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 Grade/Class : 11/.....
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100

ANSWER BOOKLET
 MATHEMATICS
 JUNE EXAMINATION PAPER 2
 03 June 2019

QUESTION 1

1.1	11, 15, 17, 18, 20, 23, 28, 29, 35, 35, 35, 40	Q_1	M	Q_3
	T_1 T_2 T_3 T_4 T_5 T_6 T_7 T_8 T_9 T_{10} T_{11} T_{12}			
1.1.1	$\bar{x} = \frac{306}{12} = 25,5$			2
1.1.2	Mode = 35			1
1.1.3	$M = \frac{23+28}{2} = 25,5$			1
1.1.4	$Q_1 = \frac{17+18}{2} = 17,5$ $Q_3 = \frac{35+35}{2} = 35$			3
1.2	11, 17,5, 25,5, 35, 40			3

Box plot for 1.2: Min=11, Q1=17,5, M=25,5, Q2=35, Max=40. Whiskers extend to 10 and 40.

box ✓
 whiskers ✓
 scale ✓

QUESTION 2

2.1 50 (20+30) = 50

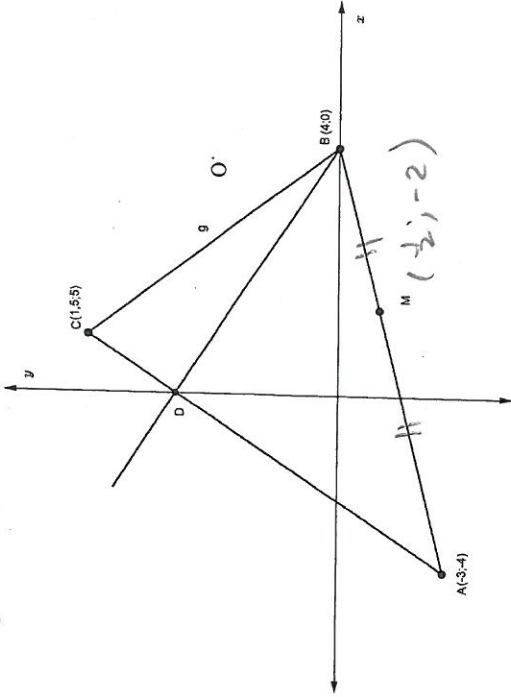
Age	freq	Midpt	f.x
$20 \leq x < 30$	5	25	125
$30 \leq x < 40$	16	35	560
$40 \leq x < 50$	12	45	540
$50 \leq x < 60$	9	55	495
$60 \leq x < 70$	8	65	520
	50		2240

Average age = $\frac{5 \cdot 25 + 16 \cdot 35 + \dots + 8 \cdot 65}{50} = 44,8$

2.3 $D_7 = T_7 (1+50) = T_{35.7} = 50 \leq x < 60$

90 1/2

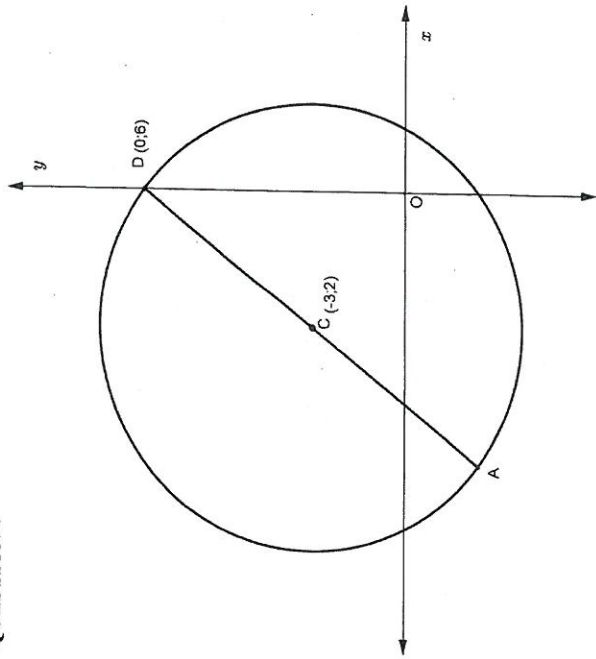
QUESTION 3



3.1.1	MAC	$= 5 - (-4)$ ✓	A(-3; -4)
		$1\frac{1}{2} - (-3)$	C(1,5; 5)
		$= 9$	
		$4,5$	
		$= 2$ ✓	
		\rightarrow	
3.1.2	BC	$= \sqrt{(1,5-4)^2 + (5-0)^2}$ ✓	B(4; 0)
		$= \sqrt{6,25+25}$	C(1,5; 5)
		$= 5,59$ ✓	
		\rightarrow	
		2	

QUESTION 4

3.1.3	$M \left(\frac{4+(-3)}{2}; \frac{0+(-4)}{2} \right)$	$A(-3; 4)$ $B(4; 0)$
	$M \left(\frac{1}{2}; -2 \right)$	2
3.1.4	$D(0, y)$	
	$\therefore m_{AB} = \frac{y - (-4)}{0 - (-3)}$	
	$= \frac{y+4}{3}$	
	but $m_{AA} = m_{AC} = m_{BC}$ collinear pts	
	$\therefore \frac{y+4}{3} = 2$	
	$y+4 = 6$	
	$\therefore y = 2$	
	$D(0, 2)$	3
	$y = 2x + c$	
	Sub in $A(-3, -4)$	
	$-4 = 2(-3) + c$	
	$y = 2x + 2$	
	$\therefore D(0, 2)$	$D(0; 2)$ $B(4; 0)$
3.2	$m_{BD} = \frac{2-0}{0-4} = -\frac{1}{2}$	$m_{AC} = 2$
	$\therefore m_{BD} \cdot m_{AC} = -\frac{1}{2} \cdot 2 = -1$	$\therefore BD \perp AC$



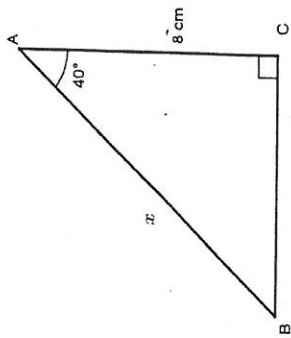
4.1	both radii	2
4.2	$\frac{x_A + 0}{2} = -3$	$\frac{y_A + 6}{2} = 2$
	$x_A = -6$	$y_A = -2$
	$\therefore A(-6, -2)$	2
4.3	$m_{CD} = \frac{6-2}{0-(-3)}$	$\frac{c(-3)-2}{1-(-3)}$
	$= \frac{4}{3}$	$= \frac{4}{3}$

Question 5

5.1.1	$\frac{\sin \theta}{2} = \frac{\sin 50^\circ}{6}$	
	$\sin \theta = \frac{2 \sin 50^\circ}{6}$	
	$\sin \theta = 0,25534, \dots$	
	$\theta = \sin^{-1}(0,25534, \dots)$	
	$\therefore \theta = 14,79^\circ$	2
5.1.2	$8^2 = 10^2 + 9^2 - 2(10)(9) \cdot \cos \theta$	
	$64 = 100 + 81 - 180 \cos \theta$	
	$-117 = -180 \cos \theta$	
	$\frac{13}{20} = \cos \theta$	
	$\theta = \cos^{-1}\left(\frac{13}{20}\right)$	
	$\theta = 49,46^\circ$	2

4.4	$m_{CD} = \frac{4}{3}$	$m_{ED} = m_L$	lines
	$y = \frac{4}{3}x + c$		
	Sub in $(-6, 5)$		
	$5 = \frac{4}{3}(-6) + c$		
	$13 = c$		
	$\therefore y = \frac{4}{3}x + 13$		3
4.5	$y = \frac{4}{3}x + 13$		
	$3y = 4x + 39$		
	$\therefore 3y - 4x - 39 = 0$		1

5.2.1



$$\cos 40^\circ = \frac{8}{x} \quad \checkmark$$

$$x \cos 40^\circ = 8$$

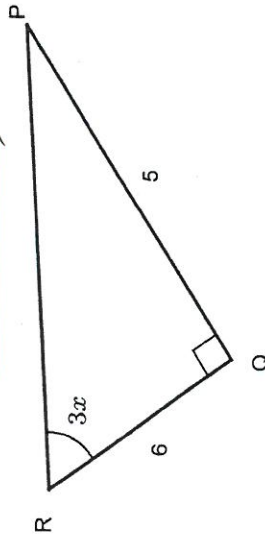
$$x = \frac{8}{\cos 40^\circ}$$

$$\cos 40^\circ$$

$$x = 10,44 \text{ cm} \quad \checkmark$$

2

5.2.2



$$\tan 3x = \frac{5}{6} \quad \checkmark$$

$$3x = \tan^{-1}\left(\frac{5}{6}\right) \quad \checkmark$$

$$3x = 39,80 \dots \quad \checkmark$$

$$x = 13,27^\circ \quad \checkmark$$

3

5.3

$$\frac{3(\tan 15^\circ)^2}{\cos(2 \cdot 15^\circ) - 1}$$

$$= -1,61 \quad \checkmark$$

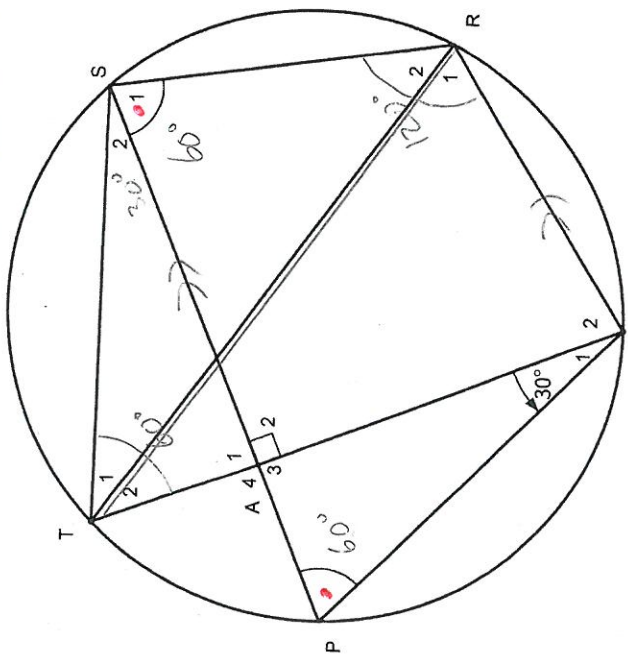
2

QUESTION 6

6.1.1	$\tan 30^\circ$	$\frac{1}{\sqrt{3}}$ ✓	$\frac{1}{\sqrt{3}}$	2
		$= \frac{1}{\sqrt{3}}$ ✓		
6.1.2	$\sin 45^\circ$	$\frac{1}{\sqrt{2}}$ ✓	$\frac{1}{\sqrt{2}}$	2
		$= \frac{1}{\sqrt{2}}$ ✓		
6.2.1	$\tan \theta > 0$	Q I III ✓		
	$\sin \theta < 0$	Q III IV ✓		
	\therefore	Q III ✓		

6.2.2		
6.2.2	$\sin \theta = \frac{-5}{13} = \frac{-5}{13}$ $\tan \theta > 0$ $y = -5$ ✓ $r = 13$ ✓ $x^2 + (-5)^2 = 13^2$ Pyth. $x^2 = 144$ $x = \pm 12$ $\therefore x = -12$ ✓	3
6.2.3	$(\sin \theta)^2 + (\cos \theta)^2 = \left(\frac{-5}{13}\right)^2 + \left(\frac{-12}{13}\right)^2$ $= \frac{25}{169} + \frac{144}{169}$ both $()^2$ $= \frac{169}{169}$ $= 1$ ✓	3

QUESTION 8



8.1 $\hat{P} = 60^\circ$ ✓ ext Δ / sum Δ in $\Delta = 180^\circ$
 $\hat{S} = 60^\circ$ ✓ given ✓
 $\hat{T}_1 + \hat{T}_2 = 60^\circ$ ✓ Δ s in same seg = 4

8.2 $\hat{QRS} + \hat{P} = 180^\circ$ ✓ opp Δ s of cyclic quad
 $\therefore \hat{QRS} = 180^\circ - 60^\circ$ ✓
 $= 120^\circ$ ✓
 OR

$\hat{QRS} + \hat{T} = 180^\circ$ ✓ opp Δ s of cyclic quad

8.3 Proving $PS \parallel QR$

$\hat{S}_1 = 60^\circ$ proved

$\hat{QRS} = 120^\circ$ proved

$\hat{S}_1 + \hat{QRS} = 180^\circ$ ✓

$\therefore PS \parallel QR$ ✓ Δ co-interior angles = 180° ✓ 2

8.4 $\hat{S}_2 = 30^\circ$ ✓ in same seg =

$\therefore \hat{S}_1 + \hat{S}_2 = 90^\circ$ ✓

$\therefore TR$ is diameter ✓ Δ in semi $\Delta = 90^\circ$ ✓ 2

$\hat{Q}_2 = 90^\circ$ ✓ co-interior Δ s $PS \parallel QR$ ✓

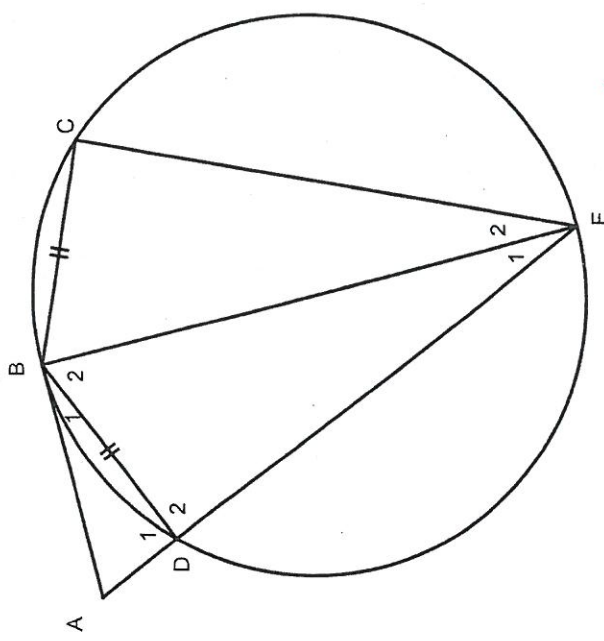
$\hat{A}_3 = 90^\circ$ ✓ Δ s on a straight line ✓

$\hat{Q}_2 = 90^\circ$ ✓ alt Δ $PS \parallel QR$ ✓

$\therefore TR$ is diameter ✓ Δ in semi $\Delta = 90^\circ$ ✓

9.2.1	$\hat{M}_1 = \hat{R}_1$ ✓ SR $\hat{R}_1 = \frac{1}{2}(80^\circ)$ ✓ SR $\hat{R}_1 = 40^\circ$ ✓ S $\therefore \hat{M}_1 = 40^\circ$ ✓ S	4
9.2.2	$\hat{M}_1 + \hat{M}_2 = 90^\circ$ ✓ SR $\hat{M}_2 = 90^\circ - 40^\circ$ $= 50^\circ$ ✓ SR $\hat{N} = \hat{M}_2 + \hat{M}_3$ ✓ SR in the same circle segm =	4
9.2.3	$TK = KN$ ✓ SR $\therefore OK \perp TK$ ✓ SR $\therefore \hat{K}_1 = 90^\circ$ ✓ SR $\hat{T}_3 = 180^\circ - (90^\circ + 80^\circ)$ ✓ SR $\therefore \hat{T}_3 = 10^\circ$ ✓ S	3

QUESTION 10



10.1	$\hat{B}_1 = \hat{E}_1$ ✓ SR $\hat{E}_1 = \hat{E}_2$ ✓ SR $\therefore \hat{B}_1 = \hat{E}_2$ ✓ SR $\hat{D}_1 = \hat{C}$ ✓ S ext ⁿ of cyclic quad ✓ R	2
	$\hat{B}_1 = \hat{E}_1$ ✓ SR tan chord ✓ SR $\hat{E}_1 = \hat{E}_2$ ✓ SR Chords = \hat{A} 's at circl ✓ SR $\therefore \hat{B}_1 = \hat{E}_2$ ✓ SR $\hat{D}_1 = \hat{C}$ ✓ S ext ⁿ of cyclic quad ✓ R	2