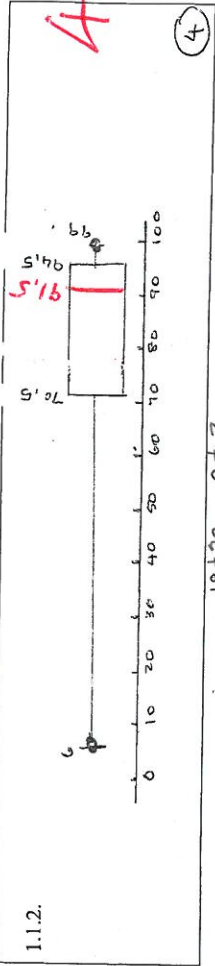


Q1, 8 Q3 ✓
M ✓
whiskers ✓
Scale ✓



ANSWER BOOKLET
June Examination Paper 2
28 May 2018

Name and Surname : MEMO
Grade/Class : 11/..... Mathematics Teacher :

100

QUESTION 1

- 2 6 7 7 5 34 56 85 89 90 90 91 92 92 93 93 93 94 95 95 96 97 97 99
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

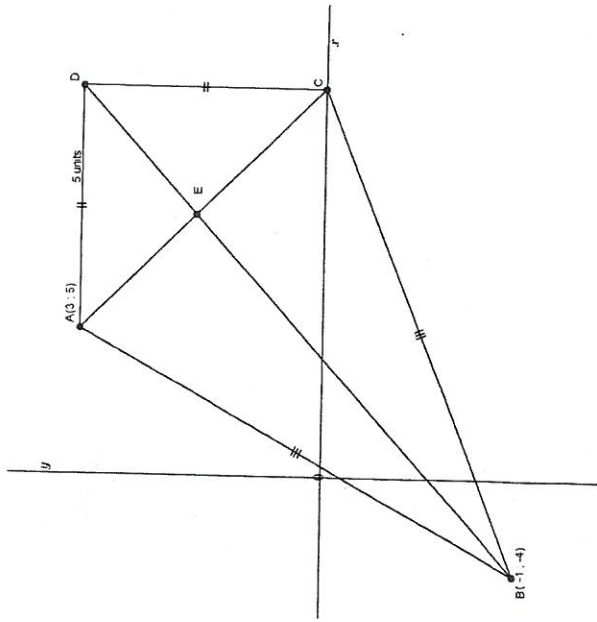
1.1.1. a)	$\frac{1789}{24}$	[sum of 17 89]
	= 74,54 ✓	[answer] 2
b)	Median = 91,5 ✓	$\frac{T_{12} + T_{13}}{2}$
		①
c)	$Q_1 = \frac{56 + 85}{2} = 70,5$ ✓	$\frac{T_6 + T_7}{2}$
	$Q_3 = \frac{94 + 95}{2} = 94,5$ ✓	$\frac{T_{18} + T_{19}}{2}$ 3
	IQR = 94,5 - 70,5	
	= 24 ✓	[IQR] ③

* $T_1; \dots; T_{24} \therefore M = T_{\frac{1}{2}(1+24)} = T_{12,5} = \frac{T_{12} + T_{13}}{2}$
 * $T_1; \dots; T_{12}$ lower list * * * * * $T_{13}; \dots; T_{24}$ upper list
 $Q_1 = T_{\frac{1}{2}(4+12)} = T_{6,5} = \frac{T_6 + T_7}{2}$ $Q_3 = T_{\frac{1}{2}(13+24)} = T_{18,5} = \frac{T_{18} + T_{19}}{2}$

1.2.1.	Range = 19 - 1	①
	= 18 hrs ✓	
1.2.2.	6 - 8 hrs ✓	①
1.2.3.	$(11 \times 6) + (3 \times 3) + (5 \times 7) + (12 \times 7) + (9 \times 9) +$ $(11 \times 6) + (13 \times 5) + (15 \times 4) + (17 \times 2) + (19 \times 1)$	
	$\bar{x} = \frac{454}{50} = 9,08$ ✓	⑤
1.3.	$\frac{12 + 17 + 20 + x + 30 + 34 + 29 + 12 + 35 + x + 19 + 35}{12}$ $= 23,75$ $231 + 2x = 23,75 \times 12$ ✓ $2x = 54$ $x = 27$ ✓	③

QUESTION 2:

2.1.



A(3;5) B(-1;-4)

2

3

2.1.4	$AB^2 = (3 - (-1))^2 + (5 - (-4))^2 \checkmark$ $AB^2 = 16 + 81$ $AB = \sqrt{97} = 9,85 \checkmark$	(2)
2.1.5	$m_{AC} = \frac{5-0}{3-8}$ $= -1 \checkmark$ $m_{BD} = \frac{8-(-4)}{3-(-1)} = \frac{12}{4} = 3$ $m_{AC} \times m_{BD} = -1 \times 3 = -3 \neq -1$ $\therefore AC \not\perp BD$	(3)

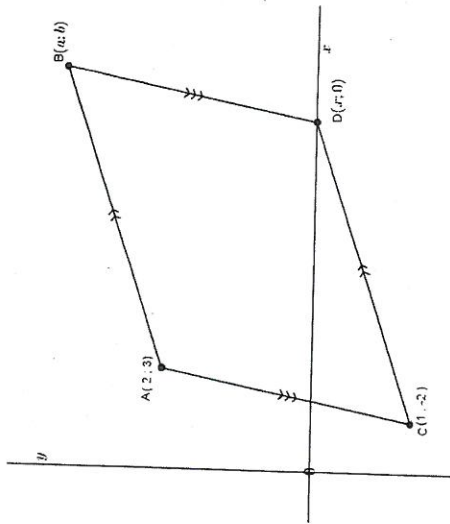
1

2

2

2.1.1.	$x = 3 + 5 \checkmark$ $C = (8; 0)$	(1)
2.1.2	$F = \left(\frac{3+8}{2}; \frac{5+0}{2} \right) = \left(\frac{11}{2}; \frac{5}{2} \right)$ $x = \frac{3+8}{2} = \frac{11}{2} = 5,5$ $y = \frac{5+0}{2} = \frac{5}{2} = 2,5$	(2)
2.1.3	$m_{BD} = \frac{8 - (-4)}{3 - (-1)} = \frac{12}{4} = 3 \checkmark$ $m_{AC} = \frac{5 - 0}{3 - 8} = -1 \checkmark$ $m_{BD} \neq m_{AC}$ $m_{BD} = 3$	(2)

2.2.



3

2.2.2	b)	$M_{AD} = \frac{3-0}{2-1}$	$A(2;3)$
		$= -\frac{3}{1}$ ✓	$D(1;0)$
		$y = -\frac{3}{1}x + c$	
		$0 = -\frac{3}{1}(1) + c$ ✓	
		$\frac{3}{1} = c$	
		$y = -\frac{3}{1}x + \frac{3}{1}$ ✓	③
		$4 \frac{1}{2}$	

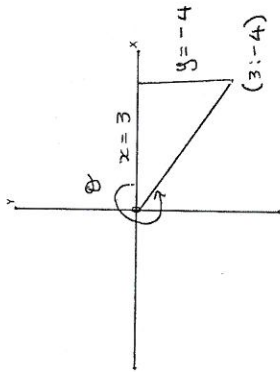
4

2

2.2.1.	$CD^2 = (1-x)^2 + (-2-0)^2 = (40)^2$ ✓	④
	$1 - 2x + x^2 + 4 = 40$	
	$x^2 - 2x - 35 = 0$ ✓	
	$(x-7)(x+5) = 0$ ✓	
	$x = 7$ ✓ $x = -5$ reject	
2.2.2	a) $B(8;5)$ ✓ ✓	②
	① $C(1;-2) \xrightarrow{6 \rightarrow 2} D(7;0)$	
	\therefore ② $A(2;3) \xrightarrow{6 \rightarrow 2} B(8;5)$	
	p.t.o.	

QUESTION 3

3.1.1.

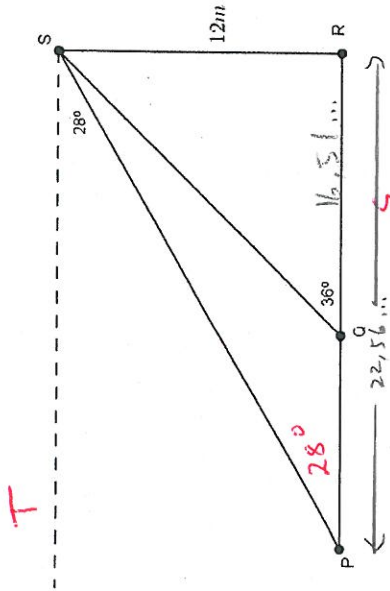


$P(3; -4)$
 ✓ correct quad.
 ✓ θ

3.1.1.		(2)
3.1.2	$r = 5$ ✓	Pythagoras 5
3.2.1.	$\tan \theta = -\frac{4}{3}$ ✓	(1)
3.2.2.	$2 \sin \theta + 3 \cos \theta$ $= 2 \left(-\frac{4}{5}\right) + 3 \left(\frac{3}{5}\right)$ ✓ $= \frac{1}{5}$ ✓	(3)

4.1.	$\cos \theta = 0,673$ $\theta = \cos^{-1}(0,673)$ ✓ $\theta = 47,70^\circ$ ✓	(1)
4.2.	$8 \tan \theta = \sin 80^\circ$ $\tan \theta = \frac{\sin 80^\circ}{8}$ ✓ $\tan \theta = 0,1231009 \dots$ $\theta = \tan^{-1}(0,1231009 \dots)$ $\theta = 7,03^\circ$ ✓	(2)
4.3.	$\sin(2\theta - 34^\circ) = \frac{5}{7}$ ✓ $2\theta - 34^\circ = 45,5847^\circ$ ✓ $2\theta = 79,5847^\circ$ $\theta = 39,79^\circ$ ✓	(3)
5.1.	 $\sqrt{2}$ z 1	(3)
5.2.	$\tan 45^\circ \cdot \cos 60^\circ + \cos^2 \theta$ $\sin 30^\circ$ $= \left(\frac{1}{1}\right) \left(\frac{1}{2}\right) + \left(\frac{1}{2}\right)^2$ $= \frac{1}{2} + \frac{1}{4}$ $= \frac{3}{4}$	(5)

QUESTION 6:

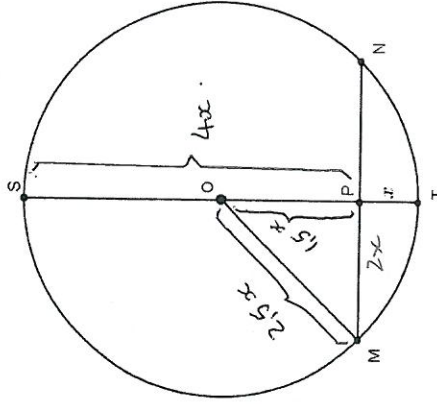


6.1.	$\hat{P} = 28^\circ$ ✓ alt \angle s = $PR \parallel TS$	(1)
6.2.	$\triangle SQR$: $\frac{SR}{QR} = \tan Q$ $\Rightarrow \frac{12}{QR} = \tan 36^\circ$ ✓ $\Rightarrow QR = \frac{12}{\tan 36^\circ}$ $\Rightarrow QR = 16,51 \dots$ ✓ $\rightarrow A$	
	$\triangle SPR$: $\frac{SR}{PR} = \tan P$ $\Rightarrow \frac{12}{PR} = \tan 28^\circ$ ✓ $\Rightarrow PR = \frac{12}{\tan 28^\circ}$ $\Rightarrow PR = 22,56 \dots$ ✓ $\rightarrow B$	
	$PQ = 22,56 \dots - 16,51 \dots$ $= 6,05 m$ ✓	(5)

QUESTION 7:

7.1.1	<u>Perpendicular</u> ✓	(2)
7.1.2	<u>bisect</u> ✓	

7.2.

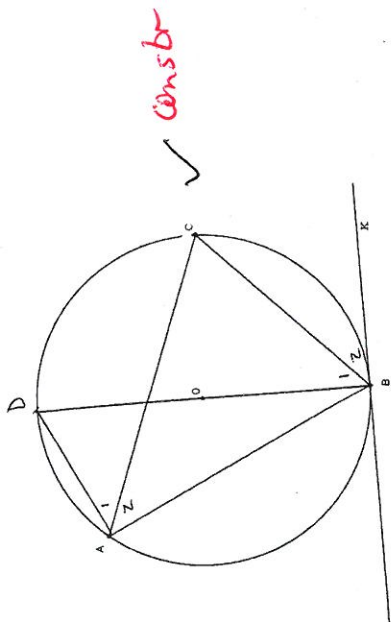


$PS = 4 \cdot PT$
 $= 4x$
 $ST = 4x + x$
 $= 5x$
 $r = \frac{5}{2}x$

	$OM = 2,5x$ ✓ 5 radii	
	$OP = 1,5x$ ✓ 3 radii	
	$MP^2 = OM^2 - OP^2$ SAR (Pyth) ✓	
	$MP^2 = (2,5x)^2 - (1,5x)^2$	(5)
	$MP^2 = 4x^2$	
	$MP = 2x$ ✓	
	$\therefore MN = 4x$ ✓ line from centre \perp to chord	

QUESTION 8

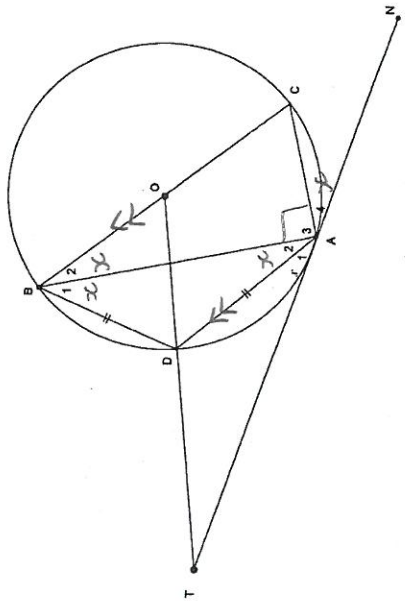
8.1.



	Const: Diameter BD, Join AD.	
	$\hat{A}_1 + \hat{A}_2 = 90^\circ$ ^{SAP} ✓	\angle in semi $\odot = 90^\circ$
	$\hat{B}_1 + \hat{B}_2 = 90^\circ$ ^{SAP} ✓	tan \perp radius
	But $\hat{A}_1 = \hat{B}_1$ ^{SAP} ✓	\angle s in same \odot segment $\hat{=}$
	$\Rightarrow \hat{A}_2 = \hat{B}_2$	
	$\Rightarrow \hat{KBC} = \hat{BAC}$	
		(4)

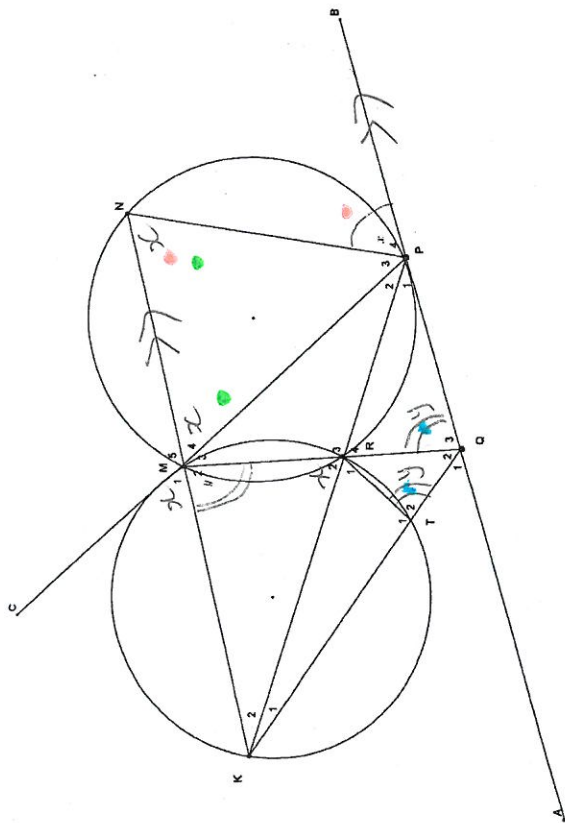
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8.2.



8.2.1.	$\hat{B}_1 = x$ ✓	tan chord ✓	
	$\hat{A}_2 = x$ ✓	∠s opp = sides ✓	
	$\hat{B}_2 = x$ ✓	alt ∠s = BC AB ✓	
	$\hat{A}_4 = x$ ✓	tan chord ✓	
			8
8.2.2.	$\hat{A}_3 = 90^\circ$ ✓	∠ in semi C = 90° ✓	
	$3x + 90^\circ = 180^\circ$ ✓	∠s on str line = 180° ✓	
	$\Rightarrow 3x = 90^\circ$		
	$x = 30^\circ$ ✓		
			4

Question 9.



9.1.1.	$\hat{M}_4 = \hat{x}$	\checkmark ^{SAC} tan chord
	$\hat{M}_1 = \hat{x}$	\checkmark ^{SAC} vert. opp $\hat{1}$'s =
	$\hat{R}_2 = \hat{x}$	\checkmark ^{SAC} tan chord
	$\hat{N} = \hat{x}$	\checkmark ^{SAC} ext $\hat{1}$ of cyclic quad
	$\Rightarrow \hat{P}_4 = \hat{N}$	\checkmark ^S
	$\Rightarrow KN \parallel AB$	\checkmark ^{SAC} alt $\hat{1}$'s =
		(6)
9.1.2.	$\hat{M}_4 = \hat{N} = \hat{x}$	\checkmark ^S
	$PM = PN$	\checkmark ^R sides opp = $\hat{1}$'s
		(7)

9.	$M_2 = y$	\checkmark ^{SAC} ext $\hat{1}$ of cyclic quad
	$T_2 = y$	\checkmark ^{SAC} alt $\hat{1}$'s =, $KN \parallel AB$
	$\hat{Q}_3 = y$	\checkmark ^{SAC} both = y
	$T_2 = \hat{Q}_3$	\checkmark $\therefore PQ$ is a tangent converse \checkmark tan chord
		(3)

3

