Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

MATHEMATICS P2

COMMON TEST

JUNE 2015

NATIONAL SENIOR CERTIFICATE

GRADE 12

Marks: 125

Time: 2½ hours

N.B. This question paper consists of 10 pages, 4 diagram sheets and 1 information sheet.

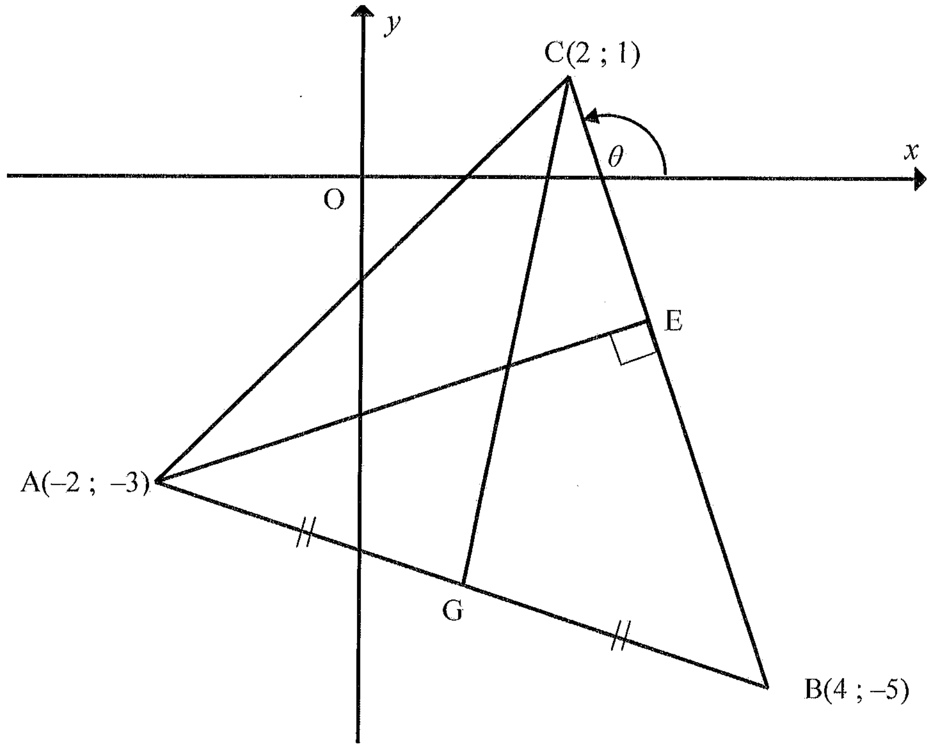
INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 8 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations, diagrams, graphs, et cetera that you have used in determining your answers.
4. Answers only will not necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, answers should be rounded off to TWO decimal places, unless stated otherwise.
7. FOUR diagram sheets for answering QUESTION 4, QUESTION 5, QUESTION 6, QUESTION 7 and QUESTION 8 are attached at the end of this question paper. Write your name on these diagram sheets in the spaces provided and insert the diagram sheets inside the back cover of your ANSWER BOOK.
8. Diagrams are **NOT** necessarily drawn to scale.
9. An information sheet with formulae is included at the end of this question paper.
10. Number the answers correctly according to the numbering system used in this question paper.
11. Write neatly and legibly.

QUESTION 1

In the diagram below, A (–2 ; –3), B(4 ; –5) and C(2 ; 1) are vertices of a ΔABC in the Cartesian plane. CG is a line such that AG = GB and AE $\perp$ BC.



1.1 Calculate the coordinates of G, the midpoint of AB. (2)

1.2 Calculate the length of CG. Leave your answer in surd form. (2)

1.3 Calculate the gradient of BC. (2)

1.4 Calculate the value of θ, the angle of inclination of BC, rounded off to ONE decimal digit. (3)

1.5 Show that ΔABC is isosceles. (4)

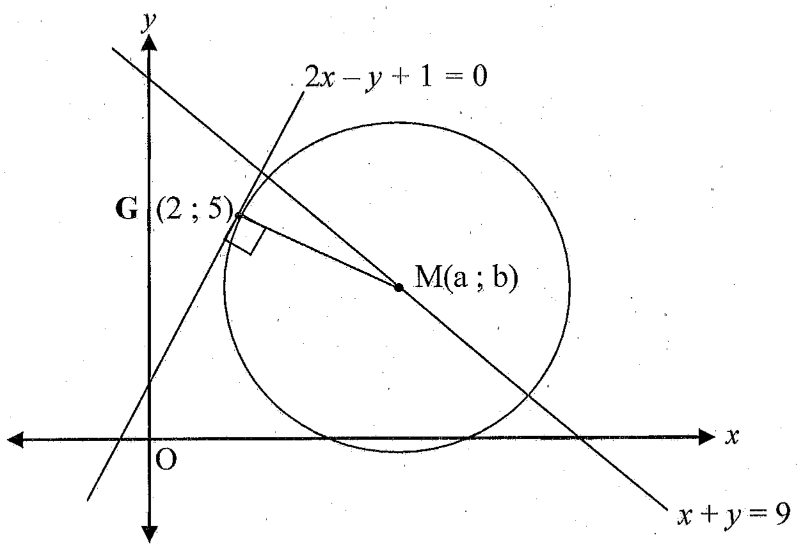
1.6 Calculate the size of $C\hat{A}B$, rounded off to ONE decimal digit. (4)

1.7 Calculate the area of ΔABC (to the nearest square unit). (3)

[20]

QUESTION 2

2.1 In the figure below, the line $2x - y + 1 = 0$ is a tangent to the circle, having centre M(a ; b), at G(2 ; 5). The centre of the circle lies on the line $x + y = 9$.



2.1.1 Determine the gradient of GM. (2)

2.1.2 Determine the equation of GM in the form: $y = mx + c$. (3)

2.1.3 Calculate the coordinates of M. (4)

2.1.4 Hence, calculate the length of the radius of the circle. (2)

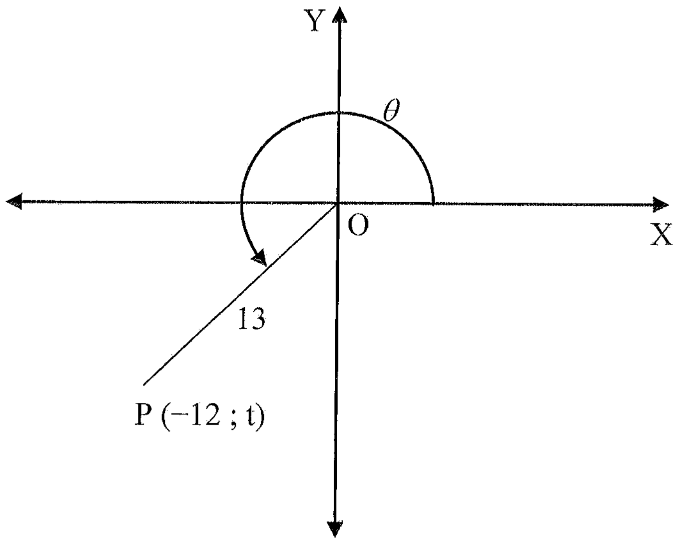
2.1.5 Write down the equation of the circle in the form:
$x^2 + y^2 + Cx + Dy + E = 0$. (3)

2.2 Determine the equation of the tangent to the circle $x^2 + y^2 - 26x + 12y + 105 = 0$ at (7 ; 2).
Give your answer in the form: $y = mx + c$. (7)

[21]

QUESTION 3

3.1 In the diagram below, reflex angle $X\hat{O}P = \theta$. P is the point (−12 ; t) and OP = 13 units.



Calculate, without using a calculator:

3.1.1 the value of t. (3)

3.1.2 $\sin\theta$ (1)

3.1.3 $\dfrac{1-\cos\theta}{\sin\theta}$ (3)

3.2 Simplify completely, without using a calculator:

$$\frac{\cos(180°-\theta)\sin 50°}{\tan(90°-\theta)\cos 140°}$$ (7)

3.3 Prove the identity:

$$\frac{(\sin\theta-\cos\theta)^2}{1-\sin^2\theta}=\frac{1}{\cos^2\theta}-2\tan\theta$$ (5)

3.4

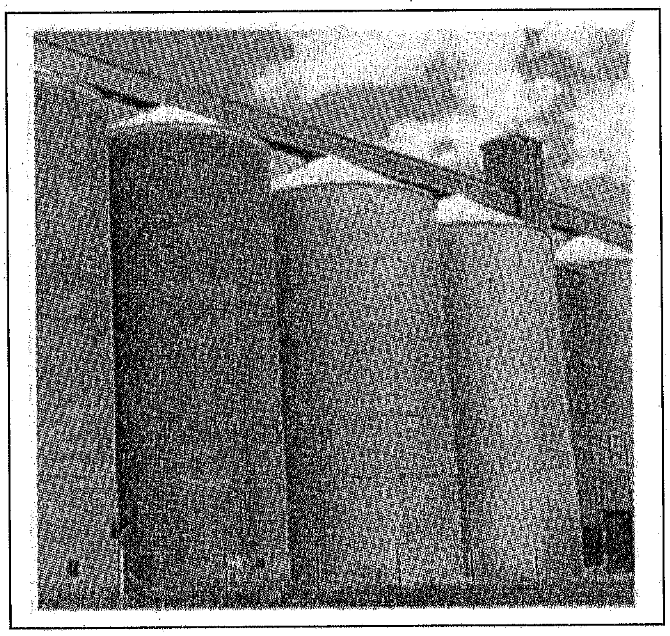
3.4.1 If $\cos(x+30°)=-2\sin x$, deduce that $\tan x=-\dfrac{1}{\sqrt{3}}$ (5)

3.4.2 Hence determine the general solution of $\cos(x+30°)=-2\sin x$. (2)

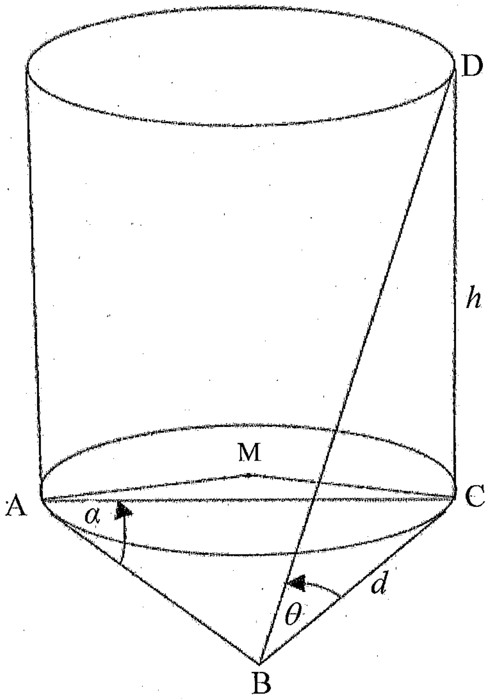
[26]

QUESTION 4

Consider the right cylindrical silos shown below:



The diagram alongside represents one of the right cylindrical silos above. M is the centre of the circular base with BA and BC tangents to the base at A and C. The points M, A, B and C lie in the same horizontal plane DC represents the vertical height of the cylindrical part of the silo.



$B\hat{A}C = \alpha$ and $D\hat{B}C = \theta$. DC = h, BC = d

4.1 Prove that AC = $d\sqrt{2 + 2\cos 2\alpha}$. (5)

4.2 Also prove that AC = $\dfrac{2h.\cos\alpha}{\tan\theta}$. (5)

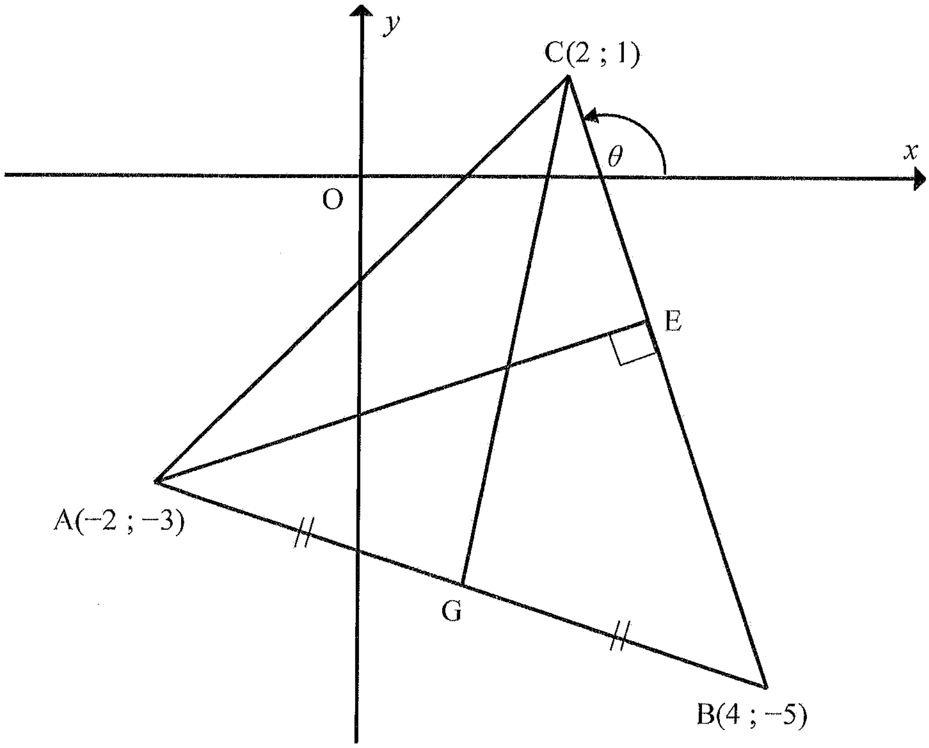
4.3 If $h = 36$ metres, $d = 10{,}3$ metres and $\alpha = 54^0$, calculate the volume of the cylindrical section of the silo (rounded off to the nearest cubic metre). (7)

[17]

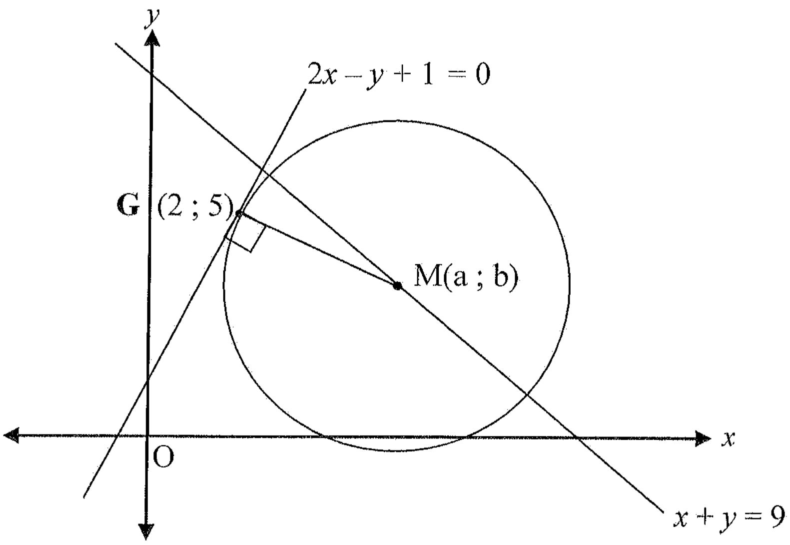
NAME: ______________________________

DIAGRAM SH EET 1

QUESTION 1



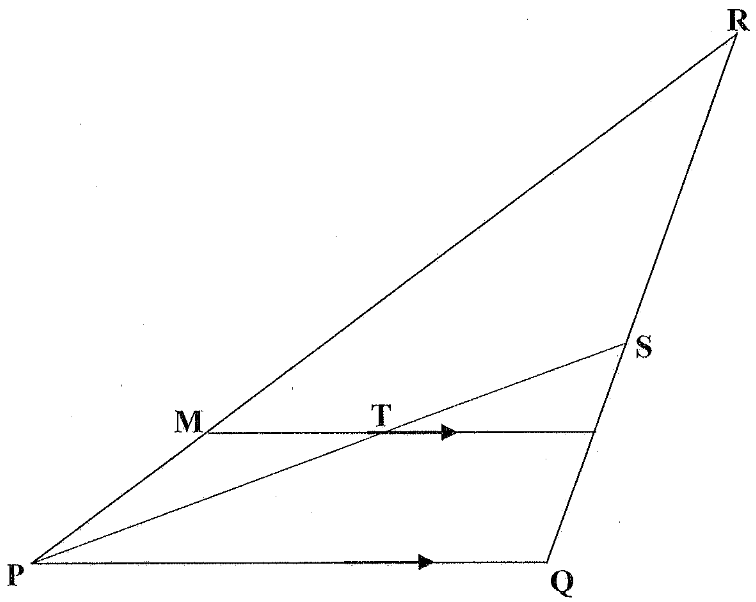
QUESTION 2



NAME: ____

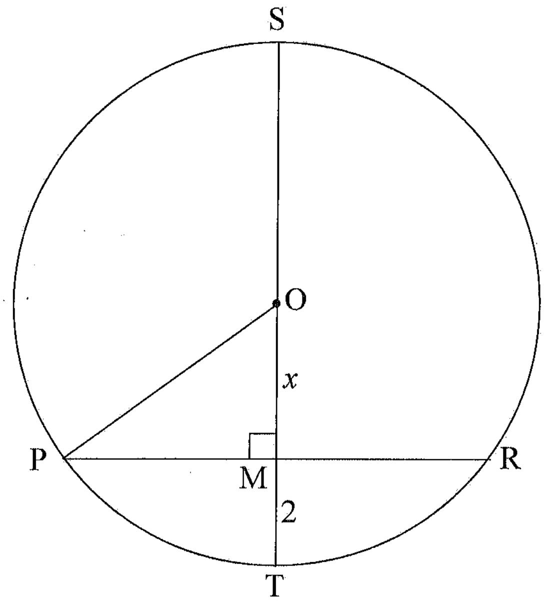
DIAGRAM SHEET 4

QUESTION 8



QUESTION 5

In the diagram below, PR is a chord of the circle with centre O. Diameter ST is perpendicular to PR at M. PR = 8 *cm*, MT = 2 *cm*, OM = x *cm*.



5.1 Write OP in terms of x and a number. (1)

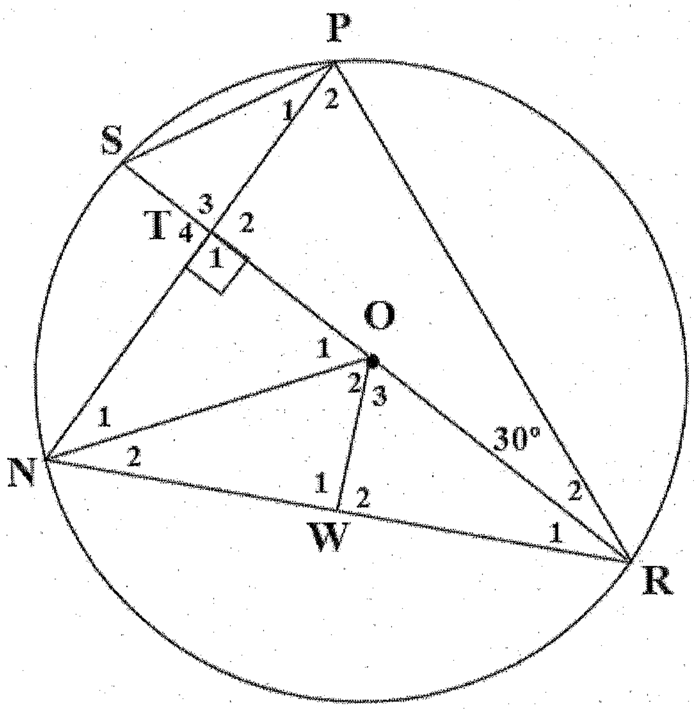
5.2 Write down the length of PM. Give a reason. (2)

5.3 Hence calculate the length of the radius of the circle. (3)

[6]

QUESTION 6

In the diagram below, the vertices of ΔPNR lie on the circle with centre O. Diameter SR is perpendicular to chord NP at T. Point W lies on NR. $\hat{R}_2 = 30^0$.



6.1 Calculate the size of the following angles, giving reasons for your answers:

6.1.1 $\hat{S}$ (3)

6.1.2 $\hat{R}_1$ (3)

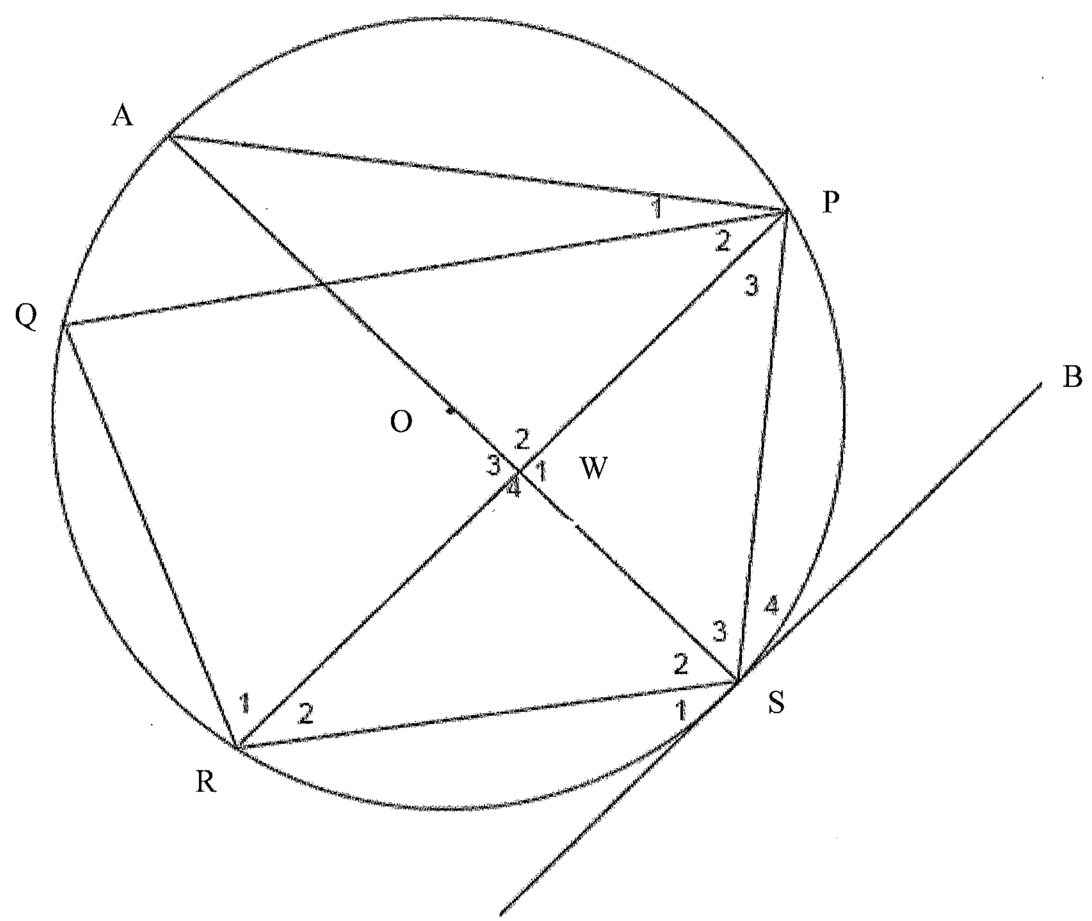
6.1.3 $\hat{N}_1$ (3)

6.2 If it is further given that NW = WR, prove that TNWO is a cyclic quadrilateral. (4)

[13]

QUESTION 7

In the diagram below, P, A, Q, R and S lie on the circle with centre O. SB is a tangent to the circle at S and RW = WP. AOWS and RWP are straight lines.



7.1 Write down, with reasons, the size of the following angles:

7.1.1 $B\hat{S}W$ (2)

7.1.2 $\hat{W}_1$ (2)

7.2 Why is SB || RP? (1)

7.3 Prove, with reasons, that:

7.3.1 $\Delta APS \,|||\, \Delta RWS$ (4)

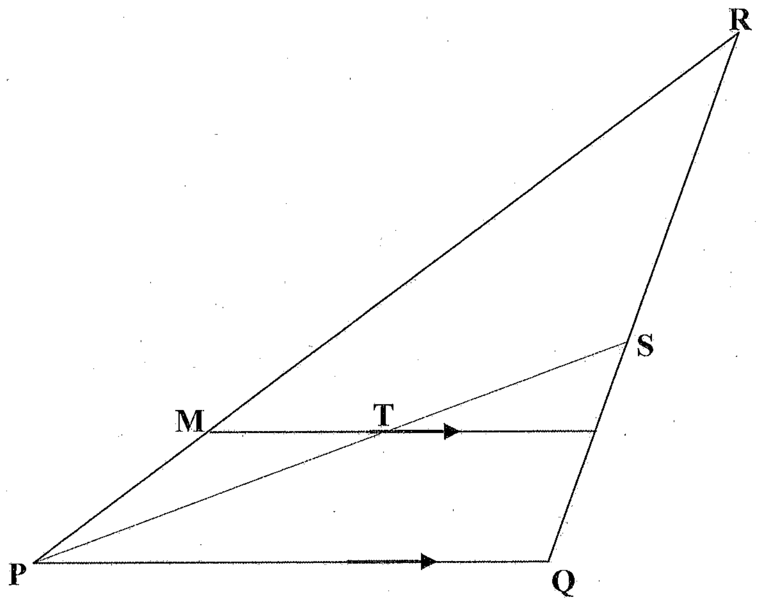
7.3.2 $RS^2 = WS.\,AS$ (4)

7.3.3 $AS = \dfrac{RW^2}{WS} + WS$ (3)

[16]

QUESTION 8

In the diagram below, S is the midpoint of QR, T is the midpoint of PS and MTW || PQ.



Calculate the numerical value of $\frac{RM}{RP}$. (6)

[6]

TOTAL: 125

INFORMATION SHEET: MATHEMATICS
INLIGTINGSBLAD: WISKUNDE

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$A = P(1+ni)$ $A = P(1-ni)$ $A = P(1-i)^n$ $A = P(1+i)^n$

$T_n = a + (n-1)d$ $S_n = \frac{n}{2}(2a + (n-1)d)$

$T_n = ar^{n-1}$ $S_n = \frac{a(r^n - 1)}{r-1}$; $r \neq 1$ $S_\infty = \frac{a}{1-r}$; $-1 < r < 1$

$F = \frac{x[(1+i)^n - 1]}{i}$ $P = \frac{x[1-(1+i)^{-n}]}{i}$

$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $\mathrm{M}\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$

$y = mx + c$ $y - y_1 = m(x - x_1)$ $m = \frac{y_2 - y_1}{x_2 - x_1}$ $m = \tan\theta$

$(x-a)^2 + (y-b)^2 = r^2$

In ΔABC: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ $a^2 = b^2 + c^2 - 2bc.\cos A$ $area\,\Delta ABC = \frac{1}{2}ab.\sin C$

$\sin(\alpha + \beta) = \sin\alpha.\cos\beta + \cos\alpha.\sin\beta$ $\sin(\alpha - \beta) = \sin\alpha.\cos\beta - \cos\alpha.\sin\beta$

$\cos(\alpha + \beta) = \cos\alpha.\cos\beta - \sin\alpha.\sin\beta$ $\cos(\alpha - \beta) = \cos\alpha.\cos\beta + \sin\alpha.\sin\beta$

$$\cos 2\alpha = \begin{cases} \cos^2\alpha - \sin^2\alpha \\ 1 - 2\sin^2\alpha \\ 2\cos^2\alpha - 1 \end{cases}$$ $\sin 2\alpha = 2\sin\alpha.\cos\alpha$

$\bar{x} = \frac{\sum fx}{n}$ $\sigma^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}$

$P(A) = \frac{n(A)}{n(S)}$ $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

$\hat{y} = a + bx$ $b = \frac{\sum(x - \bar{x})(y - \bar{y})}{\sum(x - \bar{x})^2}$

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MATHEMATICS P2

COMMON TEST

JUNE 2015

MEMORANDUM

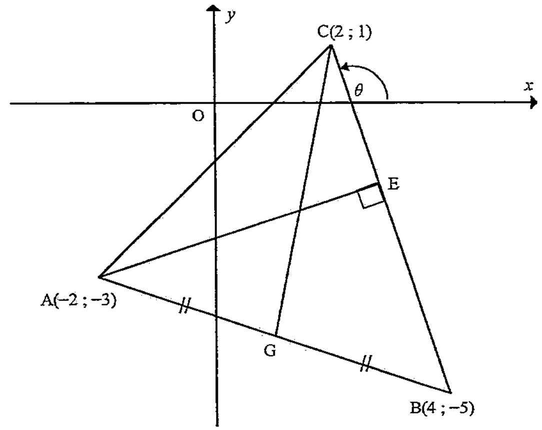
NATIONAL SENIOR CERTIFICATE

GRADE 12

MARKS: 125

N.B. This memorandum consists of 15 pages.

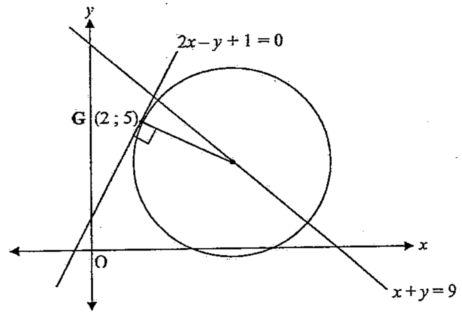
QUESTION 1



1.1	$=G\left(\frac{-2+4}{2};\frac{-3-5}{2}\right)$ $=G(1;-4)$	✓ (A) substituting into the formula ✓(A) (1 ; −4)	(2)
1.2	$CG=\sqrt{(2-1)^2+(1-(-4))^2}$ $=\sqrt{26}$	✓ (CA) substituting into the formula ✓(CA) $\sqrt{26}$	(2)
1.3	$m_{BC}=\frac{1-(-5)}{2-4}$ $=-3$	✓ (A) substituting into the formula ✓(A) answer	(2)
1.4	$\tan\theta=m_{BC}$ $\tan\theta=-3$ $\theta=180°-\tan^{-1}(3)$ $=180°-71,6°$ $=108,4°$	✓(CA) $\tan\theta = -3$ ✓(CA) correct quadrant ✓(CA) answer	(3)

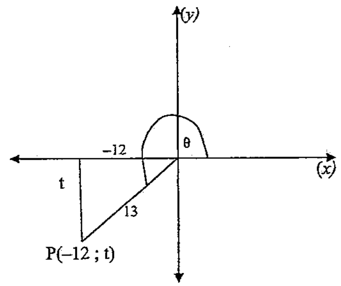
1.5	$AB^2 = (4-(-2))^2 + (-5-(-3))^2$ $= 36+4$ $= 40$ $\therefore AB = \sqrt{40}$ $BC^2 = (4-2)^2 + (-5-1)^2$ $= 4 + 36$ $= 40$ $\therefore BC = \sqrt{40}$ $AB = BC$ $\therefore \Delta$ ABC is isosceles … (2 sides equal)	✓ (A) substituting into the formula ✓ (A) $AB=\sqrt{40}$ ✓ (A) $BC=\sqrt{40}$ ✓ (A) conclusion $AB = BC$	(4)
1.6	$BC^2 = AC^2 + AB^2 - 2(AC)(AB)\cos C\hat{A}B$ $40 = 32+40-2(\sqrt{32})(\sqrt{40})\cos C\hat{A}B$ $\cos C\hat{A}B = \frac{32+40-40}{2(\sqrt{32})(\sqrt{40})}$ $C\hat{A}B = 63,4°$	✓ (A) using the cosine formula ✓ (A) $AC=\sqrt{32}$ ✓ (CA) making $\cos C\hat{A}B$ the subject ✓ (CA)answer	(4)
1.7	Area of ΔABC $=\frac{1}{2}(\sqrt{32})(\sqrt{40})\sin 63,4°$ $=16$ sq. units	✓ (A) using area formula ✓ (CA) substituting ✓ (CA) answer	(3) **[20]**

QUESTION 2



2.1.1	$m_{tan} = 2$ $m_{GM} = -\frac{1}{2}$	✓ (A) $m_{tan} = 2$ ✓ (CA) $m_{GM} = -\frac{1}{2}$	(2)
2.1.2	$y - y_1 = m(x - x_1)$ $y - 5 = -\frac{1}{2}(x-2)$ $= -\frac{1}{2}x + 1$ $y = -\frac{1}{2}x + 6$	✓(A) substitution (2;5) ✓(CA) simplification ✓(CA)answer	(3)
2.1.3	$y = -\frac{1}{2}x + 6$ $x + y = 9$ $x - \frac{1}{2}x + 6 = 9$ $\frac{1}{2}x = 3$ $x = 6$ $y = 3$ M(6 ; 3)	✓ (CA) equating ✓ (CA)simplification ✓(CA) $x = 6$ $y = 3$ (both) ✓ (CA) M (6 ; 3) ¾ if not in coordinate form	(4)

2.1.4	$r = GM = \sqrt{(6-2)^2 + (3-5)^2}$ $= \sqrt{20}$ *or* $2\sqrt{5}$ *or* 4,47	✓ (CA) subst into dist formula ✓(CA)answer	(2)
2.1.5	$(x-6)^2 + (y-3)^2 = (\sqrt{20})^2$ $x^2 - 12x + 36 + y^2 - 6y + 9 - 20 = 0$ $x^2 + y^2 - 12x - 6y + 25 = 0$	✓ (CA)substitution ✓ (CA)simplification ✓(CA)answer	(3)
2.2	$x^2 - 26x + 169 \ \ + y^2 + 12y + 36 \ = -105 + 169 + 36$ $(x-13)^2 + (y+6)^2 = 100$ *Centre* $(13;-6)$ *POC*$(7;2)$ $m_r = \frac{2-(-6)}{7-13}$ $= \frac{8}{-6}$ $= -\frac{4}{3}$ $\therefore m_t = \frac{3}{4}$ $y - 2 = \frac{3}{4}(x-7)$ $= \frac{3}{4}x - \frac{21}{4}$ $y = \frac{3}{4}x - \frac{21}{4} + 2$ $y = \frac{3}{4}x - \frac{13}{4}$	✓(A) completion of square ✓ (CA) $(x-13)^2 + (y+6)^2$ ✓(CA)centre (13 ; –6) ✓ (CA) $m_r = -\frac{4}{3}$ ✓(CA) $m_t = \frac{3}{4}$ ✓(CA) substituting (7;2) into a straight line formula ✓(CA) $y = \frac{3}{4}x - \frac{13}{4}$	(7) **[21]**

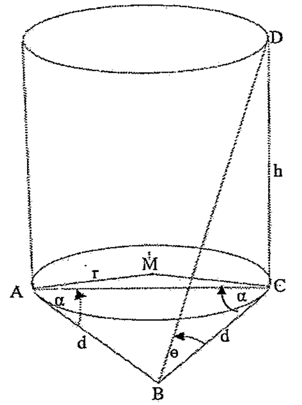
QUESTION 3			
3.1.1	 $t^2 = r^2 - x^2$ $= (13)^2 - (-12)^2$ $= 169 - 144$ $= 25$ $\therefore t = -5$	✓(A) applying Pythagoras ✓ (A) substitution ✓ (CA) $t = -5$ (provided t is negative)	(3)
3.1.2	$\sin\theta = \frac{-5}{13}$	✓(CA) $\frac{-5}{13}$	(1)
3.1.3	$\frac{1-\cos\theta}{\sin\theta}$ $= \frac{1 - \frac{-12}{13}}{\frac{-5}{13}}$ $= \frac{\frac{25}{13}}{\frac{-5}{13}}$ $= -5$	✓ (CA)substituting values for values for $\cos\theta$ and $\sin\theta$ ✓ (CA)simplification ✓ (CA)answer	(3)

3.2	$\frac{\cos(180°-\theta)\sin 50°}{\tan(90°-\theta)\cos 140°}$ $=\frac{-\cos\theta.\sin 50°}{\frac{\sin(90°-\theta)}{\cos(90°-\theta)}\cos(90°+50°)}$ $=\frac{-\cos\theta.\sin 50°}{\frac{\cos\theta}{\sin\theta}.-\sin 50°}$ $=\cos\theta\times\frac{\sin\theta}{\cos\theta}$ $=\sin\theta$	✓ (A) $-\cos\theta$ ✓ (A) identity for changing $\tan(90°-\theta)$ ✓ (A) $\cos(90°+50°)$ ✓ (A) $\frac{\cos\theta}{\sin\theta}$ ✓ (A) $-\sin 50°$ ✓ (CA) simplification ✓ (CA)answer	(7)
3.3	LHS $=\frac{(\sin\theta-\cos\theta)^2}{1-\sin^2\theta}$ $=\frac{\sin^2\theta-2\sin\theta\cos\theta+\cos^2\theta}{\cos^2\theta}$ $=\frac{(\sin^2\theta+\cos^2\theta)-2\sin\theta\cos\theta}{\cos^2\theta}$ $=\frac{1-2\sin\theta\cos\theta}{\cos^2\theta}$ $=\frac{1}{\cos^2\theta}-\frac{2\sin\theta\cos\theta}{\cos^2\theta}$ $=\frac{1}{\cos^2\theta}-\frac{2\sin\theta}{\cos\theta}$ $=\frac{1}{\cos^2\theta}-2\tan\theta$ = RHS	✓ (A) expanding $(\sin\theta-\cos\theta)^2$ ✓ (A) $1-\sin^2\theta=\cos^2\theta$ ✓ (A) $\cos^2\theta+\sin^2\theta=1$ ✓ (A) separating into two fractions ✓ (A) $\frac{2\sin\theta}{\cos\theta}$	(5)

3.4.1	$\cos(x+30°)=-2\sin x$ $\cos x.\cos 30°-\sin x.\sin 30°=-2\sin x$ $\frac{\sqrt{3}}{2}\cos x-\frac{1}{2}\sin x=-2\sin x$ $\sqrt{3}\cos x-\sin x=-4\sin x$ $3\sin x=-\sqrt{3}\cos x$ $\frac{\sin x}{\cos x}=-\frac{\sqrt{3}}{3}$ $\tan x=-\frac{1}{\sqrt{3}}$	✓ (A) expanding ✓(A) $\cos 30°=\frac{\sqrt{3}}{2}$ ✓(A) $\sin 30°=\frac{1}{2}$ ✓ (A) simplification ✓ (A) $\tan x=\frac{-1}{\sqrt{3}}$	(5)
3.4.2	$\tan x=-\frac{1}{\sqrt{3}}$ $x=150°+k.180°$ ... $k\in Z$	✓(A) $x=150°+k.180°$ ✓(A) $k\in Z$	(2) [26]

QUESTION 4

4.1



$AC^2 = d^2 + d^2 - 2.d.d.\cos(180° - 2\alpha)$ — ✓ (A) $180° - 2\alpha$ ✓ (A) applying cosine rule and substituting.

$= 2d^2 + 2d^2 \cos 2\alpha$ — ✓(A) cos 2α ✓ (A) simplification

$= d^2 (2 + 2\cos 2\alpha)$ — ✓(A) taking out d^2 as a common factor.

$AC = d\sqrt{2 + 2\cos 2\alpha}$ **(5)**

4.2

In Δ DCB : $\frac{h}{d} = \tan\theta$ — ✓ (A) $\frac{h}{d} = \tan\theta$

In Δ ABC : $\frac{AC}{\sin(180° - 2\alpha)} = \frac{d}{\sin\alpha}$

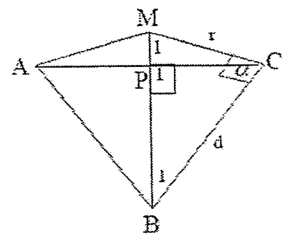
$\therefore AC = \frac{h}{\tan\theta} \times \frac{\sin(180° - 2\alpha)}{\sin\alpha}$ — ✓(A) substituting $d = \frac{h}{\tan\theta}$

$= \frac{h}{\tan\theta} \times \frac{\sin 2\alpha}{\sin\alpha}$ — ✓ (A) $\sin(180° - 2\alpha) = \sin 2\alpha$

$= \frac{h}{\tan\theta} \times \frac{2\sin\alpha\cos\alpha}{\sin\alpha}$ — ✓(A) expanding sin 2α

$= \frac{2h\cos\alpha}{\tan\theta}$ — ✓(A) simplifying **(5)**

4.3



AM = MC and AB = BC — ✓ (A) S/R

AMCB is a kite

$\therefore \hat{P}_1 = 90°$ (from above diagram)

$\therefore \hat{B}_1 = 90° - \alpha$ — ✓ (A) $\hat{B}_1 = 90° - \alpha$

$M\hat{C}B = 90°$ .... BC is a tangent

$\therefore \hat{M}_1 = 90° - (90° - \alpha)$ — ✓ (A) $\hat{M}_1 = \alpha$

$= \alpha$

$\tan\alpha = \frac{d}{r}$

$r = \frac{d}{\tan\alpha}$ — ✓ (A) $r = \frac{d}{\tan\alpha}$

$= \frac{10,3}{\tan 54°}$

$= 7,483388038$

Volume of a cylinder $= \pi r^2 h$

$= \pi r^2 h$

$= \pi\left(\frac{d}{\tan\alpha}\right)^2 (h)$ — ✓ (CA) $\frac{\pi h d^2}{\tan^2\alpha}$

$= \frac{\pi h d^2}{\tan^2\alpha}$

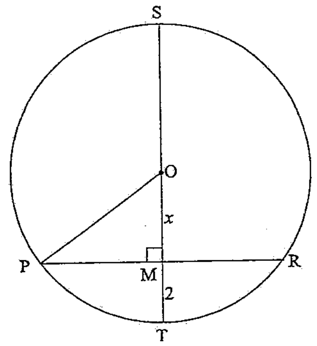
$= \pi(7,483388038)^2 \times 36\ m^3$ — ✓ (CA) substituting

$= 6333,5748\ m^3$ — ✓ (CA) answer

$= 6334\ m^3$ **(7)**

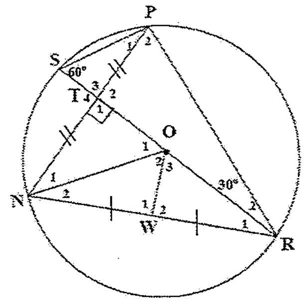
[17]

QUESTION 5

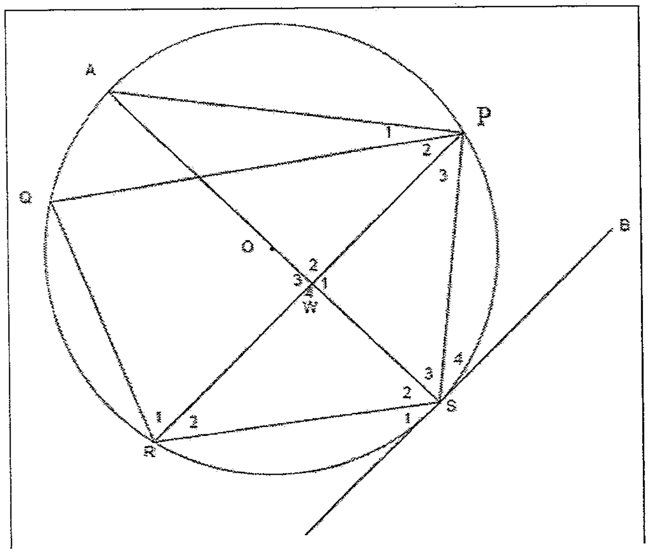


5.1	$OP = OT = x + 2$ both radii	✓(A) S	(1)
5.2	$PM = RM$ $OM \perp PR$ $= 4$	✓(A) S/R ✓(A) $PM = 4$	(2)
5.3	$OP^2 = PM^2 + OM^2$ Pythagoras $(x + 2)^2 = 4^2 + x^2$ $x^2 + 4x + 4 = 16 + x^2$ $4x = 12$ $\therefore x = 3$ cm Radius = OP = (2 + 3) cm = 5 cm	✓(CA) applying Pythagoras & substitution ✓(CA)simplifying ✓(CA) radius = $5cm$	(3) [6]

QUESTION 6



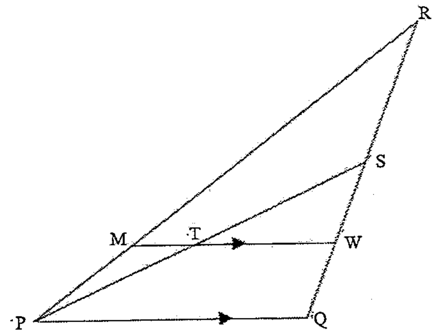
6.1.1	$\hat{P}_1 + \hat{P}_2 = 90°$ $\hat{S} = 180° - (90° + 30°)$ $= 60°$	(∠ in a semi-circle) (∠'s of a Δ SPR)	✓(A) S/R ✓(A) S ✓ (A) answer	(3)
6.1.2	$P\hat{N}R = 60°$ $\hat{R}_1 = 180° - (90° + 60°)$ $= 30°$	(angles in same segment) (∠'s of a Δ RNT)	✓(CA) S/R ✓(CA) S ✓ (CA) $\hat{R}_1 = 30°$	(3)
6.1.3	$\hat{O}_1 = 60°$ $\hat{N}_1 = 180° - (90° + 60°)$ $= 30°$	(angle at centre = twice angle at circumference)	✓ (CA)statement ✓ (A) reason ✓ (CA) $N_1 = 30°$	(3)
6.2	NW = WR $\therefore \hat{W}_1 = 90°$ Now $\hat{T}_1 + \hat{W}_1 = 90° + 90°$ $= 180°$ $\therefore TNWO$ is a cyclic quadrilateral	(line from centre to midpoint of chord) (opp. angles supplementary)	✓ (A) $\hat{W}_1 = 90°$ ✓ (A) reason ✓ (A) $\hat{T}_1 + \hat{W}_1 = 180°$ ✓ (A) reason	(4) [13]



QUESTION 7		
7.1.1 $B\hat{S}W = \hat{S}_3 + \hat{S}_4 = 90°$ ... (tangent ⊥ radius)	✓ (A) statement ✓ (A) reason	(2)
7.1.2 $\hat{W}_1 = 90°$ (line from centre to midpoint of chord)	✓(A) statement ✓(A) reason	(2)
7.2 $B\hat{S}W + \hat{W}_1 = 180°$ ∴ SB‖RP (co-interior ∠'s are supplementary)	✓(A) reason	(1)

7.3.1 In Δ APS and ΔRWS: $\hat{P}_1 + \hat{P}_2 + \hat{P}_3 = 90°$ (∠ in semi-circle) $= \hat{W}_4$ (line from centre to mid- point chord) $\hat{A} = \hat{R}_2$ (∠'s same segment) $\therefore \hat{S}_3 = \hat{S}_2$ (sum of ∠'s of Δ) ∴ Δ*APS* ||| ΔRWS (∠∠∠)	✓(A) S/R ✓ (A) S/R ✓ (A) S/R ✓ (A) R	(4)
7.3.2 $\frac{PS}{AS} = \frac{WS}{RS}$....(from question 7.2.1) But Δ RWS≡ Δ PWS .... (S∠S) ∴ RS = PS $\therefore \frac{RS}{AS} = \frac{WS}{RS}$ $\therefore RS^2 = WS \cdot AS$	✓ (A) S ✓ (A) S/R ✓ (A) S ✓ (A) S	(4)
7.3.3 $RS^2 = RW^2 + WS^2$ Pythagoras and $RS^2 = WS \cdot AS$ Proved in 7.3.2 $\therefore WS \cdot AS = RW^2 + WS^2$ $\therefore AS = \frac{RW^2}{WS} + WS$	✓ (A) statement ✓ (A) reason ✓ (A) statement	(3) [16]

QUESTION 8



$\frac{SW}{WQ} = \frac{ST}{TP}$ ..... (Prop Theorem TW∥PQ)	✓ (A) S/R	
$= 1$ .... (TS = PT)	✓ (A) TS=PT	
$\therefore SW = WQ = x$	✓ (A) SW = WQ	
$\therefore RS = SQ = 2x$ .... T midpoint of PS	✓ (A) reasoning	
In ΔRPQ		
$\frac{RM}{RP} = \frac{RW}{RQ}$ ......(Prop Theorem MW∥PQ)	✓ (A) S/R	
$= \frac{3x}{4x}$		
$= \frac{3}{4}$	✓ (A) answer	(6) [6]