



GRADE 11 /
GRAAD 11

TERM 2 / KWARTAAL 2

MATHEMATICS / WISKUNDE

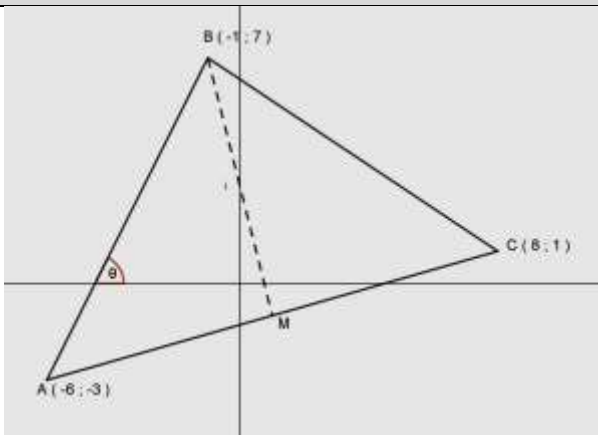
JUNE EXAMINATION / JUNIE EKSAMEN

PAPER 2 / VRAESTEL 2

MEMORANDUM

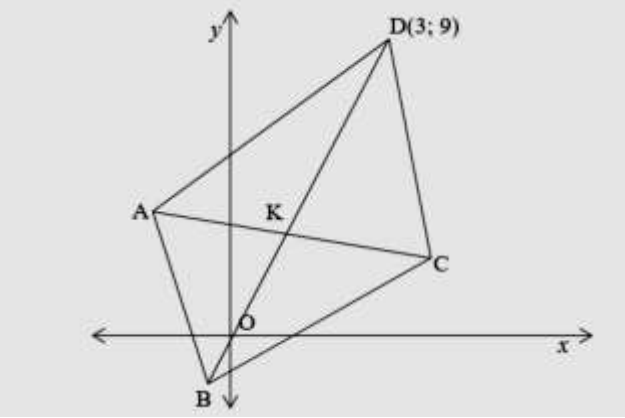
GRADE 11 /GRAAD 11
MATHEMATICS/ WISKUNDE
JUNE EXAMINATION/JUNIE EKSAMEN
PAPER 2/ VRAESTEL 2
Total/Totaal: 100 marks/Punte

MEMORANDUM

QUES T #	SOLUTION	EXPLANATION	MARKS
Question/Vraag 1 [13 marks/punte]			
			
1.1	$M = \left(\frac{-6+8}{2}; \frac{-3+1}{2} \right)$ $= (1; -1)$		2 TL 1
1.2	$m_{BM} = \frac{7+1}{-1-1} = \frac{8}{-2} = -4$ $(y + 1) = -4(x - 1)$ $y + 1 = -4x + 4$ $y = -4x + 3$		5 TL 3

1.3	$BM = \sqrt{(-1 - 1)^2 + (7 + 1)^2}$ $= \sqrt{4 + 64}$ $= \sqrt{68}$ $= 2\sqrt{17}$		3 TL 2
1.4	$m_{AB} = \frac{7+3}{-1+6} = \frac{10}{5} = 2$ $\tan \theta = 2$ $\theta = 63,43^\circ$		3 TL 2

Question/Vraag 2 [18 marks/punte]

			
2.1	$m_{AC} = -\frac{1}{3}$ $m_{BD} = 3 \quad \text{[Diagonals of a rhombus]/}$ $\quad \quad \quad \text{[Hoeklyne van ruit/rombus]}$ $y - y_1 = m(x - x_1)$ $y - 9 = 3(x - 3)$ $3x - y = 0$	<ul style="list-style-type: none"> ✓ Statement ✓ Reason ✓ subs m=3 and (3; 9) into straight line formula 	3
2.2	$x + 3y = 10 \dots \dots \dots (1)$ $\underline{3x - y = 0 \dots \dots \dots (2)}$ $3x + 9y = 30 \dots \dots \dots (3) \quad (1) \times 3$ $10y = 30 \quad \quad \quad (3) - (2)$ $y = 3$ $x + 3(3) = 10$ $x = 1$ $K(1; 3)$	<ul style="list-style-type: none"> ✓ equate two equations ✓ simplify ✓ $x = 1$ ✓ $y = 3$ 	4

2.3	$\left[\frac{x+3}{2}; \frac{y+9}{2} \right] = [1; 3]$ $\frac{x+3}{2} = 1 \quad \frac{y+9}{2} = 3$ $x+3 = 2 \quad \& \quad y+9 = 6$ $x = -1 \quad \& \quad y = -3$ $B(-1; -3)$	<ul style="list-style-type: none"> ✓ method using midpoint ✓ simplify ✓ coordinates of B 	3
2.4	$AD = \sqrt{(3-x)^2 + (9-y)^2}$ $\therefore \sqrt{50} = \sqrt{9 - 6x + x^2 + 81 - 18y + y^2}$ $\therefore 50 = x^2 - 6x + y^2 - 18y + 90$ <p>But/Maar: $x = 10 - 3y$</p> $\therefore (10 - 3y)^2 - 6(10 - 3y) + y^2 - 18y + 90 = 50$ $\therefore 100 - 60y + 9y^2 - 60 + 18y + y^2 - 18y + 90 = 50$ $= 50$ $\therefore 10y^2 - 60y + 80 = 0$ $\therefore y^2 - 6y + 8 = 0$ $\therefore (y-4)(y-2) = 0$ $y = 4 \text{ or/of } y = 2$ $x = 10 - 3(4) \text{ or/of } x = 10 - 3(2)$ $x = -2 \quad \text{or/of} \quad x = 4$ $A(-2; 4) \quad C(4; 2)$	<ul style="list-style-type: none"> ✓ subst into eqn dist AD / <i>verv. in verg.</i> <i>afstd AD</i> ✓ subst/<i>verv.</i> AD = $\sqrt{50}$ ✓ subst/<i>verv.</i> $x = 10 - 3y$ ✓ simplification <i>/vereenvoudiging</i> ✓ standard form ✓ values for y ✓ values for x ✓ coordinates 	8
Question/Vraag 3 [31 marks/punte]			
3.1	$\frac{\sin(180^\circ - x) \cdot \cos(x - 360^\circ) \cdot \tan(180^\circ + x) \cdot \cos(-x)}{\tan(-x) \cdot \cos(90^\circ - x) \cdot \sin(90^\circ - x)}$ $= \frac{\sin(180^\circ - x) \cdot [-\cos(360^\circ - x)] \cdot \tan(180^\circ + x) \cdot \cos(360^\circ - x)}{\tan(360^\circ - x) \cdot \cos(90^\circ - x) \cdot \sin(90^\circ - x)}$ $= \frac{(\sin x)(-\cos x)(\tan x)(\cos x)}{(-\tan x)(\sin x)(\cos x)}$ $= -\cos x$	<ul style="list-style-type: none"> ✓ $[-\cos(360^\circ - x)]$ ✓ negative angle cos ✓ negative angle tan 4 m each for all other reductions ✓ answer 	8

3.2.1	$\frac{\sin 110^\circ \cdot \cos(-30^\circ) \cdot \tan 420^\circ}{\cos^2(-135^\circ) \cdot \cos 200^\circ}$ $= \frac{(\sin 70^\circ)(\cos 30^\circ)(\tan 60^\circ)}{(-\cos 45^\circ)^2(-\cos 20^\circ)} \checkmark \checkmark \checkmark$ $= \frac{(\sin 70^\circ)\left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{3}}{1}\right)}{\left(-\frac{\sqrt{2}}{2}\right)^2(-\sin 70^\circ)} \checkmark \checkmark$ $= \frac{\frac{3}{2}}{\frac{1}{2} \times -1} \checkmark$ $= -3 \checkmark$	3 m reductions 2 m special angles 1 m simplify 1 m answer	7
3.2.2	$\sqrt{4 \sin 150^\circ \times 2^2 \tan 225^\circ}$ $= \sqrt{4 \sin 30^\circ \times 2^2 \tan 45^\circ} \checkmark$ $= \sqrt{4^{\frac{1}{2}} \times 2^{2 \times 1}} \checkmark$ $= \sqrt{2 \times 4} \checkmark$ $= 2\sqrt{2} \checkmark$	1 m reduction 1 m special angles 1 m simplify 1 m answer	4
3.3	$\tan^2 x - \sin^2 x = \tan^2 x \cdot \sin^2 x$ $= \frac{\sin^2 x}{\cos^2 x} - \frac{\sin^2 x}{1} \checkmark$ $= \frac{\sin^2 x - \sin^2 x \cdot \cos^2 x}{\cos^2 x} \checkmark$ $= \frac{\sin^2 x(1 - \cos^2 x)}{\cos^2 x} \checkmark$ $= \frac{\sin^2 x \cdot \sin^2 x}{\cos^2 x} \checkmark$ $= \tan^2 x \cdot \sin^2 x \checkmark$ $\therefore \text{LHS} = \text{RHS}$	1 m subst tan 1 m LCD 1 m factorise 1 m use of identity 1 m simplify	5

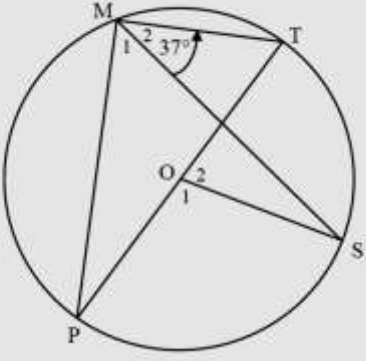
3.4.1	$\sin 197^\circ$ $= -\sin 17^\circ \checkmark$ $= -t \checkmark$	1 m reduction 1 m answer	2
3.4.2	$x^2 = 1 - t^2$ $x = \sqrt{1 - t^2} \checkmark$ $\cos 343^\circ$ $= \cos 17^\circ \checkmark$ $= \sqrt{1 - t^2} \checkmark$	1 m pythag 1 m reduction 1 m answer	3
3.4.3	$\sin 737^\circ$ $= \sin(737^\circ - 2 \times 360^\circ) \checkmark$ $= \sin 17^\circ$ $= t \checkmark$	1 m angle greater than 360 1 m answer	2
Question/Vraag 4 [11 marks/punte]			
4.1	$\sin \theta = -0,671$ Ref $\angle = 42,14^\circ$ 3 rd quad: $\theta = 180^\circ + 41,14^\circ$ $\theta = 222,14^\circ$ 4 th quad: $\theta = 360^\circ - 41,14^\circ$ $\theta = 318,86^\circ$	1 m reference angle 1 m 3 rd quad angle 1 m 4 th quad angle	3

4.2.1	$\cos \theta = 0,417$ Ref $\angle = 65,35^\circ$ 1 st quad: $\theta = 65,35^\circ + k.360^\circ \quad k \in Z$ 4 th Quad: $\theta = 360^\circ - 65,35^\circ + k.360^\circ$ $\theta = 294,65^\circ + k.360^\circ$	1 m reference angle 1 m 1 st quad angle + general solution 1 m 4 th quad angle + general solution	3
4.2.2	$2 \tan(2x + 10^\circ) = -5,5$ $\tan(2x + 10^\circ) = -2,75$ Ref $\angle = 70,02^\circ$ 2 nd quad: $2x + 10^\circ = 180^\circ - 70,02^\circ + k.180^\circ$ $2x + 10^\circ = 109,98 + k.180^\circ$ $2x = 99,98^\circ + k.180^\circ$ $x = 49,99^\circ + k.90^\circ$ 4 th quad: $2x + 10^\circ = 360^\circ - 70,02^\circ + k.180^\circ$ $2x + 10^\circ = 289,98^\circ + k.180^\circ$ $2x = 279,98^\circ + k.180^\circ$ $x = 139,99^\circ + k.90^\circ$	1 m isolate function 1 m ref angle 1 m general solution in 2 nd quad 1 m general solution in 4 th quad 1 m simplify	5

Question/Vraag 5 [11 marks/punte]

5.1	<p>Construction/Konstr: Draw/trek radii OR and/en OS In $\triangle OTR$ and/ en $\triangle OTS$ $OR = OS$ (radii) $OT = OT$ (common side/ gemene sy) $\hat{T}_1 = \hat{T}_2 = 90^\circ$ (\angle's on straight line/ op 'n reguit lyn) $\triangle OTR = \triangle OTS$ (90° HS) $\therefore RT = TS$</p>	<p>✓ construction ✓ Statement; OT is common ✓ statement/reason ✓ statement/reason ✓ conclusion</p>	(5)
5.2	<p>$AF = FB = 4$ cm (line from centre \perp chord) $OD = OB = 8 - x$ (radii) $OB^2 = OF^2 + FB^2$ (pythag; $\hat{F} = 90^\circ$) $(8 - x)^2 = (x)^2 + (4)^2$ $64 - 16x + x^2 = x^2 + 16$ $48 = 16x$ $x = 3$ \therefore radius = $8 - x$ $= 8 - 3$ $= 5$ units</p>	<p>✓ statement/reason ✓ $OB = 8 - x$ ✓ pythag ✓ calculation ✓ $x = 3$ ✓ answer</p>	6

Question/Vraag 6 [4 marks/punte]

			
6.1	<p>$\hat{M} = 90^\circ$ (\angle in a semi-\odot) $\hat{M}_1 = 90^\circ - 37^\circ = 53^\circ$</p>	<p>✓ Statement and Reason ✓ answer</p>	2

6.2	$\hat{O}_1 = 2\hat{M}_1$ ($\angle @centre = 2 \times \angle @circumf$) $\therefore \hat{O}_1 = 106^\circ$	✓ Statement and reason ✓ answer	2
Question 7/Vraag 7 [12 marks/punte]			
7.1.1	Are supplementary	✓ correct answer	1
7.1.2	Double the angle at the circumference	✓ correct answer	1
7.2.1	$\hat{D}_3 = \hat{A} = x$ (<i>corresp \angle's =</i>) $\hat{A} = \hat{C}_2 = x$ (<i>Ext \angle of \odotquad</i>) $\therefore \hat{D}_3 = \hat{C}_2$ $\therefore MC = MD$ (<i>= \angle's; opp = sides</i>)	✓ Statement/reason ✓ Statement/reason ✓ Statement ✓ conclusion ✓ reason	5
7.2.2	$\hat{M} = 180^\circ - 2x$ (<i>int \angle's of Δ</i>)	✓ statement ✓ reason	2
7.2.3	$\hat{O}_1 = 2x$ ($\angle @centre = 2 \times \angle @circumf$) $\hat{O}_1 + \hat{M} = 2x + 180^\circ - 2x = 180^\circ$ \therefore BODM is a cyclic quadrilateral (<i>opp \angle's \odotquad = 180°</i>)	✓ statement/reason ✓ calculation ✓ reason	3

Grade 11 Mathematics June Exam P2

01-Jun-19

QUESTION	THINKING LEVELS				QUEST Total	TOPICS			Total
	1	2	3	4		Analytical	Trigonometry	Geometry	
1.1	2				13	2			2
1.2			5			5			5
1.3		3				3			3
1.4		3				3			3
									0
									0
2.1			3		18	3			3
2.2			4			4			4
2.3			3			3			3
2.4				8		8			8
3.1			8		31			8	8
3.2.1		7						7	7
3.2.2			4					4	4
3.3			5					5	5
3.4.1	2							2	2
3.4.2			3					3	3
3.4.3		2						2	2
4.1		3			11			3	3
4.2.1		3						3	3
4.2.2			5					5	5
5.1	5				11			5	5
5.2		6						6	6
6.1	2				4			2	2
6.2	2							2	2
7.1.1	1				12			1	1
7.1.2	1							1	1
7.2.1		5						5	5
7.2.2		2						2	2
7.2.3		3						3	3
									0
									0
									0
									0
TOTAL	15	37	40	8	100	31	42	27	100
% TASK	15	37	40	8	100	31	42	27	
TARGET	20	35	30	15	100				
DIFFERENCE	5	-2	-10	7					