Name and Surname : ..... MEMO .....

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

100

ANSWER BOOKLET
June Examination Paper 2
28 May 2018

QUESTION 1

x 6 7 7 9 34 56 85 89 89 90 90 91 92 92 93 93 93 94 95 95 96 97 97 99

n 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 obs 1789]

$= 74,54$ ✓ [answer] 2

(2)

b) Median $= 91,5$ ✓ [ans] $\frac{T_{12}+T_{13}}{2}$ 1

(1)

c) $Q_1 = \frac{56+85}{2} = 70,5$ ✓ [Q_1] $\frac{T_6+T_7}{2}$

$Q_3 = \frac{94+95}{2} = 94,5$ ✓ [Q_2] $\frac{T_{18}+T_{19}}{2}$ 3

$IQR = 94,5 - 70,5$

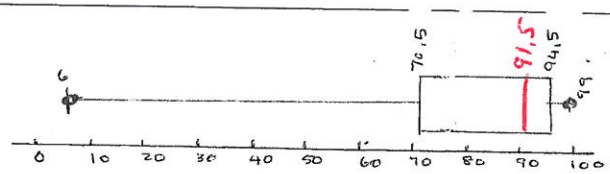
$= 24$ ✓ [IQR]

(3)

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

Q_1 & Q_3 ✓ Scale ✓
M ✓
whiskers ✓

1.1.2.



4

(4)

$\frac{18+20}{2}$ $\frac{0+2}{2}$

1.2.1. Range $= 19 - 1$

$= 18$ hrs ✓ (1) 1

1.2.2 6 – 8 hrs ✓ (1) 1

1.2.3 $(1\times1) + (3\times3) + (5\times7) + (12\times7) + (9\times9) +$ ✓ freq ✓ midpt

$(11\times6) + (13\times5) + (15\times4) + (17\times2) + (19\times1)$

$\bar{x} = \frac{454}{50}$ ✓ ✓ $= 9,08$ ✓ 5

(5)

1.3 $\frac{12+17+20+x+30+34+29+12+35+x+19+35}{12}$

$= 23,75$ ✓ equation

$231 + 2x = 23,75 \times 12$ ✓

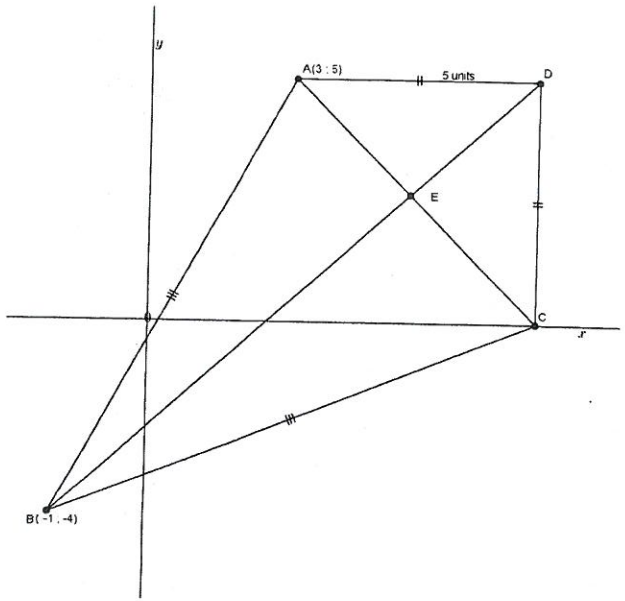
$2x = 54$

$x = 27$ ✓ 3

(3)

QUESTION 2:

2.1.



2.1.1.	$x = 3+5$ ✓ $\quad C = (8;0)$	(1)
2.1.2	$E = \left(\frac{3+8}{2} ; \frac{5+0}{2}\right)$ $\quad x = \frac{3+8}{2}$ $\quad y = \frac{5+0}{2}$	
	$= \left(\frac{11}{2} ; \frac{5}{2}\right)$ ✓ ✓ $\quad = \frac{11}{2}$ $\quad = \frac{5}{2}$	
	$5{,}5 \quad 2{,}5$	(2)
2.1.3	$m_{BD} = \frac{-4 - \frac{5}{2}}{-1 - \frac{11}{2}}$ ✓	
	$m_{BD} = 1$ ✓	(2)

B(-1;-4)
D(8;5)
E($\frac{11}{2}$; $\frac{5}{2}$)

1

2

2

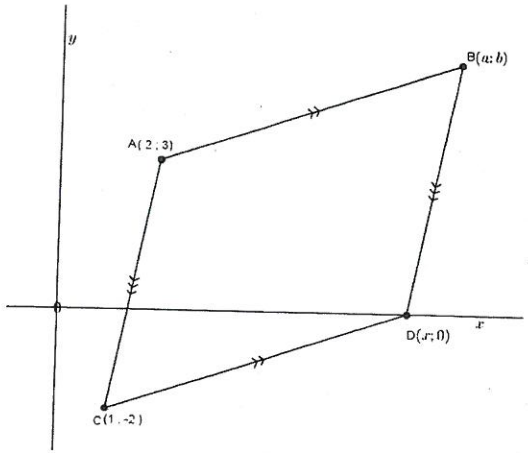
A(3;5) B(-1;-4)

2.1.4	$AB^2 = (3-(-1))^2 + (5-(-4))^2$ ✓	
	$AB^2 = 16 + 81$	
	$AB = \sqrt{97} = 9{,}85$ ✓	(2)
2.1.5	$m_{AC} = \frac{5-0}{3-8}$	
	$= -1$ ✓	
	prod of grads ✓	
	$m_{AC} \times m_{BD} = -1 \times 1$	
	$= -1$ ✓	
	$\therefore AC \perp BD$	(3)

2

3

2.2.



2.2.1. $CD^2 = (1-x)^2 + (-2-0)^2 = (\sqrt{40})^2$ ✓

$1 - 2x + x^2 + 4 = 40$

$x^2 - 2x - 35 = 0$ ✓

$(x - 7)(x + 5) = 0$ ✓

$x = 7$ ✓ $x = -5$ reject (4)

4

2.2.2 a) B (8; 5) ✓ ✓ (2)

2

① C(1; -2) $\xrightarrow{6 \rightarrow}{2 \uparrow}$ D(7; 0)

∴ ② A(2; 3) $\xrightarrow{6 \rightarrow}{2 \uparrow}$ B(8; 5)

P.T.O.

A(2; 3)

D(7; 0)

2.2.2 b) $m_{AD} = \frac{3-0}{2-7}$

$= -\frac{3}{5}$ ✓

$y = -\frac{3}{5}x + c$

$0 = -\frac{3}{5}(7) + c$ ✓

$\frac{21}{5} = c$

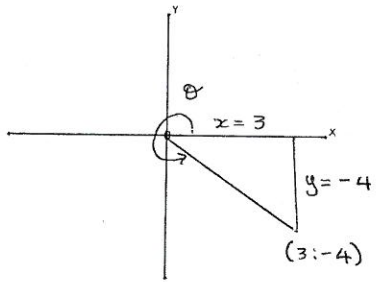
$y = -\frac{3}{5}x + \frac{21}{5}$ ✓ (3)

4,2

3

QUESTION 3

3.1.1.



P (3;−4) ✓ correct quad. ✓ θ — 2

3.1.1.		(2)
3.1.2	$r = 5$ ✓ Pythagoras	(1)
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)

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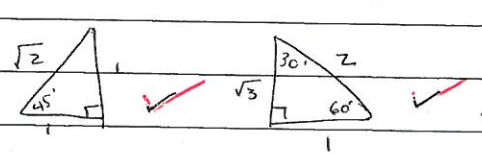
4.1.	$\cos\theta = 0{,}673$	
	$\theta = \cos^{-1}(0{,}673)$	
	$\theta = 47{,}70°$ ✓ 47,7°	(1)
4.2	$8\tan\theta = \sin 80°$	
	$\tan\theta = \frac{\sin 80°}{8}$ ✓	
	$\tan\theta = 0{,}1231009\ldots$	
	$\theta = \tan^{-1}(0{,}12\ldots)$	
	$\theta = 7{,}02°$ ✓	(2)
4.3.	$\sin(2\theta - 34°) = \frac{5}{7}$ ✓	
	$2\theta - 34° = 45{,}5847°$ ✓	
	$2\theta = 79{,}5847°$	
	$\theta = 39{,}79°$ ✓	(3)
5.1	 ✓ ✓ ✓	(3)
5.2	$\frac{\tan 45° \cdot \cos 60°}{\sin 30°} + \cos^2\theta$	
	$= \frac{\left(\frac{1}{1}\right)\left(\frac{1}{2}\right)}{\frac{1}{2}}$ ✓ $+ \left(\frac{1}{1}\right)^2$ ✓	
	$= 2$ ✓	(5)

let $A = 2\theta - 34°$
$7\sin A = 5$
$\sin A = \frac{5}{7}$
$A = \sin^{-1}\left(\frac{5}{7}\right)$
$= 45{,}58\ldots°$
$\therefore 2\theta - 34° = 45{,}58\ldots°$
$\theta = 39{,}79°$

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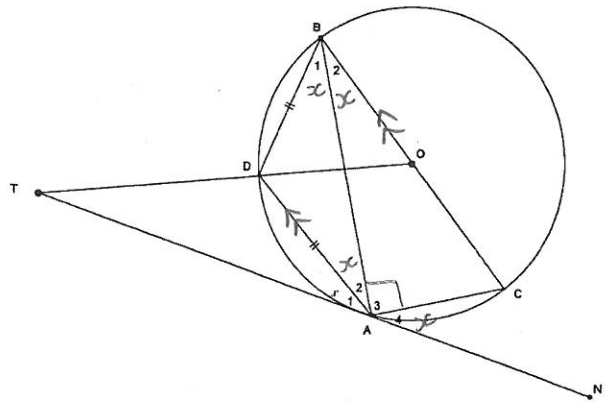
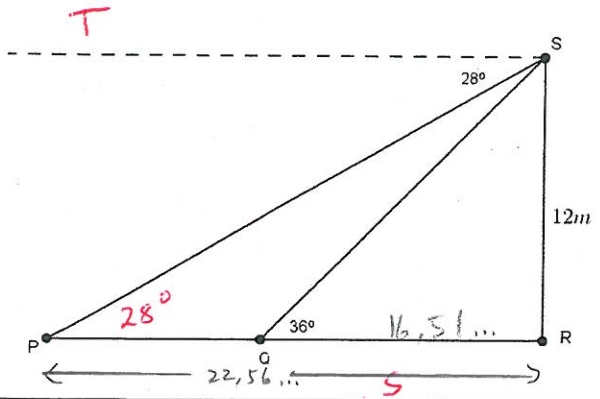
8.2.



8.2.1.	$\hat{B}_1 = x$ ✓ ^tan chord ✓	
	$\hat{A}_2 = x$ ✓ ∠'s opp = sides ✓	
	$\hat{B}_2 = x$ ✓ alt ∠s =, BC ∥ AD ✓	8
	$\hat{A}_4 = x$ ✓ ^tan chord ✓	
		(8)
8.2.2.	$\hat{A}_3 = 90°$ ✓ ∠ in semi ⊙ = 90° ✓	
	$3x + 90° = 180°$ ✓ SAP ∠'s on str line = 180°	4
	$\Rightarrow 3x = 90°$	
	$x = 30°$ ✓	
		(4)

QUESTION 6:



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

1

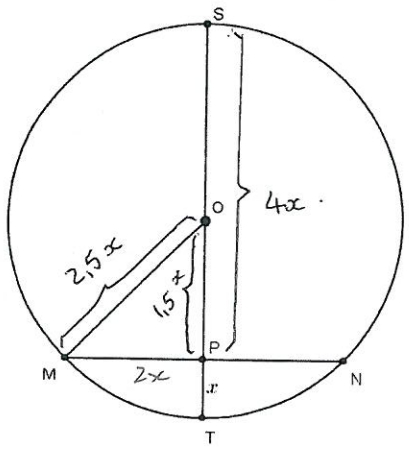
5

QUESTION 7:

7.1.1	Perpendicular ✓	
		(2)
7.1.2	bisect ✓	

2

7.2.



$PS = 4.PT$
$= 4x$

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

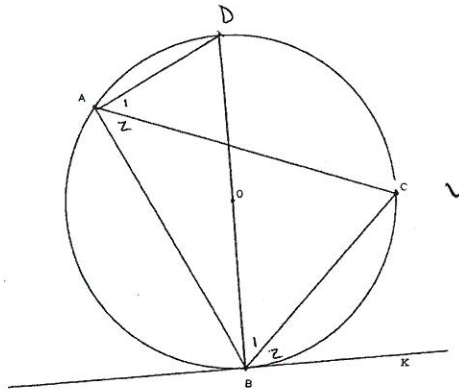
	$OM = 2,5x$ ✓ s radii	
	$OP = 1,5x$ ✓ s radii	
	$MP^2 = OM^2 - OP^2$ S&R (Pyth) ✓	
	$MP^2 = (2,5x)^2 - (1,5x)^2$	(5)
	$MP^2 = 4x^2$	
	$MP = 2x$ ✓	
	$\therefore MN = 4x$ ✓ S&R line from centre ⊙ ⊥ to chord.	

5

5

QUESTION 8

8.1.



✓ Const

Const : Diameter BD, Join AD .

$\hat{A}_1 + \hat{A}_2 = 90°$ S&R ∠ in semi ⊙ = 90°

$\hat{B}_1 + \hat{B}_2 = 90°$ S&R tan ⊥ radius

But $\hat{A}_1 = \hat{B}_1$ S&R ∠s in same ⊙ segment =

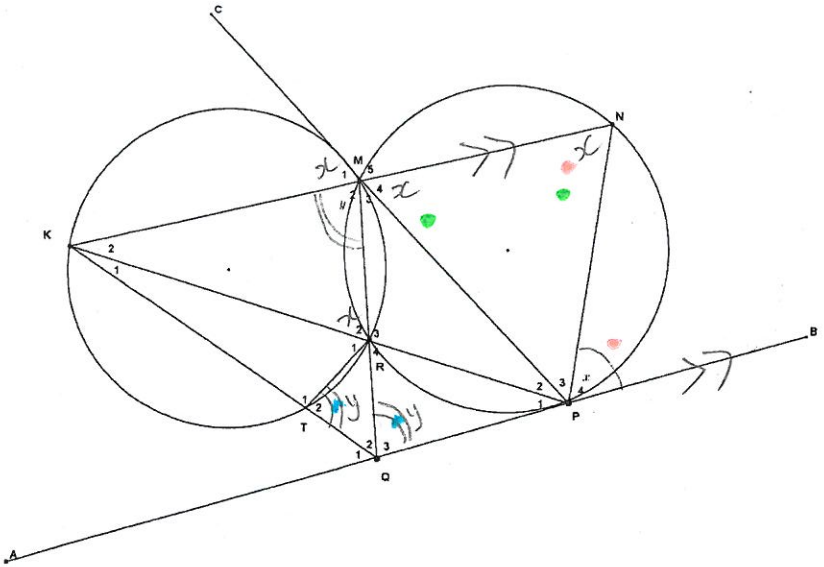
$\Rightarrow \hat{A}_2 = \hat{B}_2$

$\Rightarrow K\hat{B}C = B\hat{A}C$

4

(4)

Question 9.



9.1.	$\hat{M}_4 = x$ S&R ✓ tan chord	
	$\hat{M}_1 = x$ S&R ✓ vert. opp ∠'s =	
	$\hat{R}_2 = x$ S&R ✓ tan chord	
	$\hat{N} = x$ S&R ✓ ext ∠ of cyclic quad	
	$\Rightarrow \hat{P}_4 = \hat{N}$ ✓S	
	$\Rightarrow$ KN ∥ AB S&R ✓ alt ∠'s = .	
		(6)
9.2.	$\hat{M}_4 = \hat{N} = x$ ✓S	
	PM = PN ✓R sides opp = ∠'s	(2)

6

2

9.		
	$M_2 = y$	
	$T_2 = y$ S&R ✓ ext ∠ of cyclic quad	
	$\hat{Q}_3 = y$ S&R ✓ alt ∠'s = , KN ∥ AB	
	$\therefore \hat{T}_2 = \hat{Q}_3$ both = y	
	$\therefore$ PQ is a tangent converse ✓ tan chord	
		(3)

3
