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

Hudson Park High School

GRADE 11

MATHEMATICS

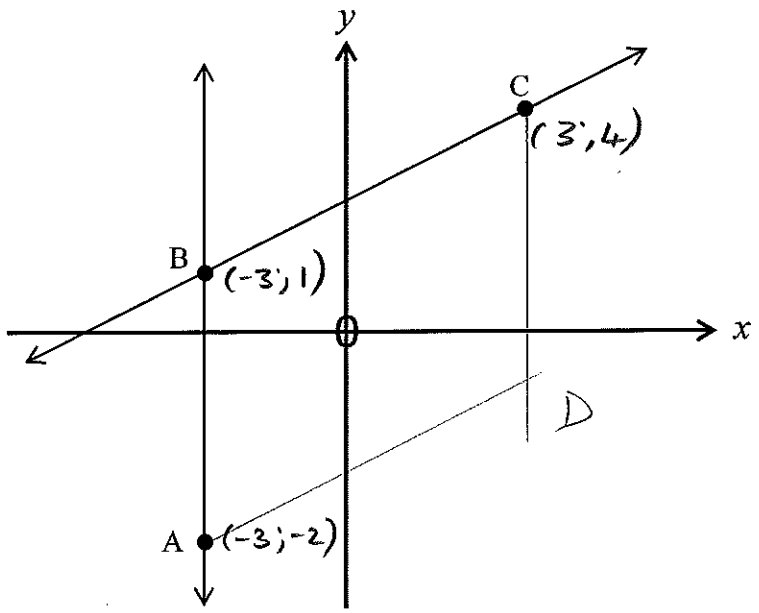
June Paper 2

Time	:	2 hours	Date	:	June 2015
Marks	:	100	Examiner	:	SLT
			Moderator(s)	:	SLK and CLM

ANSWER BOOKLET

QUESTION 1

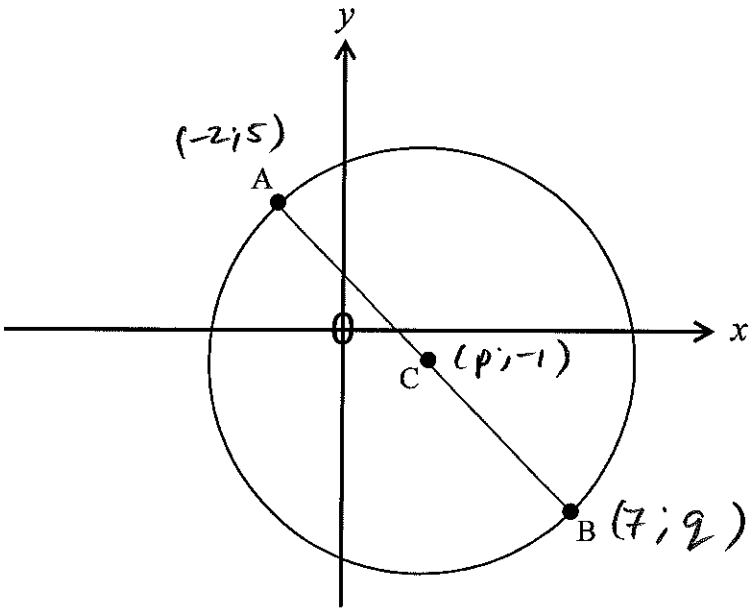
1.



1.1.1.	$m = \frac{4-1}{3-(-3)} = \frac{1}{2}$ ✓ B(-3;1) C(3;4) $\therefore y = \frac{1}{2}x + c$ Sub C(3;4) $4 = \frac{1}{2}(3) + c$ ✓ $\frac{5}{2} = c$ $\therefore y = \frac{1}{2}x + \frac{5}{2}$ ✓	3
1.1.2.	$x = -3$ ✓	1
1.2.	D(3;1) ✓ x and y → 6 ↑ 3	1

QUESTION 2

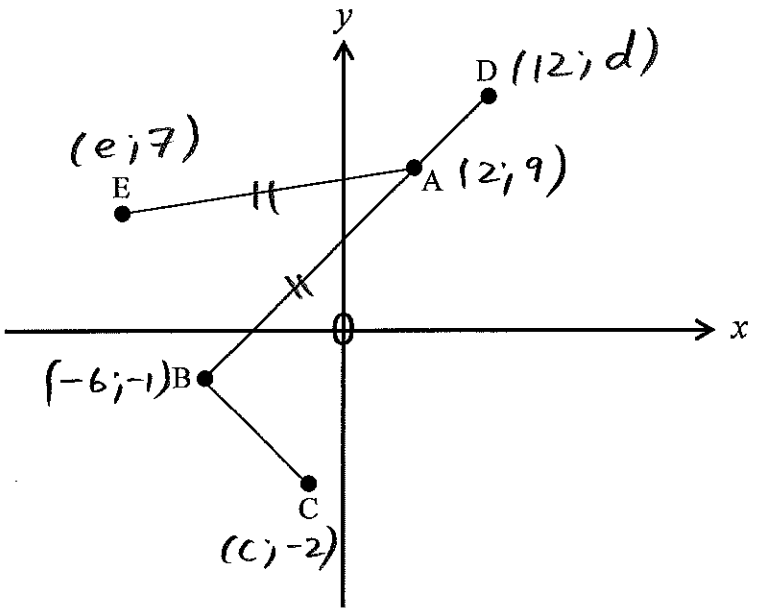
2.



2.	$p = \frac{-2+7}{2}$ $= \frac{5}{2}$ ✓ $-1 = \frac{5+q}{2}$ $-2 = 5+q$ $-7 = q$ ✓	2

QUESTION 3

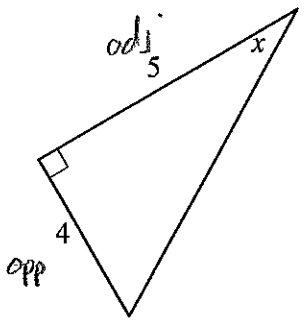
3.



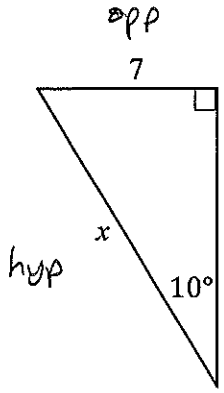
3.1.	$B(-6;-1)$ $A(2;9)$ $D(12;d)$ $m_{BA} = \frac{9-(-1)}{2-(-6)}$ $m_{AD} = \frac{d-9}{12-2}$ $= \frac{5}{4}$ ✓ $= \frac{d-9}{10}$ ✓ Collinear: $m_{AB} = m_{AD}$ $\frac{5}{4} = \frac{d-9}{10}$ ✓ $50 = 4(d-9)$ $\frac{43}{2} = d$ ✓ 21,5	4
3.2.	$m_{AB} = \frac{5}{4}$ $m_{BC} = \frac{-2-(-1)}{c-(-6)}$ $B(-6;-1)$ $C(c;-2)$ $= \frac{-1}{c+6}$ ✓ $\perp \therefore -\frac{1}{c+6} = -\frac{4}{5}$ ✓ $5 = 4(c+6)$ PTO	

	$-\frac{19}{4} = c$ ✓ $\longrightarrow$ $-4{,}75$	3
3.3.	$E(e;7)$ $A(2;9)$ $B(-6;-1)$	
	$EA = \sqrt{(7-9)^2 + (e-2)^2}$ ✓ $= \sqrt{4 + (e-2)^2}$	
	$AB = \sqrt{(-1-9)^2 + (-6-2)^2} = \sqrt{164}$ ✓	
	$EA = AB$	
	$\sqrt{4 + (e-2)^2} = \sqrt{164}$ ✓	
	$4 + (e-2)^2 = 164$ ✓ $()^2$ bs	
	$(e-2)^2 = 160$ ✓	
	$e - 2 = \pm\sqrt{160}$ ✓	
	$e = 2 \pm \sqrt{160}$	
	$= 14{,}65$ ~~or~~ $-10{,}65$ $\longrightarrow$ ✓	7
	reject	
	-1 no rejection	

QUESTION 4

4.1.1.	$\tan(108°) + 40$	
	$= 36,92$ ✓	1
4.1.2.	$(\cos(108°))^2$	
	$= 0,10$ ✓	1
4.2.1.	$\frac{\sin\theta}{3} = \frac{\sin 50°}{4}$	
	$\sin\theta = \frac{3\sin 50°}{4}$	
	$= 0,57\ldots$ ✓	
	$\theta = \sin^{-1}(0,57\ldots)$	2
	$= 35,07°$ ✓	
4.2.2.	$\cos A = 0,5$ $\quad A = 5\theta$	
	$A = \cos^{-1}(0,5)$	
	$5\theta = 60°$ ✓	
	$\theta = 12°$ ✓	2
4.3.1.		
	$\tan x = \frac{4}{5}$ ✓	
	$x = \tan^{-1}(\frac{4}{5})$	
	$= 38,66°$ ✓	2

4.3.2.



$\sin 10^\circ = \frac{7}{x}$ ✓

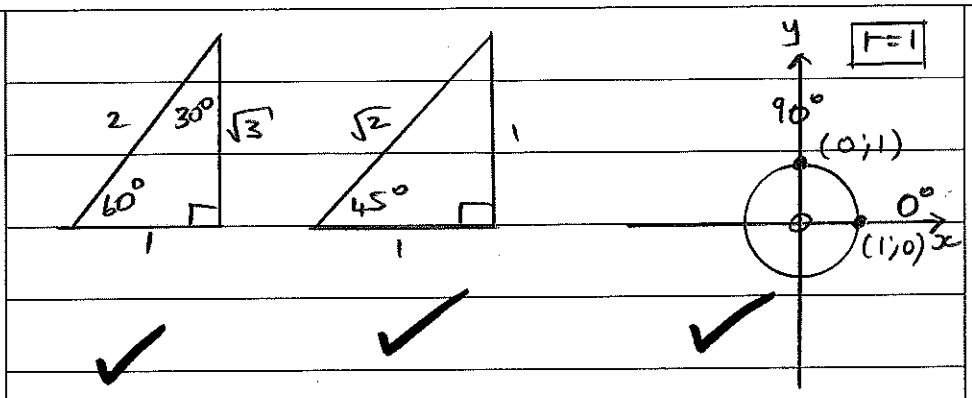
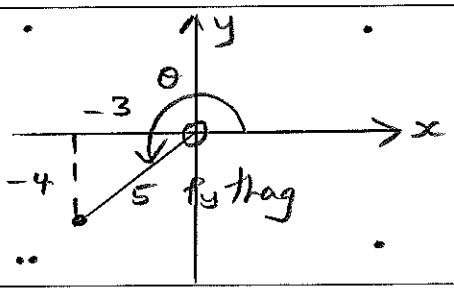
$x \cdot \sin 10^\circ = 7$

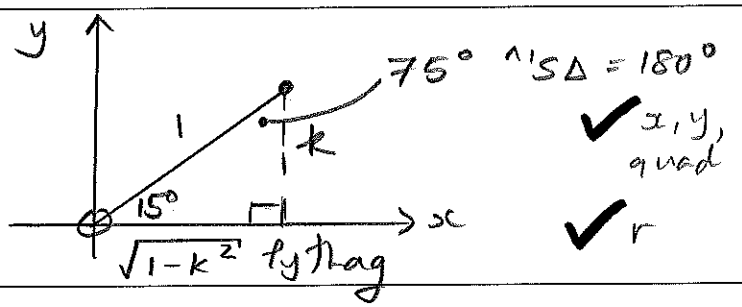
$x = \frac{7}{\sin 10^\circ}$

$= 40{,}31$ ✓

2

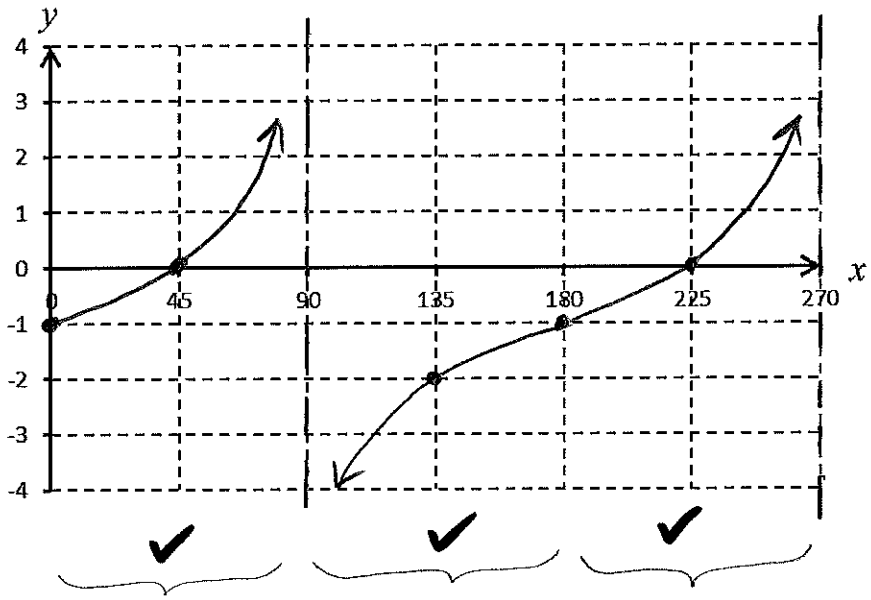
QUESTION 5

5.1.1.	 ✓ ✓ ✓	3
5.1.2.1	$\tan 45^\circ = \frac{1}{1}$ ✓ $\frac{o}{a}$ $= 1$	1
5.1.2.2.	$\sin 30^\circ = \frac{1}{2}$ ✓ $\frac{o}{h}$	1
5.1.2.3.	$\cos 0^\circ = \frac{1}{1}$ ✓ $\frac{x}{r}$ $= 1$	1
5.2.1.	$3\tan\theta - 4 = 0 \quad \therefore \tan\theta = \frac{4}{3}$ $\frac{y}{x}$ $\frac{-4}{-3}$  ✓ x, y, quad ✓ r	2

5.2.2.	$1 - \sin\theta$ $= 1 - \left(-\frac{4}{5}\right)$ ✓ $\quad \frac{y}{r}$ $= 1 + \frac{4}{5}$ $= \frac{9}{5}$ ✓	2
5.3.1.	$\sin 15^\circ = k \quad \frac{y}{r} \quad \frac{k}{1}$  ✓ x, y, quad ✓ r	2
5.3.2.	$\tan 75^\circ = \frac{o}{a}$ $= \frac{\sqrt{1-k^2}}{k}$ ✓	1

QUESTION 6

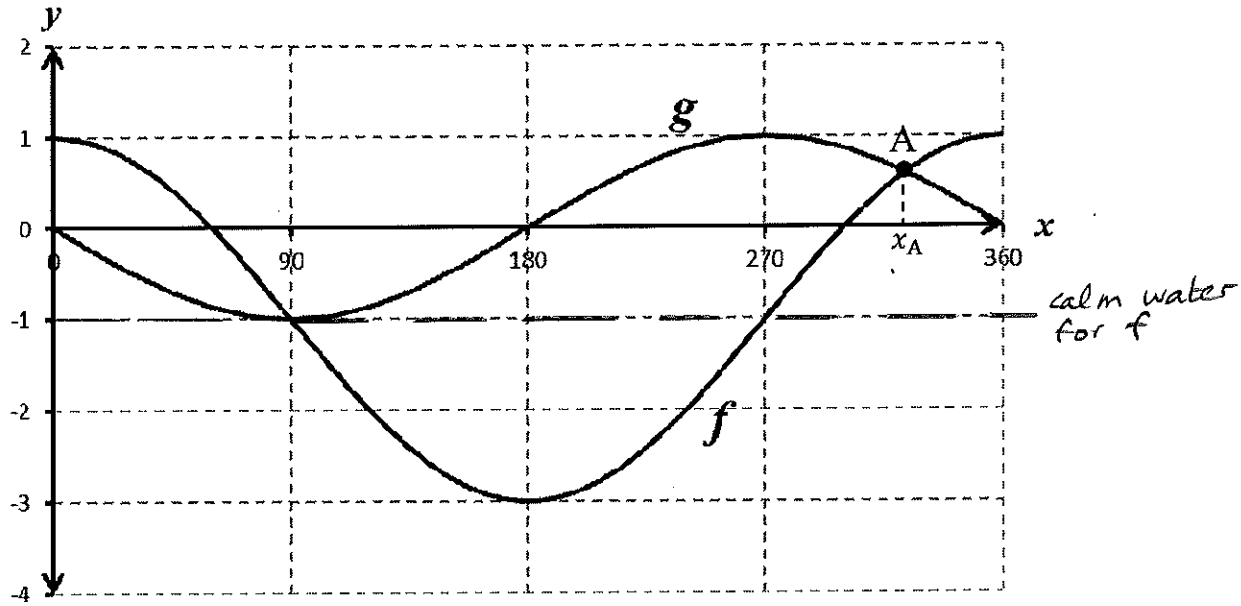
6.1.



✔ asymptotes

4

6.2.



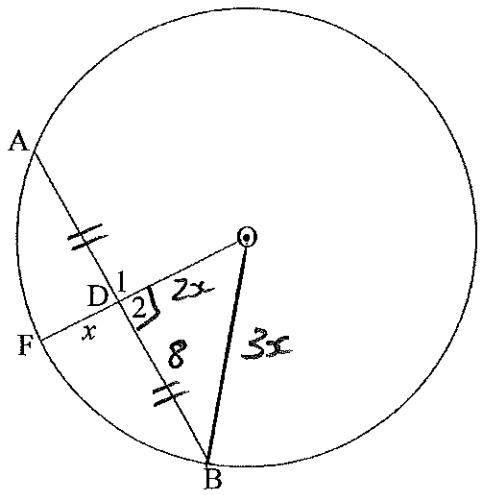
f: $y = p\cos x + q$ $\quad$ g: $y = k\sin x$

$y = 2\cos x - 1$ $\quad$ $y = -\sin x$

6.2.1.1.	$p = 2$ ✓	1
6.2.1.2.	$q = -1$ ✓	1
6.2.1.3.	$k = -1$ ✓	1
6.2.2.1.	$f(x) = g(x)$ $y_f = y_g$ $x = 90°$ ✓ or x_A ✓	2
6.2.2.2.	$g(x) \leq 0$ $y_g \leq 0$ $x \in [0°; 180°]$ or $x = 360°$ ✓ ✓	2

QUESTION 7

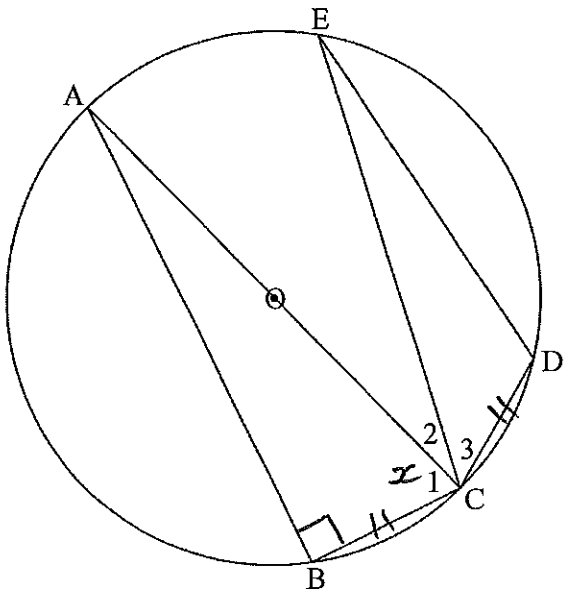
7.1.



Constr OB

7.1.	$DO = 2x$ SR $\hat{D}_2 = 90°$ ✓ line centre ⊙ to mdpt chord is ⊥ $OB = 3x$ ✓S radii $DB = 8$ given SR $(2x)^2 + 8^2 = (3x)^2$ ✓ Pythag $4x^2 + 64 = 9x^2$ $64 = 5x^2$ $\frac{64}{5} = x^2$ $\pm\sqrt{\frac{64}{5}} = x$ $3,58 = x$ ✓ reject −	4

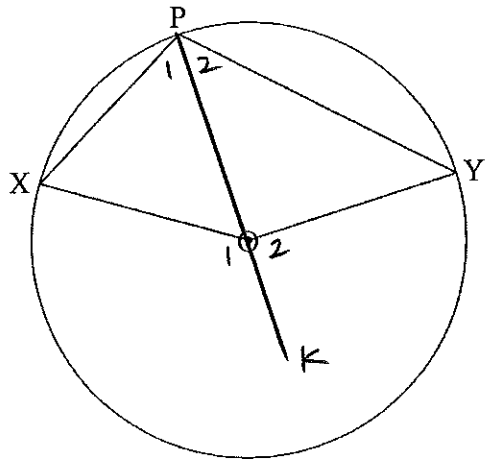
7.2.



7.2.	$\hat{B} = 90°$ ✓S ∠ in semi ⊙ = 90° ✓R $\therefore \hat{A} = 90° - x$ ✓SR ∠'s △ = 180° $\therefore \hat{E} = 90° - x$ = chords ✓S ✓R	5

QUESTION 8

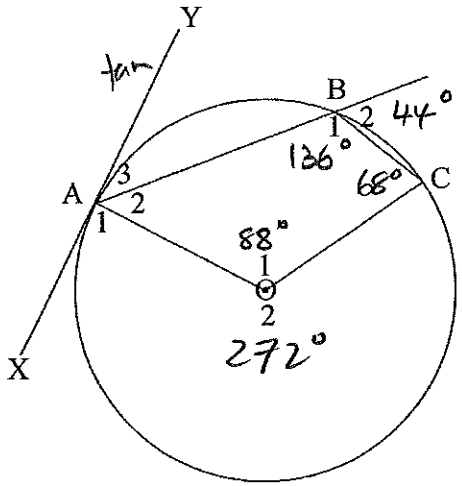
8.1.



✓ Constr

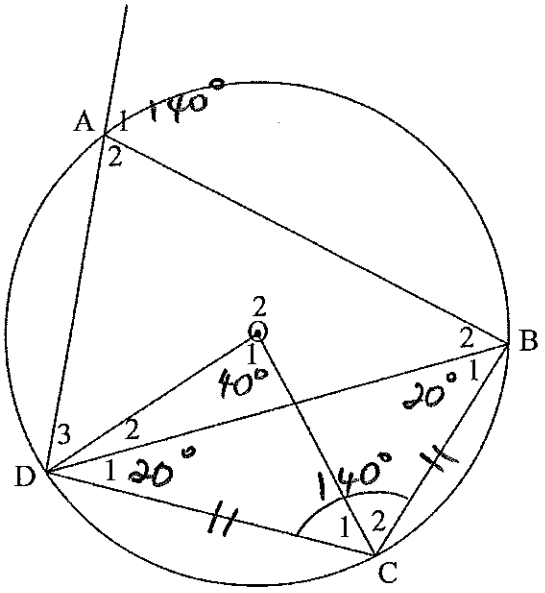
8.1.		
	Constr : Po to K	
SR ✓	$\hat{O}_1 = \hat{X} + \hat{P}_1$ Ext ∠ Δ	
SR ✓	but $\hat{X} = \hat{P}_1$ Isos Δ, sides =, radii	
	$\therefore \hat{O}_1 = 2\hat{P}_1$	
S ✓	Sim. $\hat{O}_2 = 2\hat{P}_2$	
	$\therefore X\hat{O}Y$ (reflex) $= \hat{O}_1 + \hat{O}_2$	
	$= 2\hat{P}_1 + 2\hat{P}_2$	
	$= 2(\hat{P}_1 + \hat{P}_2)$ ✓ cf	
	$= 2 . X\hat{P}Y$	5

8.2.



8.2.1.	SR $\hat{B}_1 = 136°$ ✓ ∠'s str line = 180° $\therefore \hat{O}_2 = 272°$ ✓S ✓R @ centre = 2∠ @ ⊙'ce $\therefore \hat{O}_1 = 88°$ ✓SR ∠'s rev = 360°	4
8.2.2.	SR $\hat{A}_2 = 68°$ ✓ ∠'s quad = 360° $\therefore \hat{A}_3 = 22°$ ✓S ✓R tan ⊥ rad	3

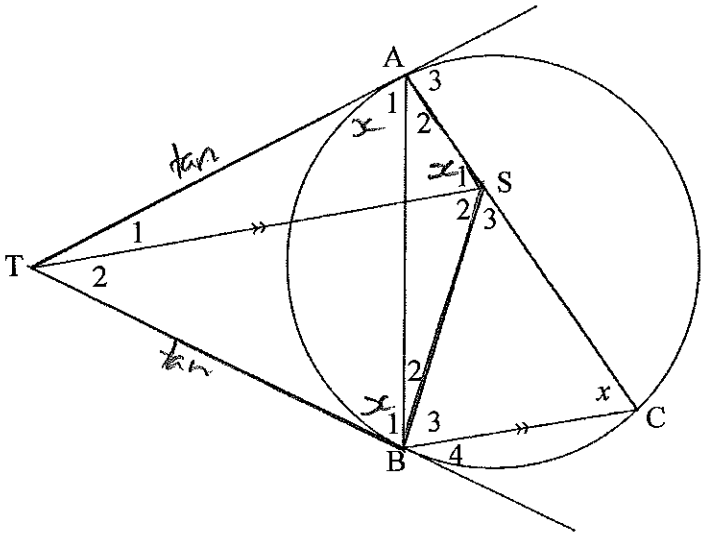
8.3.



8.3.1.	$\hat{B}_1 = 20°$ ✓SR ∠s opp equal sides $\therefore \hat{O}_1 = 40°$ ∠ at centre = 2 × ∠ at circumference ✓S ✓R	3
8.3.2.	$\hat{C}_{1+2} = 140°$ ✓SR ∠s in Δ = 180° $\therefore \hat{A}_1 = 140°$ ext ∠ cyclic quad ✓S ✓R	3

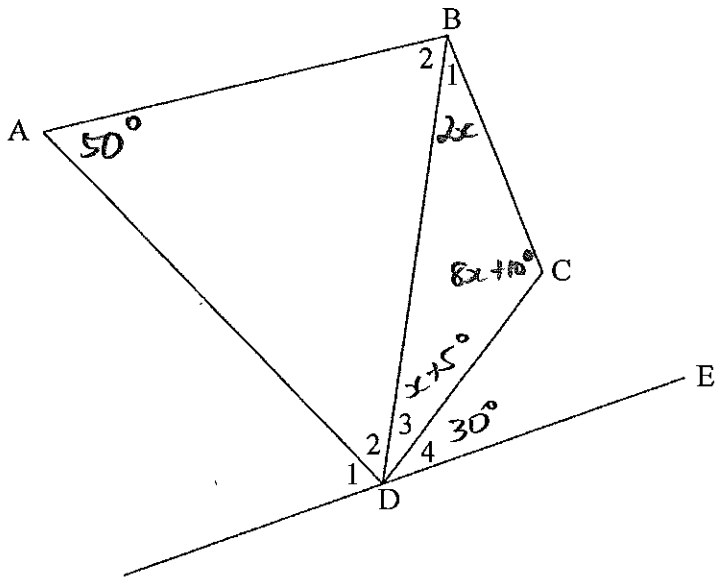
QUESTION 9

9.1.



9.1.1.	$\hat{S}_1 = x$ ✓SR Corr ∠'s =, TS ∥ BC $\hat{B}_1 = x$ ✓S ✓R ∠ tan chord $\therefore \hat{S}_1 = \hat{B}_1$ ✓S both = x $\therefore$ ΔSBT is a cyclic quad ⟶ conv ∠'s in same ⊙ segm = ✓R	5
9.1.2.	$\hat{A}_1 = x$ ✓S tan's ext∠ pt = ✓R isos Δ, sides = $\hat{S}_2 = x$ ✓S ∠'s in same ⊙ segm = ✓R $\therefore \hat{S}_1 = \hat{S}_2$ ✓S both = x $\therefore$ TS bisects $A\hat{S}B$ ⟶	5

9.2.



9.2.1.	$2x + 8x + 10° + x + 5° = 180°$ ✓SR $\angle$'s $\Delta = 180°$ $11x = 165°$ $x = 15°$ ✓	2
9.2.2.1.	$\hat{C} = 8(15°) + 10° = 130°$ ✓S $\therefore \hat{A} + \hat{C} = 50° + 130°$ ✓S $= 180°$ $\therefore$ ABCD is a cyclic quad ✓R conv opp $\angle$'s cyclic quad $= 180°$	3
9.2.2.2.	$\hat{B}_1 = 2(15°) = 30°$ ✓S $\therefore \hat{B}_1 = \hat{D}_4$ ✓S both $= 30°$ $\therefore$ DE is a tangent ✓R conv $\angle$ tan chord	3