Name and Surname : Solns .....

Grade/Class : 11/..... **Mathematics Teacher** : .....

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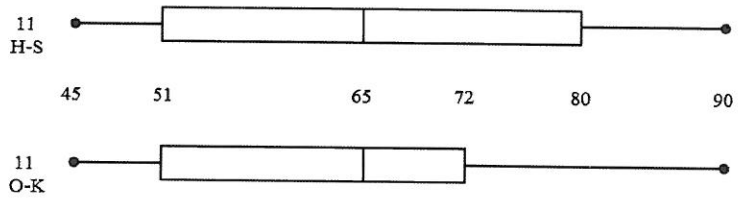
June Paper 2

ANSWER BOOKLET

2017

QUESTION 1



1.1.	IQR = 80 − 51 ✓	
	= 29 % ✓	2
1.2.	25 % ✓	1
1.3.	• Medians are the same ✓	
	M = 65 %	
	• Ranges are the same ✓	
	R = 90 − 45	
	= 45 %	2

QUESTION 2

Height (in m)	$1{,}3 \leq h < 1{,}5$	$1{,}5 \leq h < 1{,}7$	$1{,}7 \leq h < 1{,}9$	$1{,}9 \leq h < 2{,}1$
Frequency	24	73	16	5

24 97 113 118

2.1. $1{,}5 \leq h < 1{,}7$ ✓ — 1

2.2. $\bar{h} = \dfrac{1{,}4 \times 24 + 1{,}6 \times 73 + 1{,}8 \times 16 + 2{,}0 \times 5}{24 + 73 + 16 + 5}$

$= \dfrac{189{,}2}{118}$ midpt ✓ × f ✓ $\quad 189{,}2 = \frac{946}{5}$ $\quad \frac{473}{295}$

$= 1{,}60$ cm ✓ — 3

2.3. $T_1; \cdots; T_{118} \quad M = T_{\frac{1}{2}(1+118)} = T_{59{,}5}$

$T_{60}; \cdots; T_{118} \quad Q_3 = T_{\frac{1}{2}(60+118)} = T_{89}$ ✓ — 1

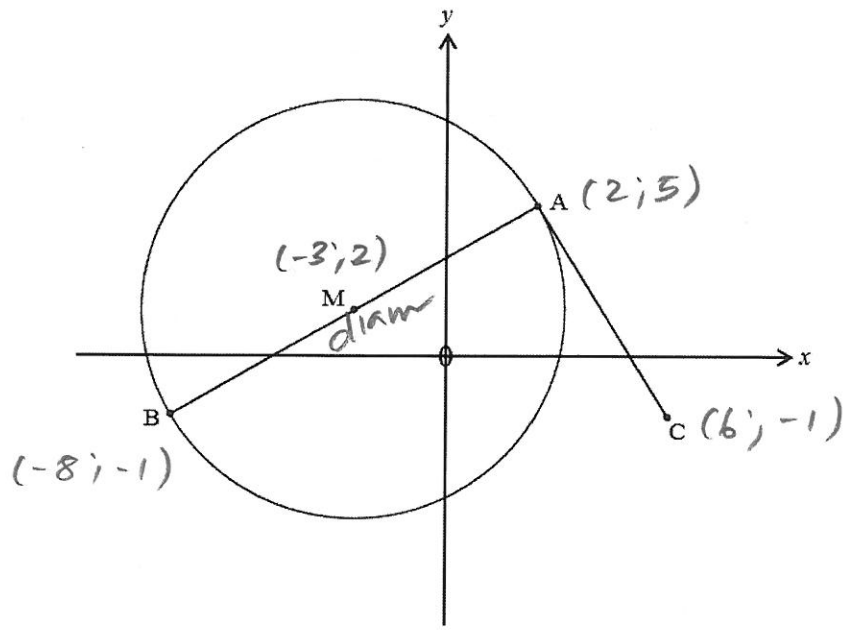
2.4. $T_1; \cdots; T_{118} \quad D_7 = T_{\frac{7}{10}(1+118)}$

$= T_{83{,}3}$

$\therefore \; 1{,}5 \leq h < 1{,}7$ ✓ — 1

QUESTION 3

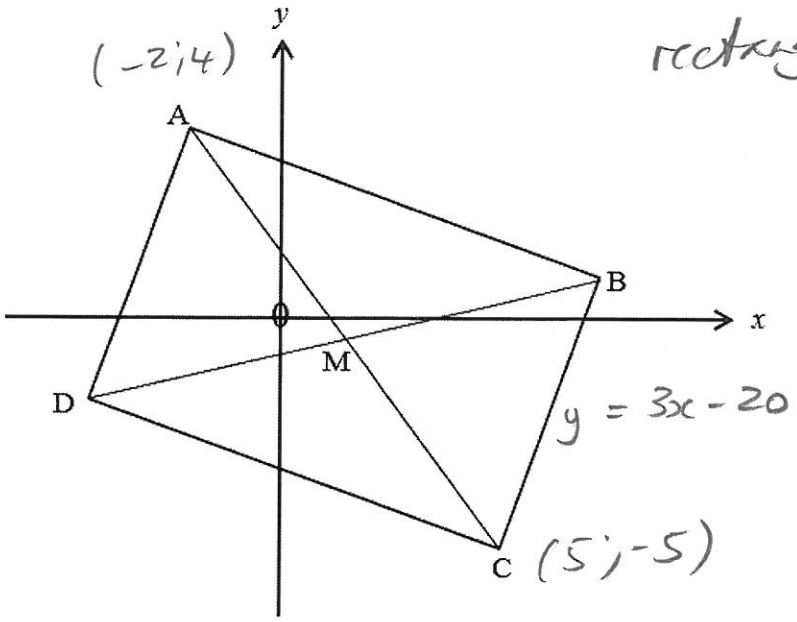
. D(16; d)



3.1.	$\frac{x_B + (2)}{2} = -3$ $\quad \frac{y_B + (5)}{2} = 2$	
	$\therefore x_B = -8$ $\quad y_B = -1$	
	$\therefore$ B(-8;-1) ✓ ✓ radii	2
3.2.	$m_{AM} = \frac{5 - 2}{2 - (-3)} = \frac{3}{5}$ ✓	1
3.3.	$m_{AC} = \frac{-1 - 5}{6 - (-2)} = -\frac{3}{2}$ ✓	
	$m_{AM} \cdot m_{AC} = \frac{3}{5} \times -\frac{3}{2}$ ✓	
	$= -\frac{9}{10}$	✓
	$\neq -1$	
	$\therefore$ AM $\not\perp$ AC	

	∴ AC is not ✓ conv ✓R tan ⊥ rad	
	a tangent to the	
	circle at A.	5
3.4	$m_{AM} = \frac{3}{5}$ $m_{AD} = \frac{d-5}{16-2}$	
	$= \frac{d-5}{14}$ ✓	
	✓method	
	Collinear $\frac{3}{5} = \frac{d-5}{14}$	
	$3.14 = 3(d-5)$	
	$\frac{67}{5} = d$ ✓	3

QUESTION 4



rectangle

4.1.	$AM = MD$ ✓R diags rect bisect	
	$x_M = \frac{-2+(5)}{2}$ $y_M = \frac{4+(-5)}{2}$	
	$= \frac{3}{2}$ ✓ $= -\frac{1}{2}$ ✓	
	$\therefore M\left(\frac{3}{2}; -\frac{1}{2}\right)$	3
4.2.	$m_{AB} = -\frac{1}{3}$ ✓ ✓R ^'s rect = 90°	
	AB: $y = -\frac{1}{3}x + c$	
	sub $A(-2;4)$	
	$4 = -\frac{1}{3}(-2) + c$ ✓	
	$\frac{10}{3} = c$	
	$\therefore y = -\frac{1}{3}x + \frac{10}{3}$ ✓	4

4 3.	$DB = AC$ ✓R diags rect =	
	$= \sqrt{(-5-4)^2 + (5-(-2))^2}$ ✓	
	$= \sqrt{130}$	
	$= 11,40$ ✓	3

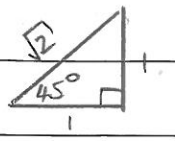
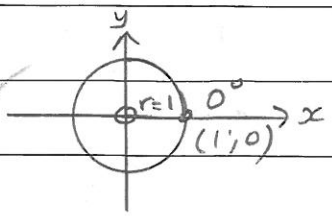
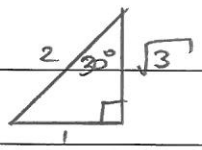
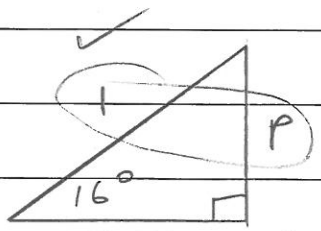
QUESTION 5

5.1.	$x = \frac{\sin 15° + 10}{3(\cos 25°)^2}$	
	$= 4,16$ ✓✓	2
5.2.	$\frac{x}{\sin 10,33°} = \frac{30,82}{\sin 50,75°}$	
	$x = 7,14$ ✓	1
5.3.	$15^2 = 14^2 + 10^2 - 2.14.10.\cos x$	
	$-71 = -280\cos x$	
	$\frac{71}{280} = \cos x$ ✓	
	$x = \cos^{-1}\left(\frac{71}{280}\right)$	
	$= 75,31°$ ✓	2

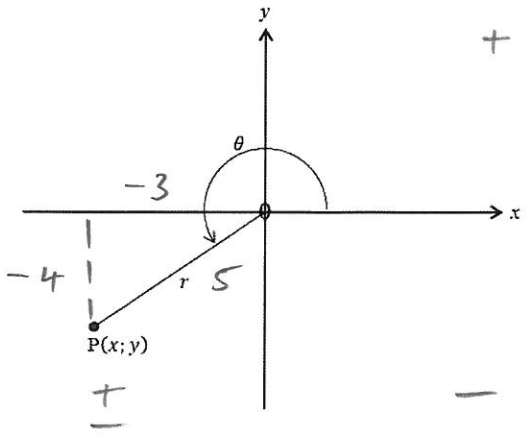
5.4	$8 - 3\tan 7(x-20°) = \tan 80°$	
	Let $A = 7(x-20°)$	
	$8 - 3\tan A = 5,67\ldots$	
	$\tan A = 0,776\ldots$ ✓	
	$A = \tan^{-1}(0,776\ldots)$	
	$= 37,82\ldots°$ ✓	
	$7(x-20°) = 37,82\ldots°$	
	$x = 25,40°$ ✓	3

NB 6.1. WDC ∴ no spec diagrams means no marks 0/6

QUESTION 6

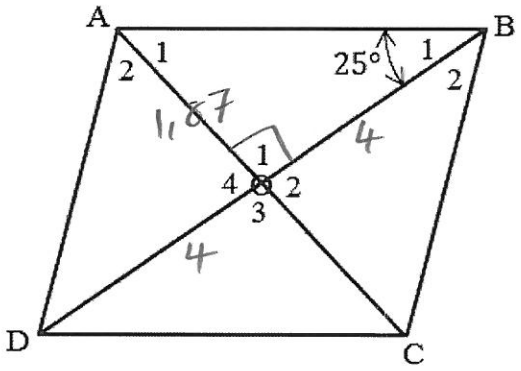
6.1.	1. $\sin 45° = \frac{o}{h}$ $= \frac{1}{\sqrt{2}}$ ✓ ✓ 	2
6.1.	2. $\cos 0° = \frac{x}{r}$ $= \frac{1}{1}$ $= 1$ ✓ ✓ 	2
6.1.	3. $\tan 30° = \frac{o}{a}$ $= \frac{1}{\sqrt{3}}$ ✓ ✓ 	2
6.2.	$\sin 16° - p = 0$ ∴ $\sin 16° = p = \frac{p}{1}\ \frac{o}{h}$	
	✓  $\sqrt{1-p^2}$ (Pythag) ✓S	
	$\tan 16° = \frac{o}{a}$ $= \frac{p}{\sqrt{1-p^2}}$ ✓	3

6.3.



6.3.	1.1. I and III ✓	1
	1.2. III and IV ✓	1
6.3.	2. $\tan\theta = \frac{4}{3}$ $\frac{y}{x}$ $\frac{-4}{-3}$	
	$\therefore x = -3$ ✓	
	$y = -4$ ✓ 5	
	$r = 5$ ✓ Pythag	3
6.3.	3. $\cos\theta = \frac{x}{r}$	
	$= \frac{-3}{5}$ ✓	1
	no CA if Cos +	
	as θ is in Q III !	

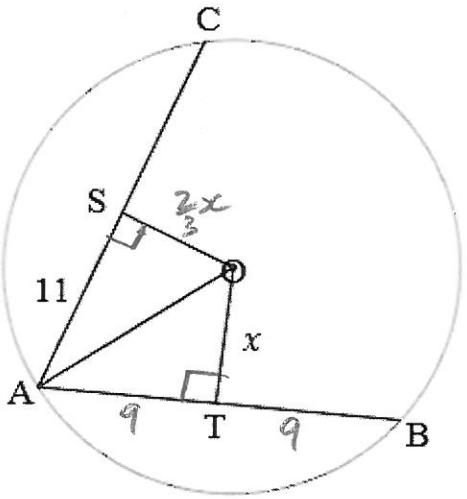
QUESTION 7



rhombus

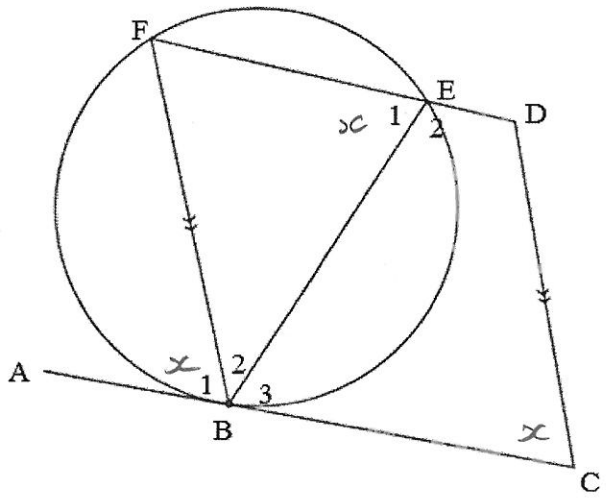
7.1.	1. $OB = 4$ ✓	1
7.1.	2 $\hat{O}_1 = 90°$ ✓	1
7.2.	$\frac{AO}{4} = \tan 25°$ ✓ $\frac{o}{a}$	
	$AO = 4 . \tan 25°$	
	$= 1,87$ ✓	2
7.3.	Area $ABCD = 4 \times (\frac{1}{2} . 4 . 1,87)$ ✓	
	$= 4 \times 3,74$	
	$= 14,96$ ✓ $\frac{374}{25}$	2
7.4.	1. $\hat{B}_2 = 25°$ ✓	1
7.4.	2. $\hat{A}_1 = 65°$	
	$A_2 = 65°$ ✓	1

QUESTION 8



8.1.	AT = 9 ✓S ✓R line from centre O ⊥ to chord	2
8.2.	$OA^2 = 9^2 + x^2$ Pythag	
	$OA^2 = 11^2 + (\frac{2}{3}x)^2$ Pythag	
✓S	$9^2 + x^2 = 11^2 + (\frac{2}{3}x)^2$ ✓method ✓S both = OA^2	
	$81 + x^2 = 121 + \frac{4}{9}x^2$	
	$\frac{5}{9}x^2 = 40$	
	$x^2 = 72$ ✓	
	$\therefore OA^2 = 9^2 + 72$	
	$= 153$	
	$\therefore OA = \sqrt{153}$	
	$= 12{,}37$ ✓	5

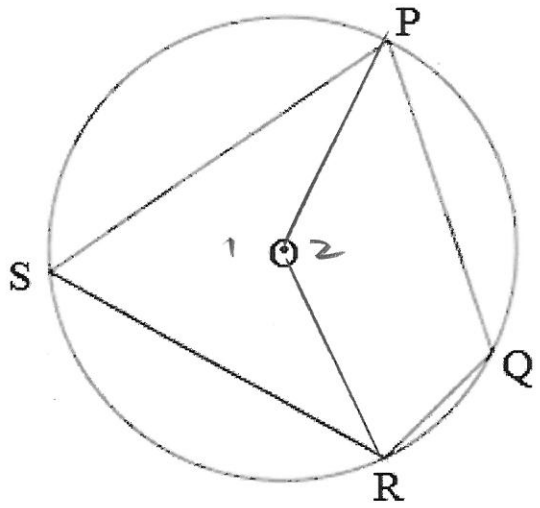
QUESTION 9



	let $\hat{E}_1 = x$	
	$\therefore \hat{B}_1 = x$ ✓S ✓R ∠ tan chord	
	$\therefore \hat{C} = x$ ✓S ✓R corr ∠s =, BF ∥ CD	
	$\therefore \hat{E}_1 = \hat{C}$ both $= x$	
	$\therefore$ BFDC is a ✓R conv ext ∠ cyclic quad. cyclic quad	5

QUESTION 10

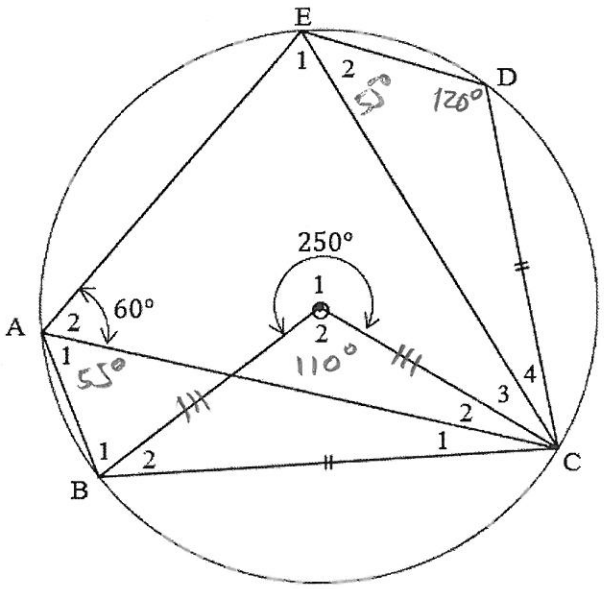
10.1.



✓ constr

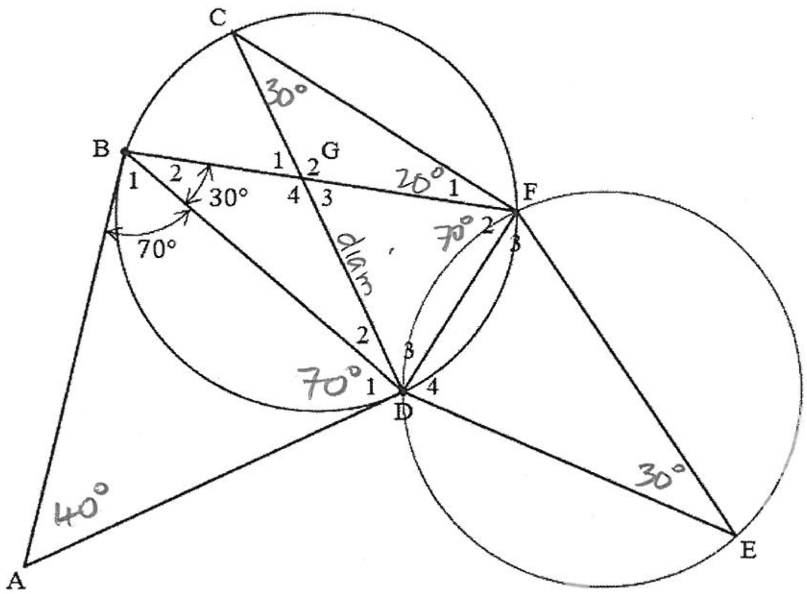
	$\hat{O}_1 = 2.\hat{Q}$ ✓SR ^@ centre = 2^@ ⊙'ce	
	$\hat{O}_2 = 2.\hat{S}$ ✓SR ^@ centre = 2^@ ⊙'ce	
	$\hat{O}_1 + \hat{O}_2 = 360°$ ✓R ∠ rev = 360°	
	$2\hat{Q} + 2\hat{S} = 360°$ ✓S	
	$2(\hat{Q} + \hat{S}) = 360°$	
	$\hat{Q} + \hat{S} = 180°$	5

10.2.



10.2.	1. $\hat{D} = 120°$ ✓S ✓R opp ^'s cyclic quad = 180°	2
10.2.	2. $OB = OC$ } SR radii	
	$\hat{B}_2 = \hat{C}_1 + \hat{C}_2$ } ✓ ^'s opp = sides	
	$\hat{O}_2 = 110°$ ✓SR 1 rev = 360°	
	∴ $\hat{B}_2 = 35°$ ✓SR ^'s Δ = 180°	3
10.2.	3. $\hat{A}_1 = 55°$ ✓S ✓R ^ @ centre = 2 ^ @ ⊙'ce	2
10.2.	4. $\hat{E}_2 = 55°$ ✓S ✓R = chords = ^'s @ ⊙'ce	2

QUESTION 11



11.1.	AB = AD ✓SR	tans ext common pt =	
	$\hat{D}_1$ = 70° ✓SR	^'s opp = sides	
	$\hat{A}$ = 40° ✓SR	^'s Δ = 180°	3
	⟶		
11.2.	$\hat{F}_2$ = 70° ✓S	✓R ^ tan chord	2
	⟶		
11.3.	$\hat{F}_1$ = 20° ✓S	✓R ^ in semi ⊙ = 90°	2
	⟶		
11.4.	$\hat{C}$ = 30° ✓S	✓R ^'s in same ⊙ segm =	2
	⟶		
11.5.	E = 30° ✓S	✓R = circles, = chords,	
	⟶	= ^'s @ ⊙'ce	2