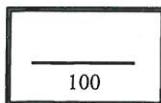


Name and Surname : MEMO :

Grade/Class : 11/.....

Mathematics Teacher :



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 6] \rightarrow 2
 $= 74,54$ ✓ [ans] 2

b) median = 91,5. ✓ [ans] 1

c) $Q_1 = \frac{56+85}{2} = 70,5$ ✓ [Q₁] $\frac{T_6+T_7}{2}$
 $Q_3 = \frac{94+95}{2} = 94,5$ ✓ [Q₃] $\frac{T_{18}+T_{19}}{2}$

IQR = 94,5 - 70,5
 $= 24$ ✓ [IQR] 3

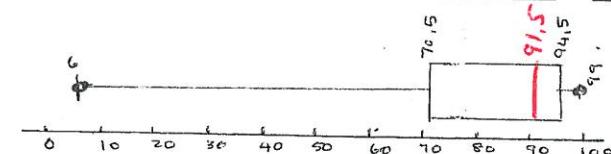
• $T_1; \dots; T_{24} \therefore M = T_{\frac{1}{2}(1+24)} = T_{12,5} = \frac{T_{12}+T_{13}}{2}$

• $T_1; \dots; T_{12}$ ^{lower} list * * $T_{13}; \dots; T_{24}$ ^{upper} list

$Q_1 = T_{\frac{1}{2}(4+12)} = T_{6,5} = \frac{T_6+T_7}{2}$ $Q_3 = T_{\frac{1}{2}(13+24)} = T_{18,5} = \frac{T_{18}+T_{19}}{2}$

Q₁, Q₃ ✓
M ✓
whiskers ✓ Scale ✓

1.1.2.



4

1.2.1. Range = $19 - 1$
 $= 18$ hrs ✓ 1

1.2.2. 6 - 8 hrs ✓ 1

1.2.3. $(1 \times 1) + (3 \times 3) + (5 \times 7) + (12 \times 7) + (9 \times 9) +$
 $(11 \times 6) + (13 \times 5) + (15 \times 4) + (17 \times 2) + (19 \times 1)$
 $\bar{x} = \frac{454}{50} = 9,08$ ✓ 5

1.3. $\frac{12+17+20+\dots+30+34+29+12+35+\dots+19+36}{12}$
 $= 23,75$ ✓ equation 3

$231 + 2x = 23,75 \times 12$. ✓

$2x = 54$

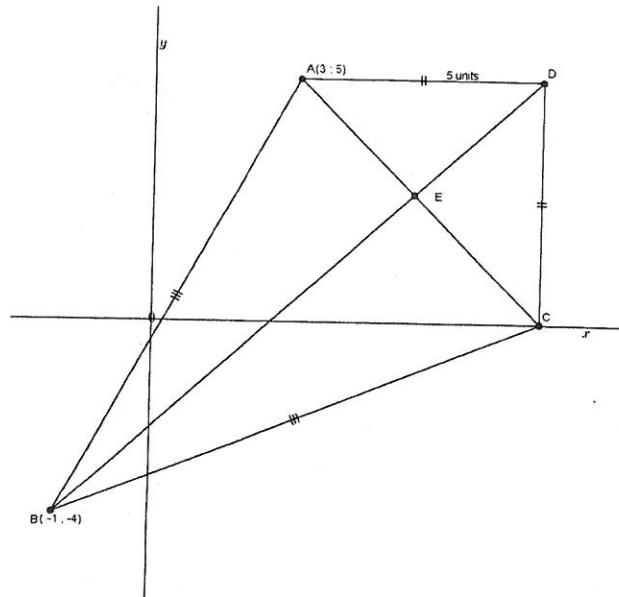
$x = 27$ ✓ 3

3

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

QUESTION 2:

2.1.



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

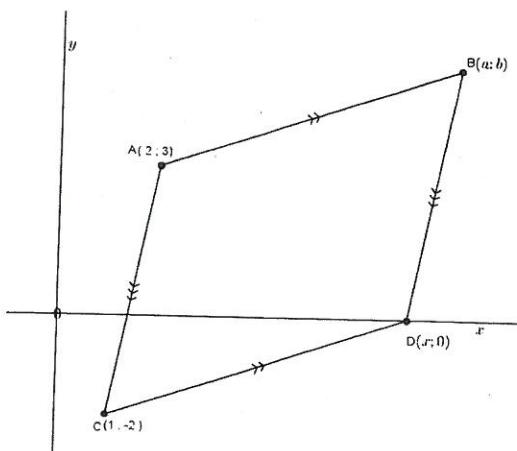
1

2

2

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

2.2.



2.2.1.	$CD^2 = (1-x)^2 + (-2-0)^2 = (\sqrt{40})^2 \checkmark$
	$1 - 2x + x^2 + 4 = 40$
	$x^2 - 2x - 35 = 0 \checkmark$
	$(x - 7)(x + 5) = 0 \checkmark$
	$x = 7 \checkmark \quad x = -5$
	reject
	(4)

4

2.2.2	a) <u>$B(8; 5)$</u>
	$\checkmark \checkmark$
	(2)

① $C(1, -2) \xrightarrow[\frac{6}{2} \uparrow]{\rightarrow} D(7, 0)$

\therefore ② $A(2, 3) \xrightarrow[\frac{6}{2} \uparrow]{\rightarrow} B(8, 5)$

P.T.O.

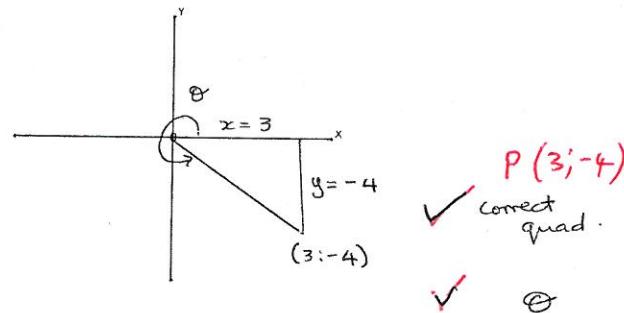
2

2.2.2	$m_{AD} = \frac{3-0}{2-7} = -\frac{3}{5}$
	$y = -\frac{3}{5}x + c$
	$0 = -\frac{3}{5}(7) + c \checkmark$
	$\frac{21}{5} = c$
	$y = -\frac{3}{5}x + \frac{21}{5} \checkmark$
	4, 2
	(3)

3

QUESTION 3

3.1.1.



2

$$3.1.1. \quad \text{At } A = 2\theta - 34^\circ \quad \text{at } A = 20^\circ - 34^\circ \quad \text{at } A = 20^\circ - 34^\circ$$

$$3.1.2. \quad r = 5 \quad \checkmark \quad \text{Pythagoras} \quad \text{Pythagoras} \quad \text{Pythagoras}$$

$$3.2.1. \quad \tan \theta = \frac{-4}{3} \quad \checkmark \quad \frac{4}{3} \quad \text{Pythagoras} \quad \text{Pythagoras}$$

$$3.2.2. \quad 2 \sin \theta + 3 \cos \theta$$

$$= 2 \left(-\frac{4}{5}\right) \checkmark + 3 \left(\frac{3}{5}\right) \checkmark \quad \frac{4}{5} \quad \frac{3}{5}$$

$$= \frac{1}{5} \quad \checkmark$$

3

$$= \frac{1}{5} \quad \checkmark$$

$$= \frac{1}{5} \quad \checkmark$$

$$= \frac{1}{5} \quad \checkmark$$

$$= \frac{1}{5} \quad \checkmark$$

$$4.1. \quad \cos \theta = 0,673$$

$$\theta = \cos^{-1}(0,673)$$

$$\theta = 47,70^\circ \quad \checkmark \quad 47,7^\circ \quad \text{Red arrow} \quad (1)$$

$$4.2. \quad 8 \tan \theta = \sin 80^\circ$$

$$\tan \theta = \frac{\sin 80^\circ}{8} \quad \checkmark$$

$$\tan \theta = 0,1231009 \dots$$

$$\theta = \tan^{-1}(0,123 \dots)$$

$$\theta = 7,02^\circ \quad \checkmark \quad (2)$$

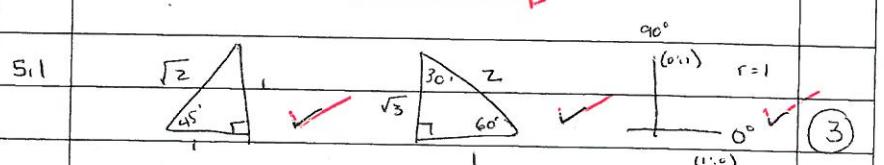
$$4.3. \quad \sin(2\theta - 34^\circ) = \frac{5}{7} \quad \checkmark \quad \sin A = \frac{5}{7}$$

$$A = \sin^{-1}\left(\frac{5}{7}\right)$$

$$2\theta - 34^\circ = 45,5847^\circ \quad \checkmark \quad 2\theta - 34^\circ = 45,58 \dots^\circ$$

$$2\theta = 79,5847^\circ \quad \checkmark \quad \theta = 39,79^\circ$$

$$\theta = 39,79^\circ \quad \checkmark \quad (3)$$



$$5.2. \quad \frac{\tan 45^\circ \cdot \cos 60^\circ}{\sin 30^\circ} + \cos^2 \theta$$

$$= \frac{\left(\frac{1}{1}\right) \left(\frac{1}{2}\right) \checkmark}{\frac{1}{2} \checkmark} + \left(\frac{1}{1}\right)^2 \checkmark$$

$$= 2 \quad \checkmark \quad (5)$$

1

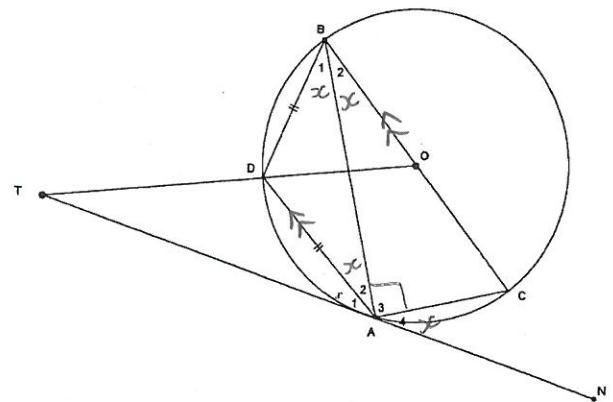
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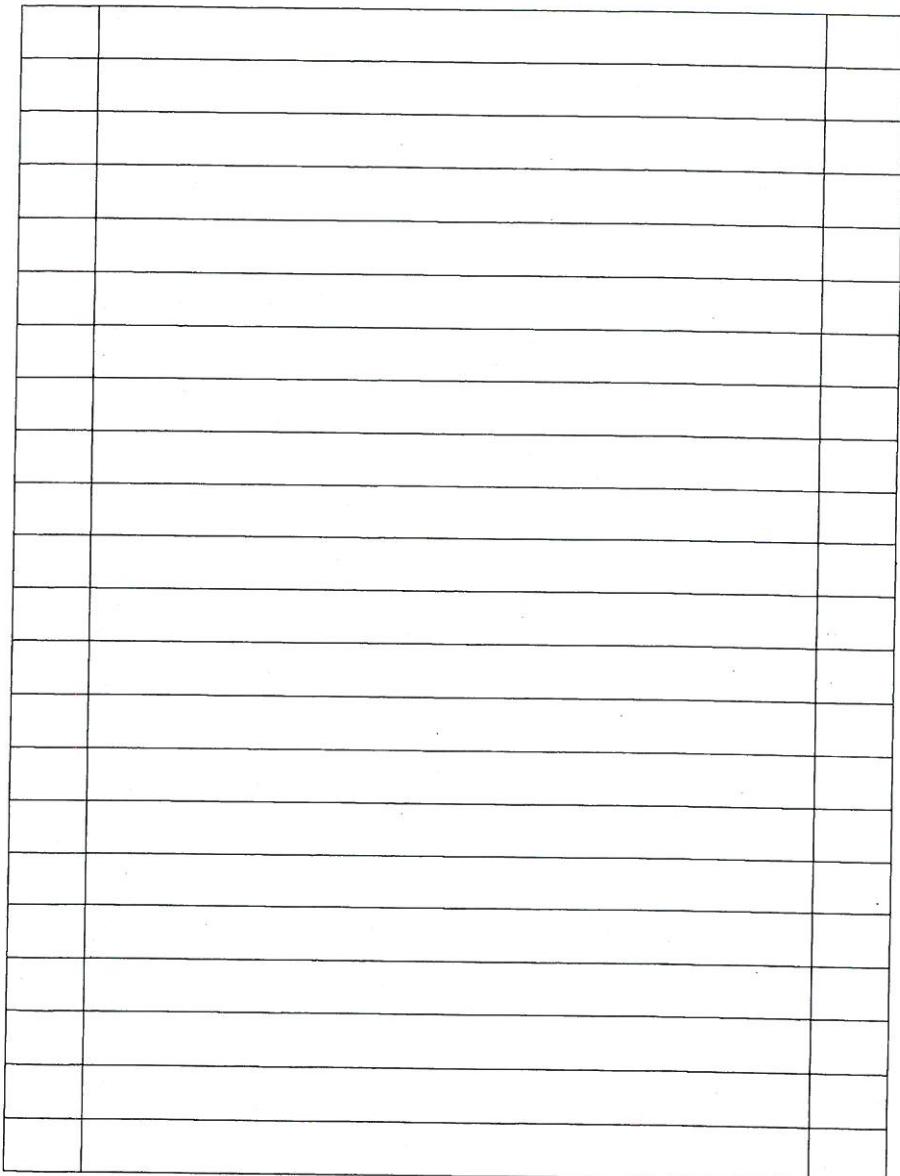
3

5

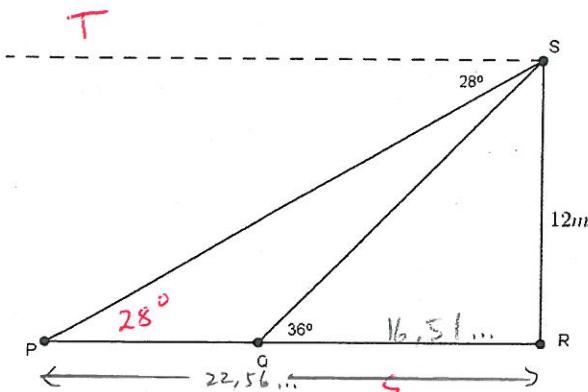
8.2.



8.2.1.	$\hat{B}_1 = x$ ✓	\hat{A}_1 tan chord ✓	
	$\hat{A}_2 = x$ ✓	1's opp = sides ✓	
	$\hat{B}_2 = x$ ✓	alt 1's $\hat{BC} \parallel \hat{AB}$ ✓	8
	$\hat{A}_4 = x$ ✓	\hat{A}_4 tan chord ✓	
8.2.2.	$\hat{A}_3 = 90^\circ$ ✓	\hat{A}_3 in semi $\odot = 90^\circ$ ✓	(8)
	$3x + 90^\circ = 180^\circ$ ✓	^{sap} 1's on str line $= 180^\circ$ ✓	
	$\Rightarrow 3x = 90^\circ$		4
	$x = 30^\circ$ ✓		



QUESTION 6:



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

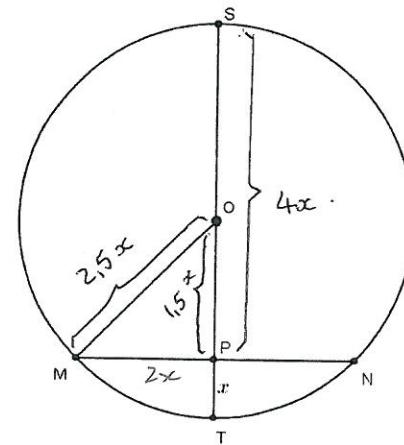
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QUESTION 7:

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

2

7.2.



$$PS = 4 \cdot PR \\ = 4x$$

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

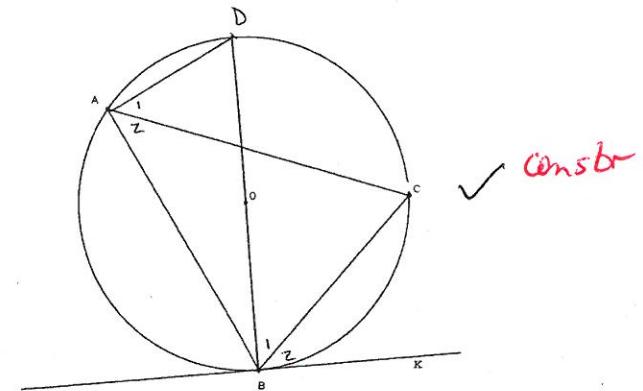
	$OM = 2,5x \checkmark$ s radii	
	$OP = 1,5x \checkmark$ s radii	
	$MP^2 = OM^2 - OP^2$ s ² R (Pyth) ✓	
	$MP^2 = (2,5x)^2 - (1,5x)^2$	(5)
	$MP^2 = 4x^2$	
	$MP = 2x \checkmark$	
	$\therefore MN = 4x$ s ² P line from centre $\odot \perp$ to chord	

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5

QUESTION 8

8.1.



Const : Diameter BD , Join AD .

$$\hat{A}_1 + \hat{A}_2 = 90^\circ \quad \text{S&R} \quad \text{1 in semi } \odot = 90^\circ$$

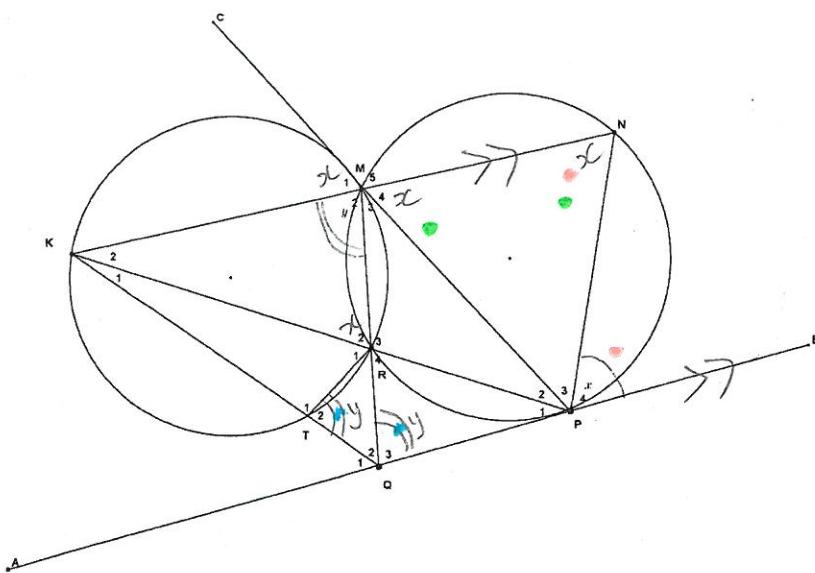
$$\hat{B}_1 + \hat{B}_2 = 90^\circ \quad \text{S&R} \quad \text{tan } \perp \text{ radius}$$

But $\hat{A}_1 = \hat{B}_1$ S&R $\therefore \hat{A}_2 = \hat{B}_2$ S&R $\therefore \hat{KBC} = \hat{BAC}$

4

(4)

Question 9.



9.1.	$\hat{M}_4 = x$ ✓ vert. opp $\hat{M}_1 = DC$ $\hat{R}_2 = DC$ ✓ $\hat{N} = DC$ $\Rightarrow \hat{P}_4 = \hat{N}$ ✓ $\Rightarrow KN \parallel AB$ ✓	tan chord vert. opp $\hat{S} =$ tan chord ext 1 of cyclic quad \hat{S} alt $\lambda's =$
9.2.	$\hat{M}_4 = \hat{N} = x$ ✓ $PM = PN$ ✓	\hat{S} R sides opp = $\lambda's$

6

2

7

9.	$M_2 = y$ $T_2 = y$ ✓ ext 1 of cyclic quad $Q_3 = y$ ✓ alt $\lambda's = KN \parallel AB$ $\therefore T_2 = Q_3$ both = y $\therefore PQ$ is a tangent converse \hat{PQ} tan chord
----	---

3

3
