

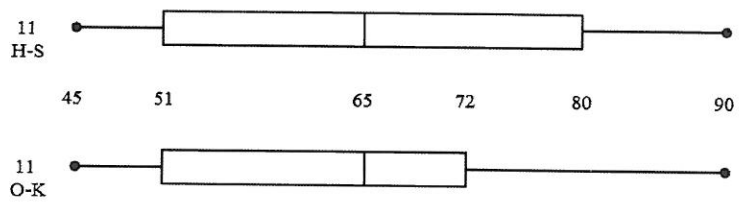
Name and Surname : Solns

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

100

June Paper 2  
ANSWER BOOKLET  
2017

QUESTION 1



1.1.	$IQR = 80 - 51$ $= 29\% \checkmark$	
		2
1.2.	$25\% \checkmark$	1
1.3.	<ul style="list-style-type: none"> <li>• <u>Medians are the same</u> <math>\checkmark</math></li> <li><math>M = 65\%</math></li> <li>• <u>Ranges are the same</u> <math>\checkmark</math></li> <li><math>R = 90 - 45</math></li> <li><math>= 45\%</math></li> </ul>	2

QUESTION 2

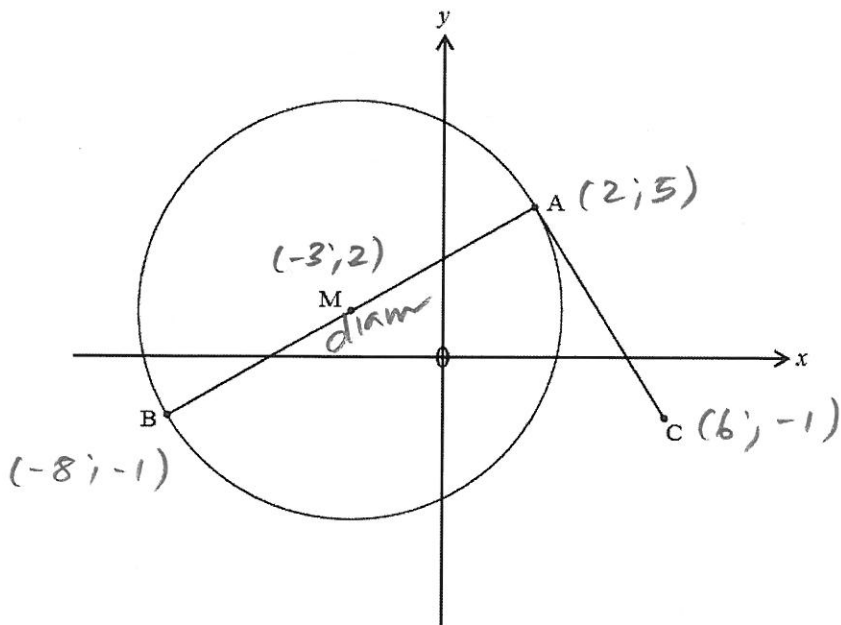
Height (in m)	$1,3 \leq h < 1,5$	$1,5 \leq h < 1,7$	$1,7 \leq h < 1,9$	$1,9 \leq h < 2,1$
Frequency	24	73	16	5

$\begin{matrix} & 24 & 97 & 113 & 118 \\ & | & | & | & | \end{matrix}$

2.1.	$1,5 \leq h < 1,7$ ✓	1
	→	
2.2.	$\bar{h} = \frac{1,4 \times 24 + 1,6 \times 73 + 1,8 \times 16 + 2,0 \times 5}{24 + 73 + 16 + 5}$	
	$= \frac{189,2}{118}$ midpoint ✓ x f ✓	$189,2 = \frac{946}{5}$
	$= 1,60 \text{ cm}$ ✓	$\frac{473}{295}$
	→	3
2.3.	$T_1; \dots; T_{118}$ $M = T_{\frac{1}{2}(1+118)} = T_{59,5}$	
	$T_{60}; \dots; T_{118}$ $Q_3 = T_{\frac{3}{4}(60+118)} = T_{89}$ ✓	1
	→	
2.4.	$T_1; \dots; T_{118}$ $D_7 = T_{\frac{7}{10}(1+118)}$	
	$= T_{83,3}$	
	$\therefore 1,5 \leq h < 1,7$ ✓	1
	→	

QUESTION 3

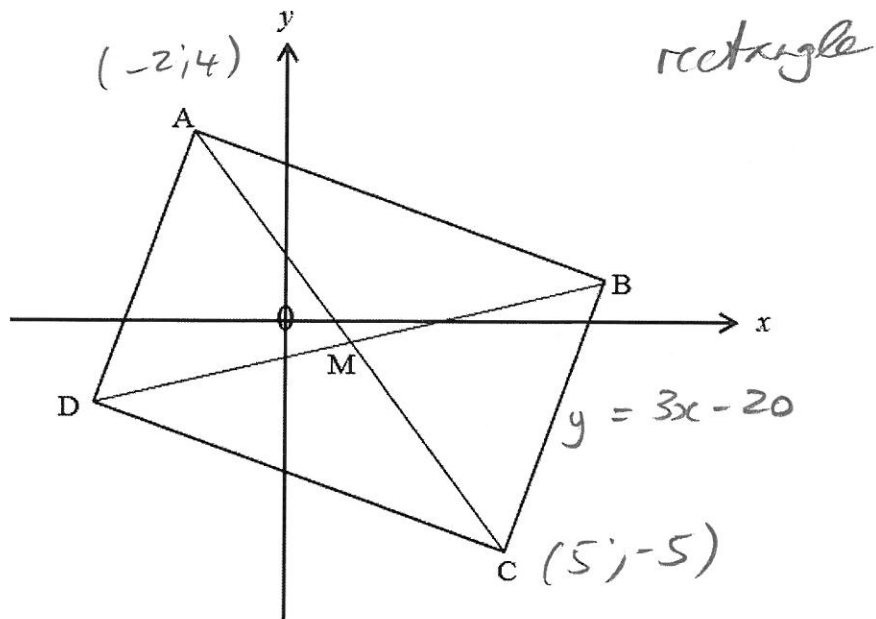
. D(16; d)



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

	$\therefore AC$ is <u>not</u> <u>congruent</u> <u>to</u> <u>rad</u>	
	a <u>tangent</u> to the	
	<u>circle</u> at <u>A</u> .	5
3.4	$MAA = \frac{3}{5}$	$MAO = \frac{d-5}{16-2}$
		$= \frac{d-5}{14} \checkmark$
	Collinear	$\frac{3}{5} \stackrel{\text{method}}{=} \frac{d-5}{14} \checkmark$
		$3.14 = 3(d-5)$
		$\frac{67}{5} = d \checkmark$
		$\xrightarrow{\quad}$

QUESTION 4



41.	$AM = MD$	$\checkmark^R$ diagonals 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
42.	$m_{AB} = -\frac{1}{3} \checkmark$	$\checkmark^R$ "s rect = $90^\circ$	
	AB: $y = -\frac{1}{3}x + c$		
	sub $A(-2; 4)$		
	$4 = -\frac{1}{3}(-2) + c \checkmark$		
	$\frac{10}{3} = c$		
	$\therefore y = -\frac{1}{3}x + \frac{10}{3} \checkmark$		4

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

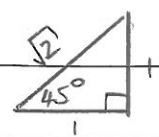
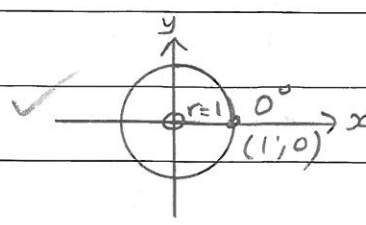
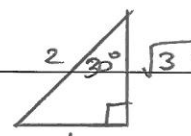
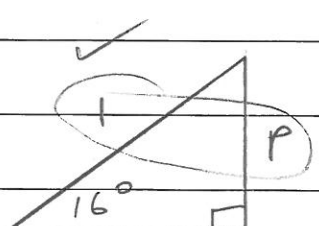
QUESTION 5

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

5.4	$8 - 3 \tan 7(x - 20^\circ) = \tan 80^\circ$	
	let $A = 7(x - 20^\circ)$	
	$8 - 3 \tan A = 5,67 \dots$	
	$\tan A = 0,776 \dots \checkmark$	
	$A = \tan^{-1}(0,776 \dots)$	
	$= 37,82 \dots^\circ \checkmark$	
	$7(x - 20^\circ) = 37,82 \dots^\circ$	
	$\underline{x = 25,40^\circ \checkmark}$	3

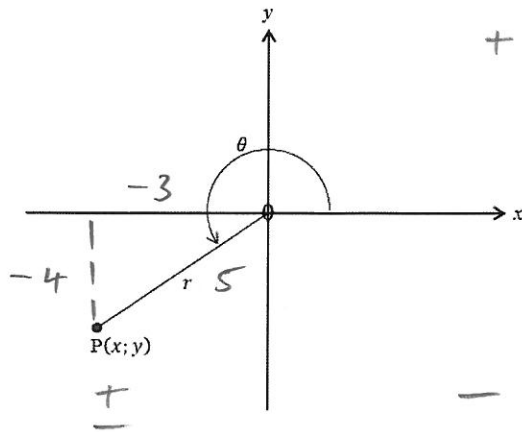
QUESTION 6

NB 6.1. w/c ∴ no spec diagrams means no marks %/6

6.1.	1.	$\sin 45^\circ = \frac{o}{h}$ $= \frac{1}{\sqrt{2}} \checkmark$	$\checkmark$ 	2
6.1.	2.	$\cos 0^\circ = \frac{x}{r}$ $= \frac{1}{1}$ $= 1 \checkmark$	$\checkmark$ 	2
6.1.	3.	$\tan 30^\circ = \frac{o}{a}$ $= \frac{1}{\sqrt{3}} \checkmark$	$\checkmark$ 	2
6.2.	$\sin 16^\circ - p = 0 \quad \therefore \sin 16^\circ = p = \frac{p}{1} \frac{o}{h}$			
			$\checkmark$ 	
			$\sqrt{1-p^2}$ bythag $\sqrt{s}$	
		$\tan 16^\circ = \frac{o}{a}$ $= \frac{p}{\sqrt{1-p^2}} \checkmark$		3

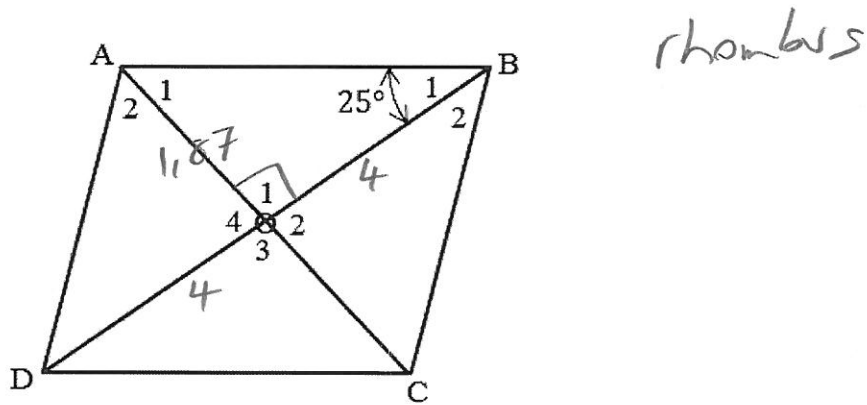


6.3.



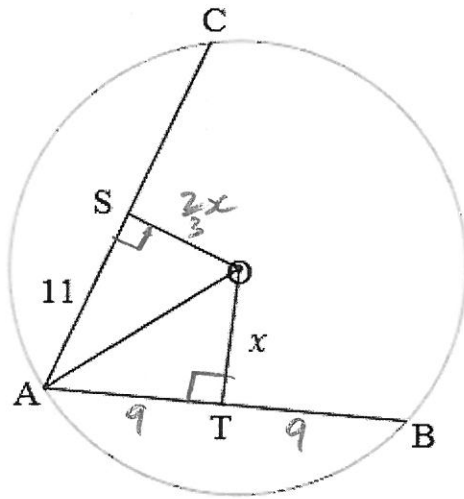
6.3.	1.1.	<u>I and III</u> ✓	1
		→	
	1.2.	<u>III and IV</u> ✓	1
		→	
6.3.	2.	$\tan \theta = \frac{4}{3} \quad \frac{y}{x} = \frac{-4}{-3}$	
		$\therefore x = -3$ ✓	
		$y = -4$ ✓	
		$r = 5$ ✓ Pythag	3
6.3.	3.	$\cos \theta = \frac{x}{r}$	
		$= \frac{-3}{5}$ ✓	1
		no CA if $\cos +$	
		as $\theta$ is in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

QUESTION 7



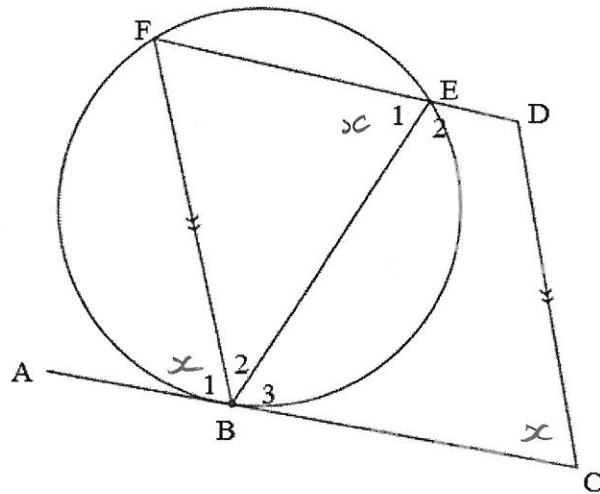
7.1. 1.	$OB = 4$ ✓ →	1
7.1. 2	$\hat{O}_1 = 90^\circ$ ✓ →	1
7.2.	$\frac{AO}{4} = \tan 25^\circ$ ✓	$\frac{0}{a}$
	$AO = 4 \cdot \tan 25^\circ$	
	$= 1,87$ ✓ →	2
7.3.	Area ABCD = $4 \times (\frac{1}{2} \cdot 4 \cdot 1,87)$ ✓	
	$= 4 \times 3,74$	
	$= 14,96$ ✓	$\frac{374}{25}$
	→	2
7.4. 1.	$\hat{B}_2 = 25^\circ$ ✓ →	1
7.4. 2.	$\hat{A}_1 = 65^\circ$	
	$A_2 = 65^\circ$ ✓ →	1

QUESTION 8



8.1.	$AT = 9$ ✓ $\sqrt{s}$ ✓ $\checkmark$ 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	
	✓ $9^2 + x^2 = 11^2 + (\frac{2}{3}x)^2$ ✓ $\checkmark$ 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

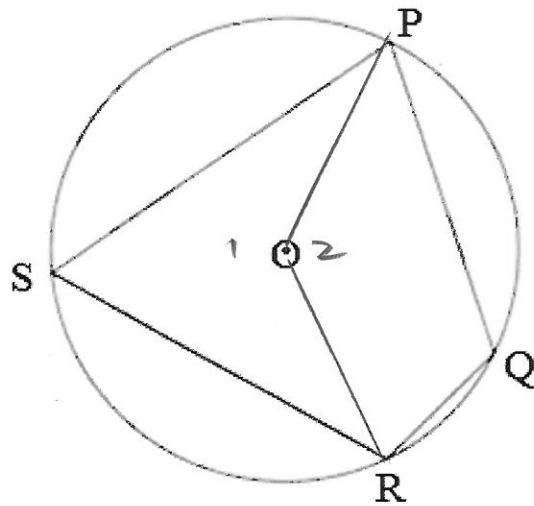
QUESTION 9



	let $\hat{E}_1 = x$	
	$\therefore \hat{B}_1 = x$ ✓ <sup>s</sup> ✓ <sup>r</sup> tan chord	
	$\therefore \hat{C} = x$ ✓ <sup>s</sup> ✓ <sup>r</sup> corr <sup>n</sup> s =, BF    CD	
	$\therefore \hat{E}_1 = \hat{C}$ both = x	
	$\therefore$ <u>BFDC</u> is a ✓ <sup>r</sup> conv ext <sup>n</sup> cyclic quad.	
		5

QUESTION 10

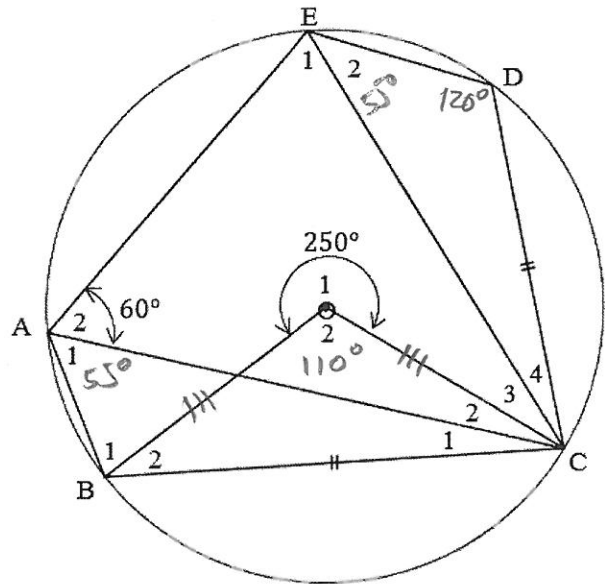
10.1.



✓ constr

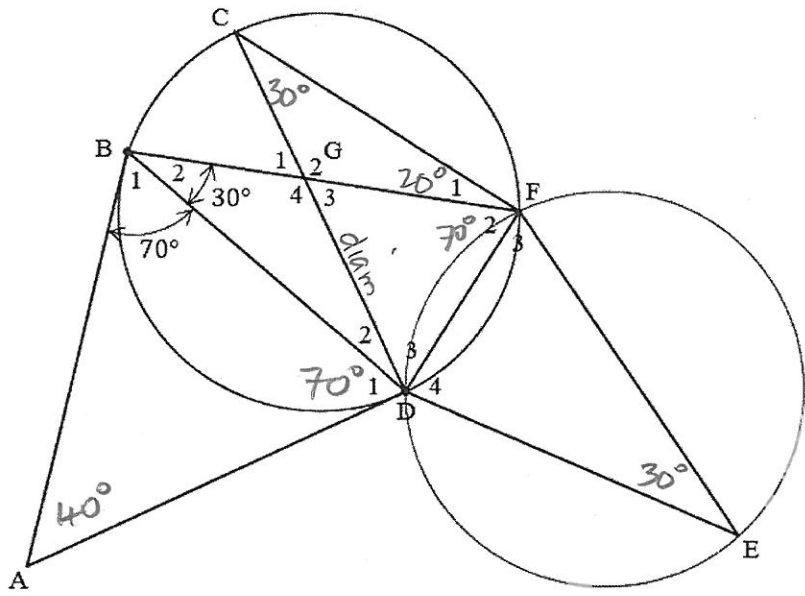
	$\hat{O}_1 = 2 \cdot \hat{Q}$ ✓SR ^ @ centre = 2 ^ @ O'ce	
	$\hat{O}_2 = 2 \cdot \hat{S}$ ✓SR ^ @ centre = 2 ^ @ O'ce	
	$\hat{O}_1 + \hat{O}_2 = 360^\circ$ ✓R   rev = 360°	
	$2\hat{Q} + 2\hat{S} = 360^\circ$ ✓S	
	$2(\hat{Q} + \hat{S}) = 360^\circ$	
	$\hat{Q} + \hat{S} = 180^\circ$	5
	→	

10.2.



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

QUESTION 11



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