i)	Join C and D. $\angle CDB = \angle CAB$ $\angle QCD = \angle CAD$ $\angle QCD = \angle CDB$ So, $\angle CAB = \angle CAD$ $AE = AE$ $AB = AD$ $\Delta ABE \cong \Delta ABD$	(∠s in the same s (∠ in alt segmen (alt. ∠s, PQ // s (common side) (given) (SAS)	t)	
		Marking Scheme: Case 1 Any corr	ect proof with correct reasons.	3	
		Case 2 Any corr	ect proof with correct reasons. e proof with any one correct step and one correct.	2	
	(ii)	of $\angle BAD$. So, AC By (a)(i), $\angle AED =$	$\angle CAD$. Therefore, AC is the angle C must pass through the in-centre of $\angle AEB$. Note that $\angle AED + \angle AE$. $= \angle AEB = 90^{\circ}$. So, AE is an altitude.	ABD . $B = 180^{\circ}$.	
		passing through $A = A$ Also, $BE = DE$. T passes through the c	Therefore, AE is a median of $\triangle ABL$	D . So, AC 1A	1A for any one correct 1A for any two correct
		passes through the c Therefore, the in-cer circumcentre lie on	ircumcentre of $\triangle ABD$. Intre, the orthocentre, the centroid and the straight line passing through A at the orthocentre, the centroid and the	d the and C.	f.t.
(b)			entre of the circle is $\frac{14+4}{2} = 9$. nates of the centre of the circle.	1A	
	$\sqrt{(9)}$	$(-4)^2 + (t-4)^2 = \sqrt{(9)^2 + (t-4)^2}$	$(9-8)^2 + (t-12)^2$	1M	1 CENT OF BOOK OF THE SECOND O
	t = -	$\frac{13}{2}$ the slope of the tangent slope of <i>BD</i>	at PQ	TO AND THE THE STATE OF	
	$=\frac{8}{8}$	2-4		1M	for slope formula
	I of	(a,b) be the coordi	nates of C.	1M	can be absorbed
					for mid-point formula
	Note		9 and $\frac{b+4}{2} = \frac{13}{2}$.	1M	101 mid-point formula
	Note There	we have $\frac{a+14}{2} = 9$ we have $a = 4$ and required equation is $y-9=2(x-4)$ 2x-y+1=0	2 2	IM IM 1A	for mid-point formula
	Note There	we have $\frac{a+14}{2} = 9$ we have $a = 4$ and required equation is $y-9 = 2(x-4)$	2 2	1M	for mid-point formula

$\sqrt{(9-4)^2 + (t-4)^2} = \sqrt{(9-8)^2 + (t-12)^2}$ $t = \frac{13}{2}$ So, the equation of the circle is $x^2 + y^2 - 18x - 13y + 92 = 0$. The slope of the tangent PQ = the slope of BD = $\frac{12-4}{8-4}$ = 2 Let the equation of the tangent be $y = 2x + k$, where k is a constant. Putting $y = 2x + k$ in $x^2 + y^2 - 18x - 13y + 92 = 0$, we have $x^2 + (2x + k)^2 - 18x - 13(2x + k) + 92 = 0$. Therefore, we have $5x^2 - (4k - 44)x + (k^2 - 13k + 92) = 0$. For tangency, we have $\Delta = 0$. $(4k - 44)^2 - 4(5)(k^2 - 13k + 92) = 0$ $k^2 + 23k - 24 = 0$ $k = 1 \text{ or } k = -24 \text{ (rejected)}$ Thus, the required equation is $2x - y + 1 = 0$. Let the equation of the circle be $x^2 + y^2 + k_1x + k_2y + k_3 = 0$, where k_1 , k_2 and k_3 are constants. $\begin{bmatrix} 14^2 + 4^2 + k_1(14) + k_2(4) + k_3 = 0 \\ 8^2 + 12^2 + k_1(8) + k_2(12) + k_3 = 0 \\ 4^2 + 4^2 + k_1(4) + k_2(4) + k_3 = 0 \end{bmatrix}$ Solving, we have $k_1 = -18$, $k_2 = -13$ and $k_3 = 92$. So, the equation of the circle is $x^2 + y^2 - 18x - 13y + 92 = 0$. The slope of the tangent PQ	1A 1M 1M 1M 1M 1A	for slope formula
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2 2	11/4	
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For tangency, we have $\Delta = 0$.		*
2	1M	
$k^2 + 23k - 24 = 0$		
k = 1 or $k = -24$ (rejected)		
	1A	

Paper 2

Question No.	Key	Question No.	Key
1.	C	31.	В
2.	C	32.	D
3.	C	33.	A
4.	A	34.	A
5.	. C	35.	D
6.	D	36.	C
7.	D	37.	C
8.	Α	38.	A
9.	C	39.	A
10.	Α	40.	С
11.	С	41.	В
12.	В	42.	В
13.	D	43.	D
14.	C	44.	В
15.	В	45.	D
16.	В		
17.	Α		
18.	В		
19.	A		
20.	Α		
21.	В		
22.	C		
23.	В		
24.	D		
25.	A		
26.	D		
27.	D		
28.	В		
29.	D		
30.	В		