Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

MATHEMATICS P2

PREPARATORY EXAMINATION

SEPTEMBER 2016

SPECIAL ANSWER BOOK

NATIONAL SENIOR CERTIFICATE

GRADE 12

MARKS: 150

TIME: 3 hours

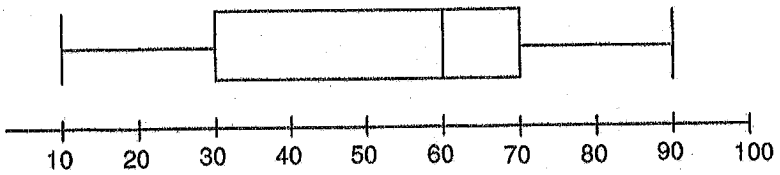
This answer book consists of 21 pages

QUESTION 1

Marks of M-cee-nai High School learners

9	14	14	19	21
23	33	35	37	37
42	45	55	56	57
59	68	75	75	75
77	78	80	81	92

The box and whisker diagram for the Bee Vee High School Learners



	Solution/*Oplossing*	**Marks/ *Punte***
1.1		(4)
1.2		(3)
1.3		(1)

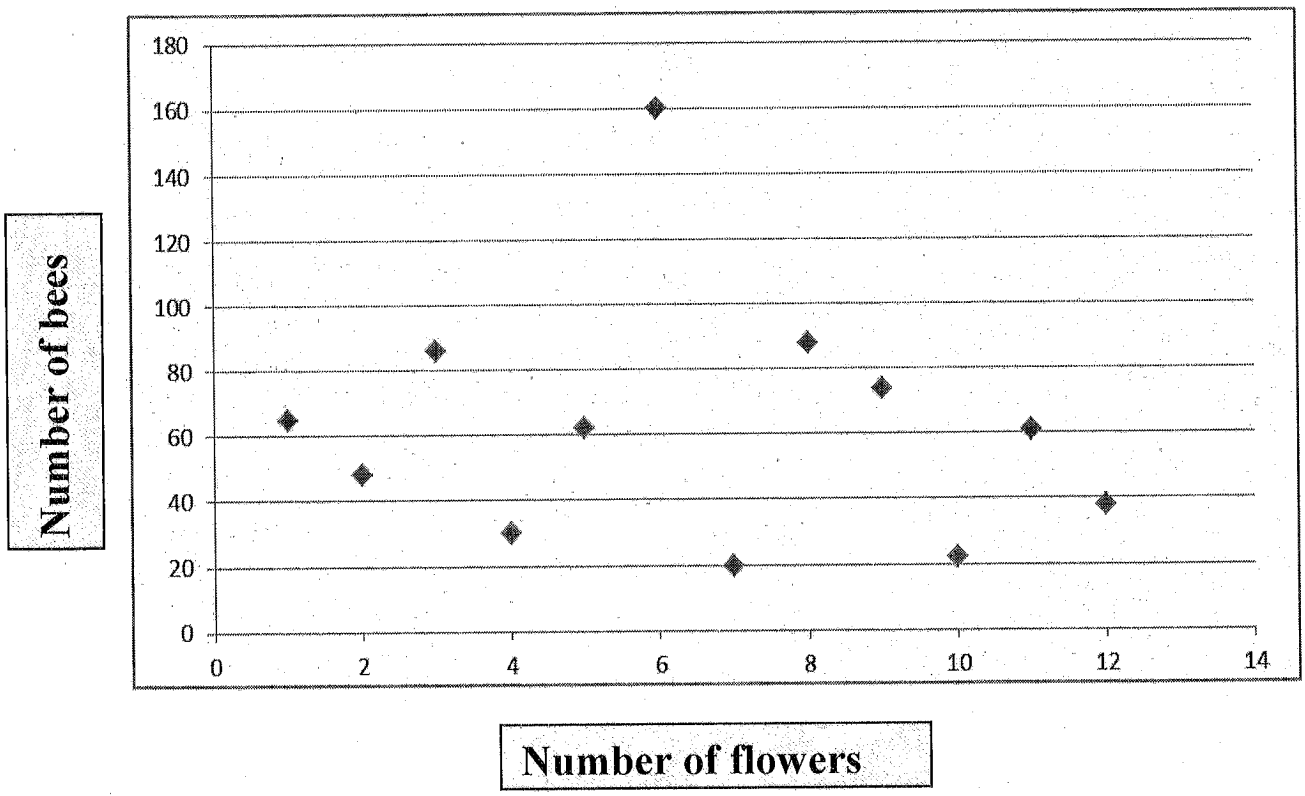
Copyright reserved

	Solution/*Oplossing*	**Marks/ *Punte***
1.4		(2)
1.5		(3)
		[13]

Copyright reserved

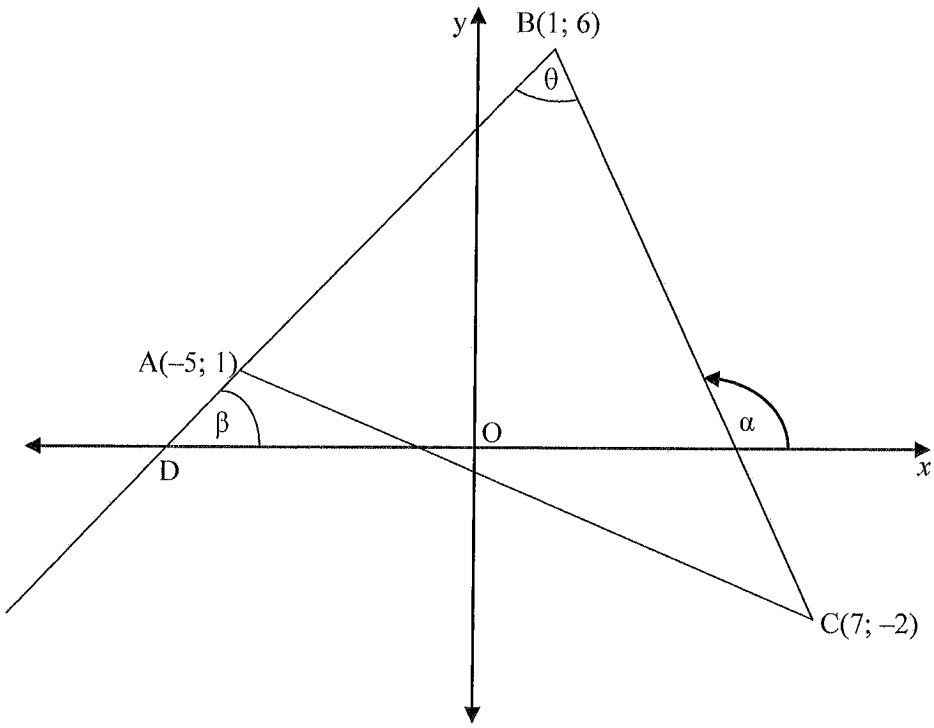
QUESTION 2

SCATTER PLOT



	Solution/*Oplossing*	Marks/ *Punte*
2.1		(2)
2.2		(4)
2.3		(2)
		[8]

QUESTION 3



	Solution/*Oplossing*	Marks/ *Punte*
3.1		(2)
3.2		(3)

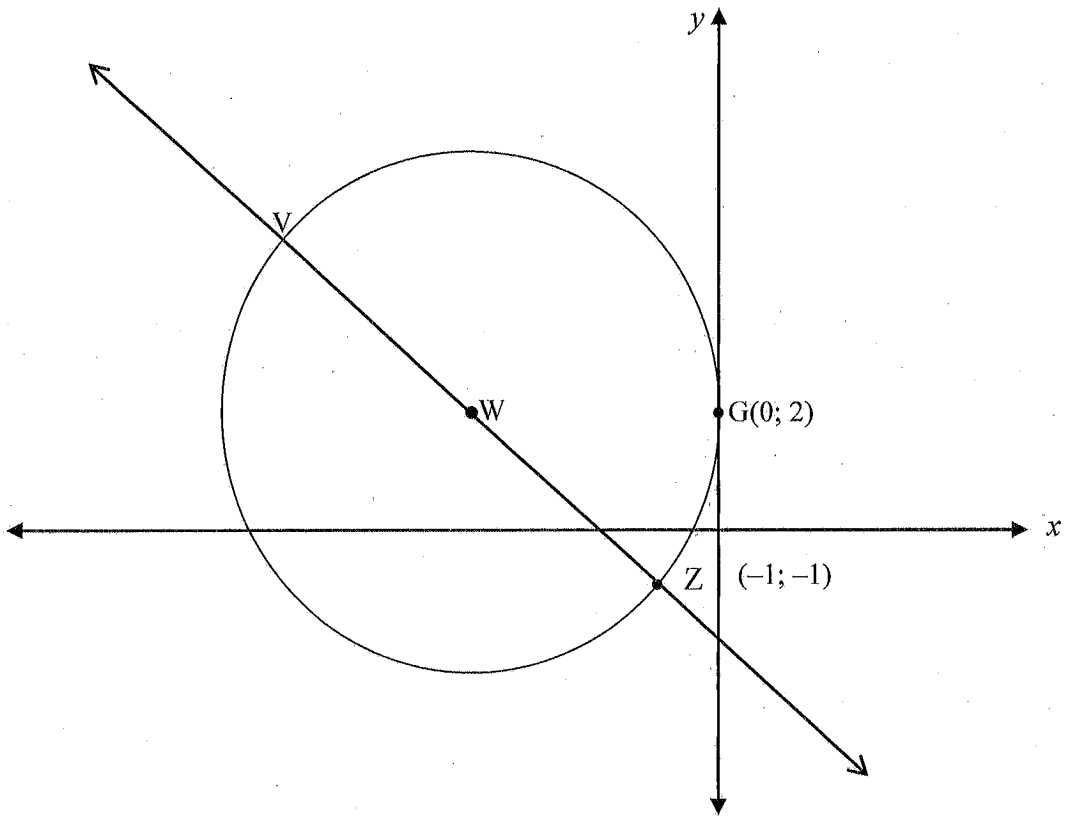
	Solution/*Oplossing*	**Marks/ *Punte***
3.3		(5)
3.4		(2)
3.5		(3)

Copyright reserved

	Solution/*Oplossing*	**Marks/ *Punte***
3.6		(3)
		[18]

	Additional space/*Bykomende ruimte*	**Marks/ *Punte***

QUESTION 4



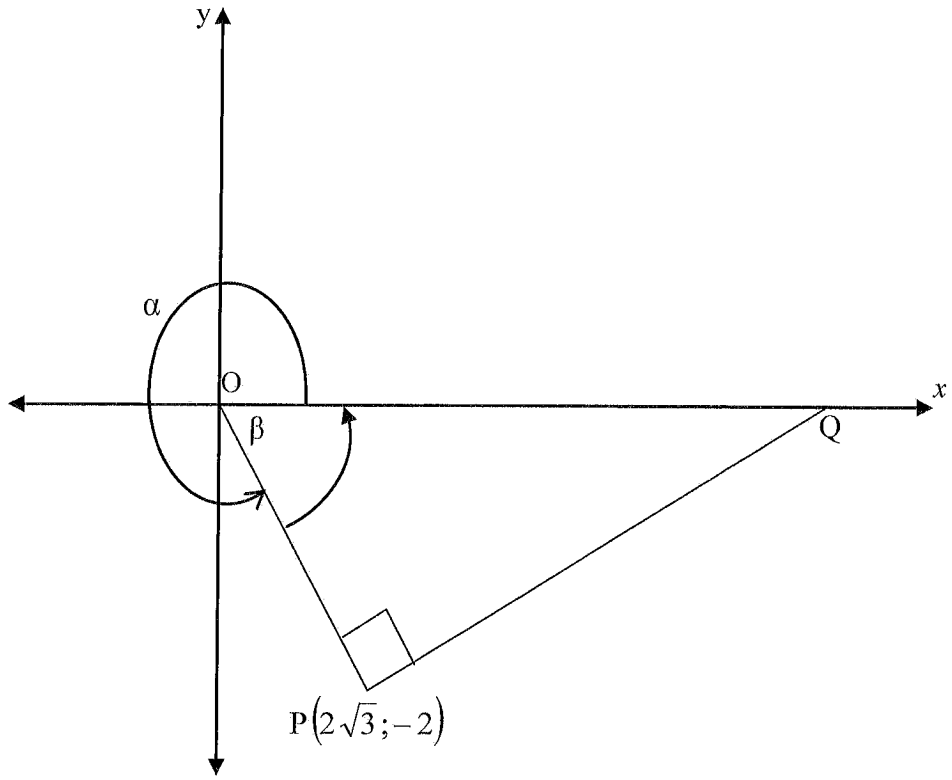
	Solution/*Oplossing*	**Marks/ *Punte***
4.1.1		(5)

	Solution/*Oplossing*	**Marks / *Punte***
4.1.2		(1)
4.1.3		(2)
4.1.4		(1)
4.1.5		(3)
4.1.6		(2)

	Solution/Oplossing	**Marks/ Punte**
4.2.1		(6)
4.2.2		(3)
		[23]

	Additional space/*Bykomende ruimte*	**Marks/ *Punte***

QUESTION 5



	Solution/*Oplossing*	Marks/ *Punte*
5.1.1		(3)
5.1.2		(2)

Copyright reserved

	Solution/*Oplossing*	**Marks/ *Punte***
5.1.3		(3)
5.2		(5)
		[13]

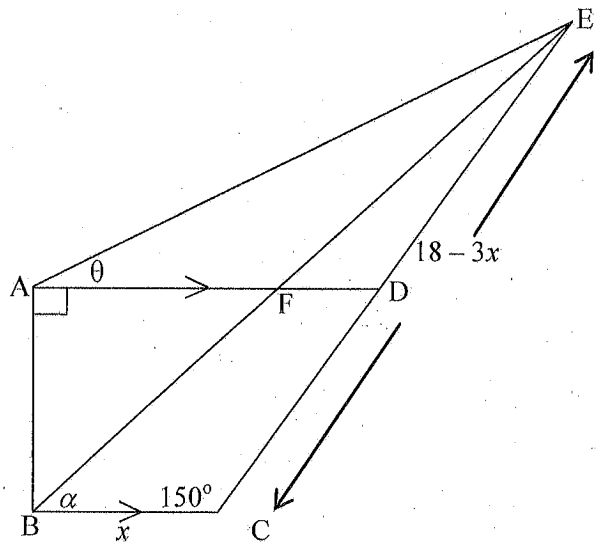
QUESTION 6

	Solution/*Oplossing*	**Marks/ *Punte***
6.1		(5)
6.2		(1)
6.3		(2)
6.4		(2)
6.5		(1)
		[11]

Copyright reserved

QUESTION 7

	Solution/*Oplossing*	**Marks/ *Punte***
7.1		(5)

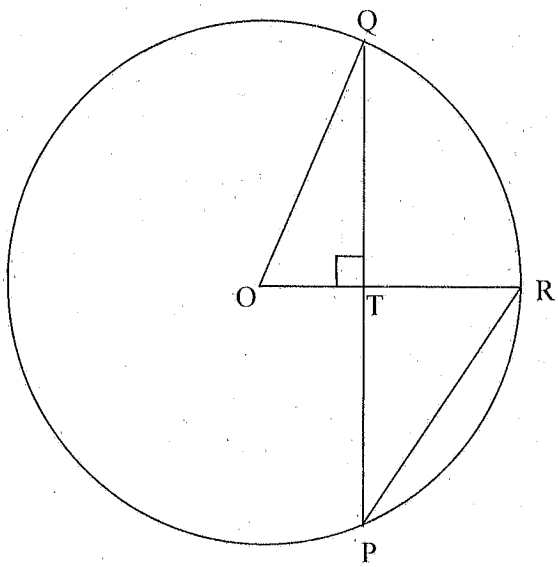


7.2.1		(5)

	Solution/*Oplossing*	**Marks/ *Punte***
7.2.2		(3)
7.2.3		(3)
7.2.4		(3)
		[19]

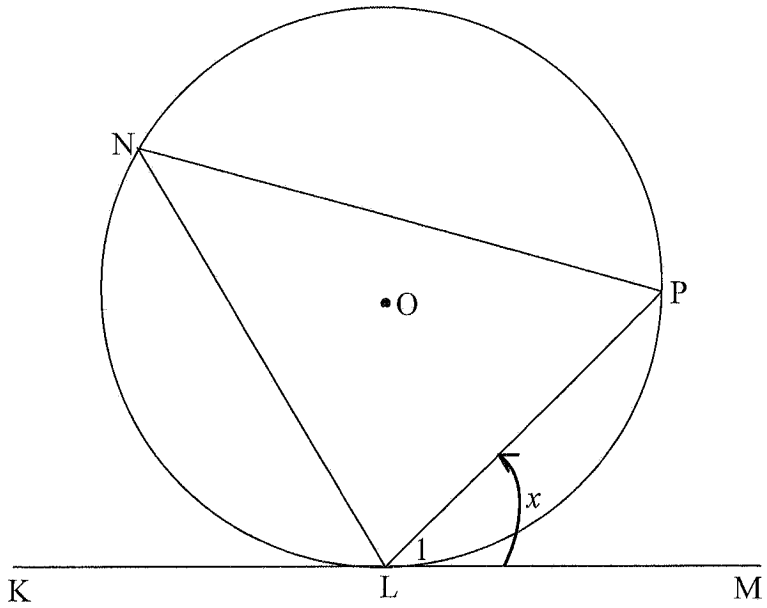
	Additional space/*Bykomende ruimte*	**Marks/ *Punte***

QUESTION 8



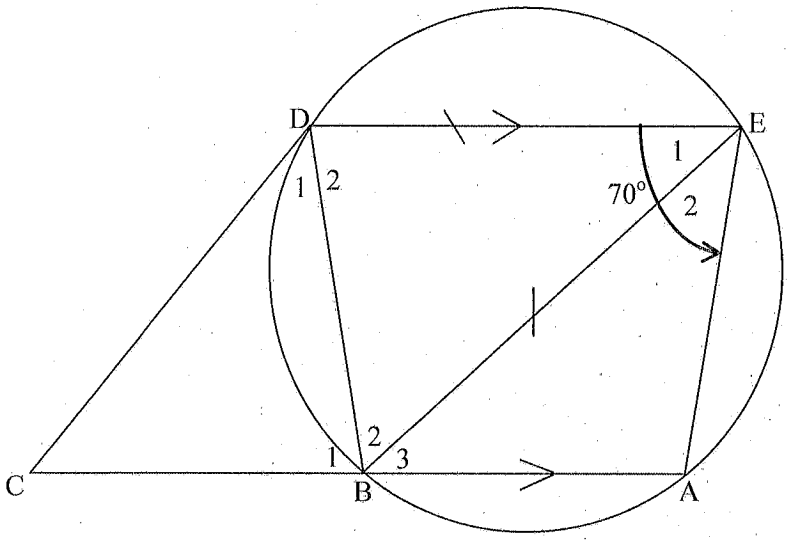
	Solution/*Oplossing*	**Marks/ *Punte***
8.1		(2)
8.2		(4)
		[6]

QUESTION 9



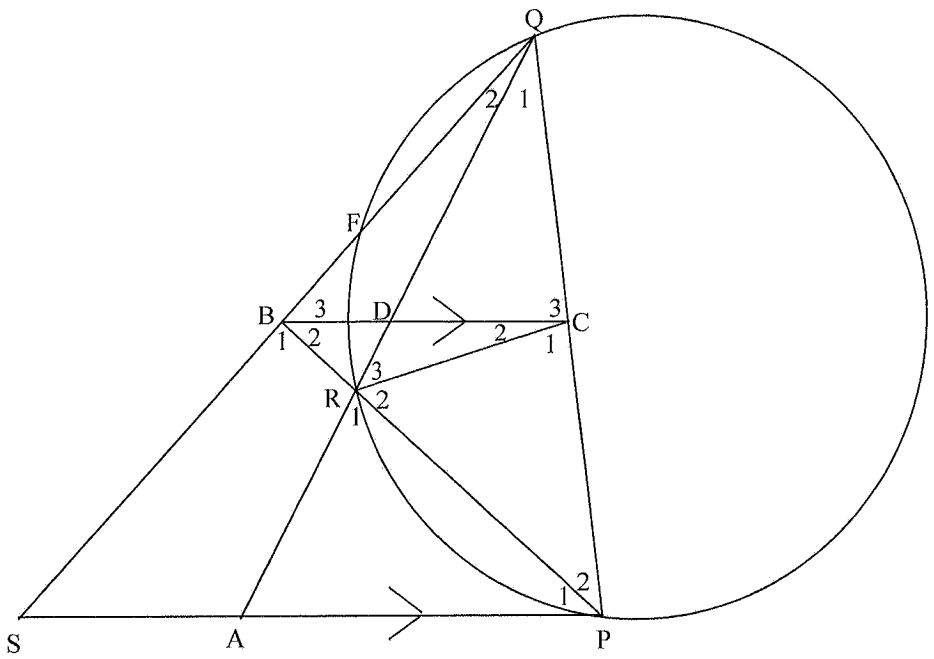
	Solution/*Oplossing*	**Marks/ *Punte***
9.1		(1)
9.2		(5)

9.3



	Solution/*Oplossing*	**Marks/ *Punte***
9.3.1		(2)
9.3.2		(2)
9.3.3		(2)
9.3.4		(2)
9.3.5		(3)
		[17]

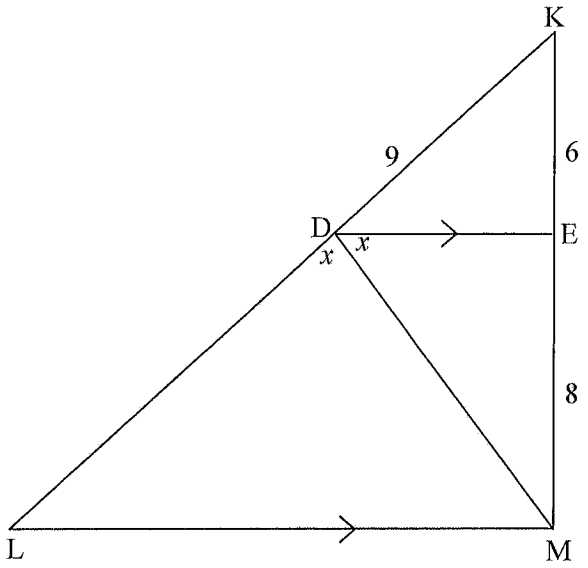
QUESTION 10



	Solution/Oplossing	**Marks/ Punte**
10.1		(4)
10.2		(2)
10.3		(2)

	Solution/Oplossing	Marks/ Punte
10.4		(5)
10.5		(4)
		[17]

QUESTION 11



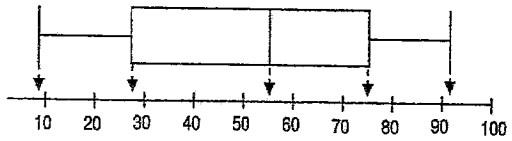
	Solution/*Oplossing*	**Marks/ *Punte***
		(5)
		[5]

TOTAL: [150]

Copyright reserved

SECTION A

QUESTION 1

1.1	min = 9 ; maximum = 92 ; upper quartile = 75 Lower quartile = 28 and medium = 55 Therefore five number summary is (9; 28; 55; 75; 92)	A✓9 and 92 A✓28 A✓55 A✓75 (4)
1.2		CA✓ correct Q1 & Q3 CA✓ median correctly shown CA✓ both correct whiskers (3)
1.3	Data is skewed to the left /Data is negatively skewed	CA CA✓✓Answer (2)
1.4	mean mark for M–cee-nai High $= \frac{9+14+14+19+21+23+33+35+37+37+42+45+55+56+57+59+68+75+75+75+77+78+80+81+92}{25}$ $\frac{1257}{25} = 50,28$ OR $\bar{x} = \frac{1257}{25} = 50,28$	A✓sum CA✓answer (2) [Answer only full marks]
1.5	Bee Vee High School. Bee Vee High School performed better because half of the learners got above 60% whilst half of M–cee-nai learners got more than 55%. The median of Bee Vee High was higher than that of M–cee-nai High.	CA✓Bee Vee High CA✓✓Reasoning (3)
		[13]

Copyright Reserved

Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

MATHEMATICS P2

PREPARATORY EXAMINATION

SEPTEMBER 2016

MEMORANDUM

NATIONAL SENIOR CERTIFICATE

GRADE 12

MARKS : 150

This memorandum consists of 17 pages.

Copyright Reserved

QUESTION 2

2.1	(6; 160)	A✓ 6 A✓ 160 (2)
2.2	$y = -1{,}64x + 73{,}52$	AA✓✓ gradient AA✓✓ y - intercept (4)
2.3	$r = -0{,}2$	AA✓✓ answer (2)
		[8]

QUESTION 3

3.1	$AC = \sqrt{(-5-7)^2 + (1-(2))^2}$ $= \sqrt{(12)^2 + (3)^2}$ $= \sqrt{144+9}$ $= \sqrt{153}$ $= 12{,}37$	A✓ correct Subst CA ✓ answer (2)
3.2	$M_{BC} = \frac{6-(2)}{1-7}$ $= \frac{8}{-6}$ $= \frac{-4}{3}$ $y - y_1 = m(x - x_1)$ $y - 6 = -\frac{4}{3}(x-1)$ $3y - 18 = -4x + 4$ $3y = -4x + 22$	 A✓ $\frac{-4}{3}$ CA✓ correct subst. of (1;6) And (7;-2) CA✓ equation in any form (3)

3.3 $\hat{B} = \theta = \alpha - \beta$ ....Ext $\angle$ $\tan\alpha = m_{BC} = -\frac{4}{3}$ $\therefore \quad \alpha = 126{,}9^\circ$ $\tan_\beta = m_{AB} = \frac{5}{6}$ $\therefore \quad \beta = 39{,}8^\circ$ $\theta = \alpha - \beta$ $\theta = \alpha - \beta$ $= 126{,}9^\circ - 39{,}8^\circ$ $= 87{,}1^\circ$ $\therefore A\hat{B}C = 87{,}1^\circ$ OR Distance $AB = \sqrt{(1+5)^2 + (6-1)^2}$ $= \sqrt{61}$ Distance $BC = \sqrt{(1-7)^2 + (6+2)^2}$ $= \sqrt{100}$ $= 10$ Distance $AC = \sqrt{(-5-7)^2 + (1+2)^2}$ $= \sqrt{153}$ $\cos\hat{B} = \frac{a^2 + c^2 - b^2}{2ac}$ $= \frac{10^2 + \left(\sqrt{61}\right)^2 - \left(\sqrt{153}\right)^2}{2(10)\left(\sqrt{61}\right)}$ $= 0{,}051$ $\hat{B} = 87{,}1^\circ$	CA✓ $\tan\alpha = -\frac{4}{3}$ CA✓ $\alpha = 126{,}9^\circ$ A ✓$\tan\beta = \frac{5}{6}$ CA✓ $\beta = 39{,}8^\circ$ CA ✓ $A\hat{B}C = 87{,}1^\circ$ (5) A ✓Distance AB A ✓Distance BC A ✓Distance AC CA ✓substitution in cosine rule CA ✓answer (5)
3.4 $P\left(\frac{-5+1}{2}; \frac{1+6}{2}\right)$ $P\left(-2; \frac{7}{2}\right)$	AA✓✓both co-ordinates (2)

3.5 $m_{AC} = \frac{-2-1}{7+5}$ $= \frac{-3}{12}$ $= \frac{-1}{4}$ through =(–1 ; 3) equation: $y-3=-\frac{1}{4}(x+1)$ $y-3=-\frac{1}{4}x-\frac{1}{4}$ $\therefore \quad y=\frac{-1}{4}x+2\frac{3}{4}$ or $y=-\frac{1}{4}x+\frac{11}{4}$ or $4y+x-11=0$	A ✓ $\frac{-1}{4}$ CA ✓ subst. (-1;3) CA ✓ equation in any form (3)
3.6 $m_{AB} = \frac{5}{6}$; $6x + 5y = 18$ $5y = -6x + 18$ $y = \frac{-6}{5}x + \frac{18}{5}$ $\therefore m_1 = \frac{-6}{5}$ $m_{AB}\ m_1 = -1$ $\therefore \quad m_{AB} \perp 6x + 5y = 18$	A ✓ $m_1 = -\frac{6}{5}$ A ✓ $m_{AB} . m_1$ A ✓ = -1 (3)
	[18]

QUESTION 4	
4.1.1 At W, y = 2 $3x + 4(2) + 7 = 0$ $3x = -15$ $x = -5$ W(–5;2) r = 5 $(x+5)^2 + (y-2)^2 = 25$	A ✓ subst y = 2 CA ✓ $x = -5$ CA ✓ co -ordinates of W CA ✓ r = 5 CA ✓ equation of the circle. (5)
4.1.2 VZ = 2r = 2 x 5 = 10 units	CA ✓ answer (1)
4.1.3 $m_{GZ} = \frac{2+1}{0+1}$ $= 3$	A ✓ substitution into formula CA ✓ answer (2)
4.1.4 Midpoint of GZ is $\left(-\frac{1}{2}; \frac{1}{2}\right)$	A ✓ coordinates (1)
4.1.5 $m_{GZ} = 3$ $m_{\perp} = -\frac{1}{3}$ $y - \frac{1}{2} = -\frac{1}{3}\left(x + \frac{1}{2}\right)$ $y = -\frac{1}{3}x + \frac{1}{3}$	CA ✓ gradient of perpendicular bisector CA ✓ substitution into formula CA ✓ answer (3)

4.1.6 W (–5; 2) into $x+3y-1=0$ LHS $= (2(-5)+6(2)-2$ $= -10+12-2$ $= 0$ $= RHS$ W is on the line that bisects GZ perpendicularly and W on GZ. $\therefore$ lines intersect at W. **OR** $-\frac{1}{3}x+\frac{1}{3}=2$ $-x+1=6$ $x=-5$ This is the x - value of the coordinate of W. **OR** Equation of WZ: $y-y_1=m(x-x_1)$ $y+1=\frac{2+1}{-5+1}(x+1)$ $y+1=-\frac{3}{4}(x+1)$ $y=-\frac{3}{4}x-\frac{7}{4}$ $\therefore -\frac{3}{4}x-\frac{7}{4}=-\frac{1}{3}x+\frac{1}{3}$ $-9x-21=-4x+4$ $-5x=25$ $x=-5$ $\therefore y=-\frac{1}{3}(-5)+\frac{1}{3}=2$ This is the coordinate of W.	A✓ substitution A✓ = 0 (2) A✓equating eq. of perpendicular bisector to the horizontal line $y=2$ A✓ $x=-5$ (2) A✓equation of WZ A✓ $x=-5$ (2)
4.2.1 circle M: M(–2; 1) ; $r_1 = 5$ circle N: N(1;3) ; $r_2 = 3$ $\therefore$ $r_1+r_2 = 8$ and $r_1-r_2=2$ MN $= \sqrt{(1-(-2))^2+(3-1)^2}$ $= \sqrt{3^2+2^2}$ $= \sqrt{9+4}$ $= \sqrt{13}$ or 3,6 $\therefore$ $r_1 + r_2 >$ MN $> r_1 - r_2$ $\therefore$ The two circles intersect at two distinct points.	A ✓ $r_1 = 5$ A ✓ $r_2 = 3$ A ✓ $r_1+r_2=8$ A ✓ MN $=\sqrt{13}$ $=3,6$ A✓comparing A✓ conclusion (6)

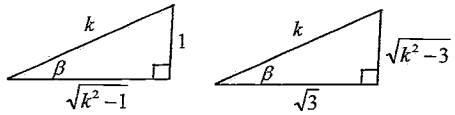
Copyright Reserved

4.2.2 circle M = circle N $(x+2)^2+(y-1)^2-25=(x-1)^2+(y-3)^2-9$ $x^2+4x+4+y^2-2y+1-25=x^2-2x+1+y^2-6y+9-9$ $6x+4y=21$ $\therefore$ The equation of the common chord is : $6x + 4y = 21$	M✓ equating A✓ simplifying CA✓ equation of the chord (3) **[23]**
QUESTION 5 5.1.1 $\tan\alpha=\frac{-2}{2\sqrt{3}}=\frac{-1}{\sqrt{3}}$ $\therefore$ $\alpha=360^\circ-30^\circ$ $= 330^\circ$ $\therefore$ $\beta = 30^\circ$ or $\tan(-\beta)=-\tan\beta$ $=-(\frac{-2}{2\sqrt{3}})$ $\tan\beta=\frac{2}{2\sqrt{3}}$ $\beta = 30^\circ$	A✓correct ratio CA✓ $\alpha = 330^\circ$ CA✓ $\beta = 30^\circ$ A✓correct ratio CACA✓✓ $\beta = 30^\circ$ (3)
5.1.2 $OP^2 = (2\sqrt{3})^2 + (-2)^2 = 12 + 4$ $= 16$ $\therefore$ $OP = 4$	A✓ using distance for formula CA✓answer (2)
5.1.3 $\frac{OP}{OQ} = \cos\beta$ $\therefore$ $OQ=\frac{OP}{\cos\beta}=\frac{4}{\cos30^\circ}$ $=\frac{4}{\frac{\sqrt{3}}{2}}$ $=\frac{8}{\sqrt{3}}$	CA✓ $\cos 30^\circ = \frac{\sqrt{3}}{2}$ CA✓ $\frac{8}{\sqrt{3}}$

Copyright Reserved

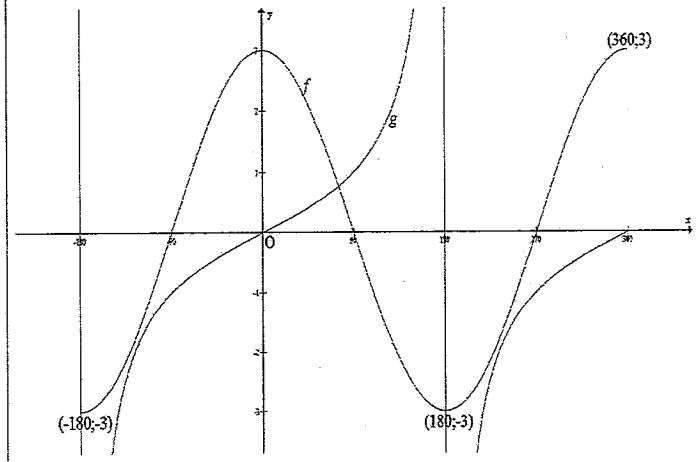
$Q=\left(\frac{8\sqrt{3}}{3};0\right)$	CA✓ co-ordinates
or	
$\frac{OP}{OQ}=\cos 30°$	
$OQ=\frac{4}{\cos 30°}=\frac{4}{\frac{\sqrt{3}}{2}}$	CA✓ $\cos 30° = \frac{\sqrt{3}}{2}$
$OQ=\frac{8\sqrt{3}}{3}$	CA✓ $\frac{8\sqrt{3}}{3}$
$Q=\left(\frac{8\sqrt{3}}{3};0\right)$	CA✓ co-ordinates
	(3)

5.2 $2\left[\frac{1}{2}\cos\alpha+\frac{\sqrt{3}}{2}\sin\alpha\right]$	M✓ for introducing 2
	A✓ introducing 30° special angle
$= 2\left[\sin 30°\cos\alpha+\cos 30°\sin\alpha\right]$	A✓ sum compound formula
$= 2\sin(30°+\alpha)$	A✓ calculating k
$k=2\ ;\ \beta=30°$	A✓ calculating β
OR	
$\frac{1}{2}\cos\alpha+\frac{\sqrt{3}}{2}\sin\alpha=\frac{k}{2}(\sin\alpha+\beta)$	A✓ for introducing 2
$= \sin 30°\cos\alpha+\cos 30°\sin\alpha=\frac{k}{2}\sin(\alpha+\beta)$	A✓ introducing 30° special angle
$= \sin(30°+\alpha)=\frac{k}{2}\sin(\alpha+\beta)$	A✓ sum compound formula
$\frac{k}{2}=1,\ \beta=30°$	A✓ calculating k
$\therefore k=2,\ \beta=30°$	A✓ calculating β
OR	(5)

$\cos\alpha+\sqrt{3}\sin\alpha=k\sin(\alpha+\beta)$	
$\cos\alpha+\sqrt{3}\sin\alpha=k(\sin\alpha\cos\beta+\cos\alpha\sin\beta)$	
$\cos\alpha+\sqrt{3}\sin\alpha=k\sin\alpha\cos\beta+k\cos\alpha\sin\beta$	A✓ expansion
$\cos\alpha+\sqrt{3}\sin\alpha=(k\sin\beta)\cos\alpha+(k\cos\beta)\sin\alpha$	
$\therefore 1=k\sin\beta$ and $\sqrt{3}=k\cos\beta$	A✓ comparing coefficients
$\therefore \sin\beta=\frac{1}{k}$ $\cos\beta=\frac{\sqrt{3}}{k}$	A✓ values of trig ratios
	
$\sqrt{k^2-1}=\sqrt{3}$	
$k^2=4$	
$k=2$	
$\sin\beta=\frac{1}{2}$	A✓ calculating k
$\beta=30°$	A✓ calculating β
	(5)
	[13]

QUESTION 6

6.1



A✓asymptotes
A✓shape of f
A✓shape of g
A✓correct x- intercept of f (–90°; 90°; 270°)
A✓correct x – intercept of g (0°; 360°)
(5)

6.2 360°

A✓360°
(1)

6.3 (0; 3) and (180°; –3)
(–180°; –3) and (360°; 3)

CA✓for any two
(2)

6.4 $-180° < x < 0°$ or $180° < x < 360°$
OR
$-180° < x < 0° \cup 180° < x < 360°$

CA✓$-180° < x < 0°$
CA✓$180 < x < 360°$
[penalize one mark for incorrect notation]
(2)

6.5 $y = 3\cos(x - 45°)$

A✓$3\cos(x - 45°)$
(1)
[11]

QUESTION 7

7.1 $\cos 54° \cdot \cos x + \sin 54° \cdot \sin x = \sin 2x$

$\cos(54° - x) = \sin 2x$

$= \cos(90° - 2x)$

$\therefore \quad 54° - x = 90° - 2x + n \cdot 360°$ *or* $54° - x = 360 - (90° - 2x) + n \cdot 360°$

$x = 36° + n \cdot 360°$ *or* $-3x = 216° + n \cdot 360°$

$x = 36° + n \cdot 360°$ *or* $-x = -72° + n \cdot 120°$

$\therefore \quad x = 36° + n \cdot 360°$ *or* $x = -72° + n \cdot 120°$, $n \in Z$

A✓$\cos(54° - x)$
A✓$\cos(90° - 2x)$
CA✓$x = 36° + n \cdot 360°$
CA✓$x = -72° + n \cdot 120°$
A✓$n \in Z$ (5)

7.2.1 $E\hat{F}D = F\hat{B}C = \alpha$ ... corresponding $\angle$'s ... AD // BC

$E\hat{F}D = \theta + A\hat{E}F$ ... ext $\angle$ of Δ AEF

$\therefore A\hat{E}F = \alpha - \theta$

In Δ ABE: $\dfrac{\sin A\hat{E}B}{AB} = \dfrac{\sin E\hat{A}B}{BE}$

$\therefore BE = \dfrac{AB \sin(90° + \theta)}{\sin(\alpha - \theta)}$

$= \dfrac{AB \cos\theta}{\sin(\alpha - \theta)}$

A✓ S/R
A✓ S/R
A✓ $A\hat{E}F = \alpha - \theta$
A✓ sine rule application
A✓ substitution
(5)

7.2.2 Area of Δ BCE $= \dfrac{1}{2} \cdot x(18 - 3x)\sin 150°$

$A(x) = \dfrac{1}{2}x \cdot (18 - 3x) \cdot \dfrac{1}{2}$

$= \dfrac{1}{4} \cdot x \cdot 18 - \dfrac{1}{4}x \cdot 3x$

$= \dfrac{18}{4}x - \dfrac{3}{4}x^2$

$= \dfrac{9}{2}x - \dfrac{3}{4}x^2$

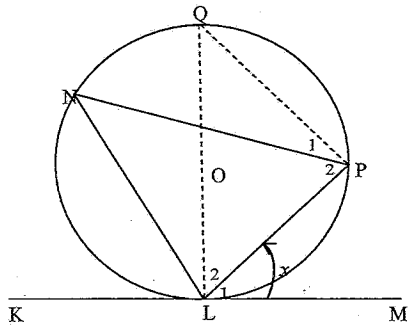
A✓ area rule
A✓ $\sin 150° = \dfrac{1}{2}$
A✓ simplifying
(3)

7.2.3	At maximum area: $A'(x) = 0$ $A'(x) = \frac{9}{2} - 2.\frac{3}{4}x$ $0 = \frac{9}{2} - \frac{3}{2}x$ $3x = 9$ $x = 3$	M✓ $A'(x) = 0$ A✓ derivative CA✓ $x = 3$ (3)
7.2.4	$BC = 3$ $CE = 18 - 3(3)$ $= 18 - 9$ $= 9$ $BE^2 = BC^2 + CE^2 - 2\,BC\,.\,CE\cos 150°$ $= (3)^2 + (9)^2 - 2 \times 3 \times 9(-\cos 30°)$ $= 9 + 81 + 54\cos 30°$ $= 90 + 54\,.\left(\frac{\sqrt{3}}{2}\right)$ $= 136{,}765$ $\therefore BE = 11{,}695$ $= 11{,}69$	A✓ for both $BC = 3$ and $CE = 9$ CA✓ applying cosine rule and substitution CA✓ answer (3) **[19]**

QUESTION 8

8.1	PT = TQ = 12cm ...(line from center perpendicular to chord PQ) $\therefore$ PQ = 12 cm + 12 cm = 24cm	A✓ R A✓ answer (2)
8.2	$OT^2 = OQ^2 - QT^2$ ..... pythagoras $= 13^2 - 12^2$ $= 169 - 144$ $= 25$ $\therefore OT = 5$ $\therefore TR = OR - OT$ $= 13cm - 5cm$ $= 8cm$ In Δ PTR, $PR^2 = TR^2 + PT^2$ $= 8^2 + 12^2$ $= 64 + 144$ $= 208\ cm^2$ $\therefore PR = \sqrt{208}$ cm or $4\sqrt{13}$ cm or 14,42 cm	A✓ OT = 5 CA✓ TR = 8cm CA✓ PR^2 =208 CA✓ PR = $4\sqrt{13}$ or 14,42 (4) **[6]**

QUESTION 9

9.1 Interior opposite angle	A✓ S (1)
9.2 	
Construction : Draw diameter LOQ and join QP or Join OL and OP	A✓construction

STATEMENT	REASON	
Let $P\hat{L}M = \hat{L}_1 = x$		
$\hat{P}_1 + \hat{P}_2 = 90°$	angle subtended by the diameter	A✓S/R
$\hat{L}_2 = 90° - x$	LM ⊥ OL, tan – radius	A✓S/R
$\therefore \hat{Q} = x$	Sum of the angles of a triangle	A✓S
$\hat{N} = x$	Subtended by the same chord LP	A✓S/R
$P\hat{L}M = \hat{N}$		(5)

9.3.1 $\hat{A} = 180° - A\hat{E}D$ ... co interior ∠'s, AB//ED $= 180° - 70°$ $= 110°$	A✓ S/R A✓ 110° (2)
9.3.2 $\hat{B}_1 = 70°$ ... ext ∠ cyclic quad ABDE	A✓ R A✓ 70° (2)
9.3.3 $\hat{D}_2 = \hat{B}_1 = 70°$ ....(alt ∠s ; DE//CA)	CA✓ 70° A✓ S/R (2)
9.3.4 $\hat{B}_2 = \hat{D}_2 = 70°$ ... (∠s opp = sides)	CA✓ 70° A✓ S/R (2)

9.3.5 $\hat{E}_1 = 180° - (\hat{B}_2 + \hat{D}_2)$ ...(∠sum of Δ) $= 180° - 140°$ $= 40°$ $\therefore \hat{D}_1 = \hat{E}_1 = 40°$ ... tan chord theorem	CA✓ $\hat{E}_1 = 40°$ CA✓ $\hat{D}_1 = 40°$ A✓ R (3) [17]

QUESTION 10

10.1 $\hat{P}_1 = \hat{B}_2 = x$ ... alt ∠s; SP//BC $\hat{P}_2 = \hat{P}_1 = x$ ... given $Q_1 = P_1 = x$ ... tan chord theorem	A✓ S A✓ R A✓ S/R A✓ S/R (4)
10.2 PC = BC ... $\hat{P}_2 = \hat{B}_2 = x$ proved above (Δ PCB)	A✓ $\hat{P}_2 = \hat{B}_2 = C = x$ A✓reason (2)
10.3 $\hat{Q}_1 = \hat{B}_2 = x$ ... proved ∴ RCQB is a cyclic quad ... converse ∠'s in the same segment	A✓ S A✓ R (2)
10.4 $\hat{S} = \hat{B}_3$ ... corresp ∠'s SP ∥ BC $= \hat{R}_3$ ...∠'s in the same segment, cyclic quad RCQB In Δ PBS and Δ QCR $\hat{P}_1 = \hat{Q}_1 = x$ ... proved $\hat{S} = \hat{R}_3$ ... proved Remaining ∠s equal ∴ Δ PBS ||| Δ QCR	A✓ S/R A✓ S/R A✓ S/R A✓ S/R A✓ R (5)
10.5 In Δ PBQ and Δ PCR $\hat{P}_2$ is common $P\hat{Q}B = \hat{R}_2$ ...ext ∠ of cyclic quad RCQB Δ PBQ ||| Δ PCR ... (3rd ∠ Δ) $\therefore \frac{PB}{CP} = \frac{QB}{CR}$ (||| Δ s) ∴ PB . CR = QB . CP	A✓S A✓ S/R A✓ S/R A✓ S (4) [17]

QUESTION 11

In Δ KLM $\frac{LD}{9} = \frac{8}{6}$ ... (LM//DE; proportionality theorem) $\therefore$ LD = 12 $D\hat{M}L = M\hat{D}E = x$ ... alt $\angle s$, LM $\parallel$ DE $\therefore$ LM = LD = 12 ... (sides opp = $\angle s$)	A✓S/R A✓ LD = 12 A✓ S A✓answer A✓ R (5)
	[5]

TOTAL: [150]

Copyright Reserved