education

Department of Education
FREE STATE PROVINCE

PREPARATORY EXAMINATION/
VOORBEREIDENDE EKSAMEN

GRADE/*GRAAD* 12

MATHEMATICS P2/
WISKUNDE V2

SEPTEMBER 2024

MARKS/*PUNTE*: 150

MARKING GUIDELINES/
NASIENRIGLYNE

These marking guidelines consist of 22 pages./
Hierdie nasienriglyne bestaan uit 22 bladsye.

Copyright reserved/*Kopiereg voorbehou*

NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed-out version.
- Consistent accuracy applies in ALL aspects of the marking memorandum. Stop marking the second calculation error.
- Assuming answers/values in order to solve a problem is NOT acceptable.

NOTA:

- *As 'n kandidaat 'n vraag TWEE KEER beantwoord, merk slegs die EERSTE poging.*
- *As 'n kandidaat 'n antwoord van 'n vraag doodtrek en nie oordoen nie, merk die doodgetrekte poging.*
- *Volgehoue akkuraatheid word in ALLE aspekte van die nasienriglyne toegepas. Hou op nasien by die tweede berekeningsfout.*
- *Aanvaar van antwoorde/waardes om 'n probleem op te los, word NIE toegelaat nie.*

Copyright reserved/*Kopiereg voorbehou*

QUESTION/*VRAAG* 1

1.1

Number of litres used	Frequency (*f*)	Midpoint of interval (*x*)	Cumulative frequency	*f.(x)*
$50 \leq x < 100$	20	75	20	1500
$100 \leq x < 150$	30	125	50	3750
$150 \leq x < 200$	50	175	100	8750
$200 \leq x < 250$	100	225	200	22500
$250 \leq x < 300$	80	275	280	22000
$300 \leq x < 350$	70	325	350	22750
$350 \leq x < 400$	50	375	400	18750
			TOTAL	100 000

✓ midpoint of interval column/*middelpunt van intervalkolom*

✓ cumulative frequency column/*kummulatiewe frekwensiekolom*

✓ *f.(x)* column/*f.(x) kolom*

(3)

1.2

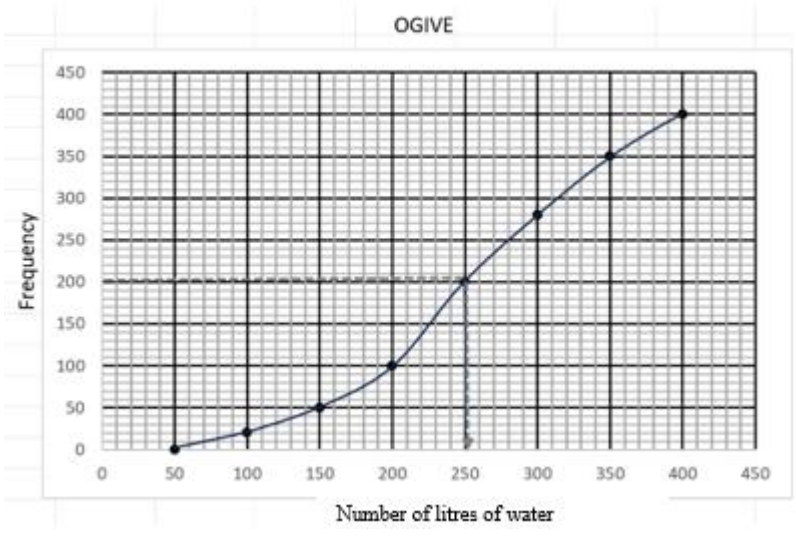
$$\overline{x} = \frac{100000}{400}$$
$$= 250$$

✓substitute/*substitusie*

✓ answer/*antwoord*

(2)

1.3



✓plotting points correctly/*stip punte korrek*

✓shape/*vorm*

(2)

1.4

Median = 250

✓accept/*aanvaar* (249–251)

(1)

1.5

Symmetrical. Mean = Median/
Simmetries. Gemiddeldeld =Mediaan

✓answer/antwoord

✓reason/*rede*

(2)

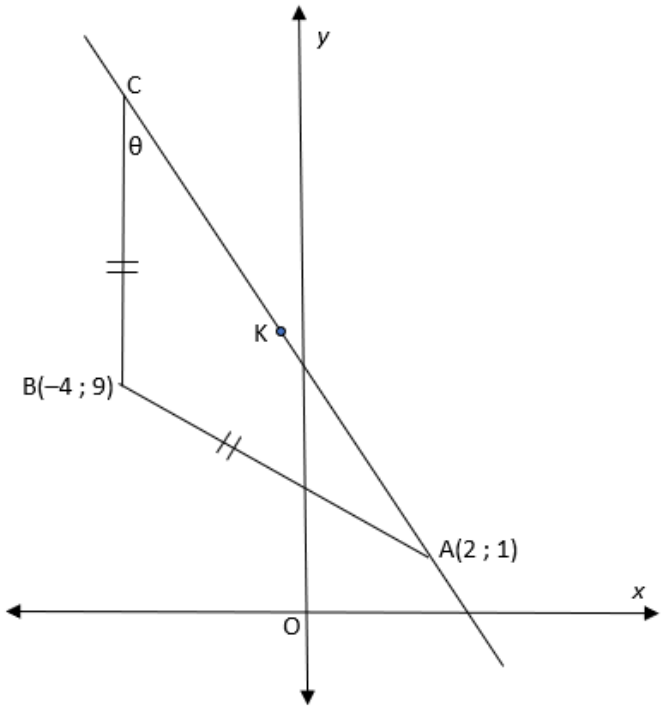
1.6	Standard deviation will increase/*Standaard afwyking sal toeneem* The values will be further from the new mean./*Die waardes sal verder wees vanaf die nuwe gemiddelde.*	✓increase/vermeerder ✓ reason/*rede* (2)
		[12]

QUESTION/*VRAAG* 2

Number of leg presses done per day (x)	36	136	51	126	90	43	77	68	103	124
Strength of upper leg (y)	0,2	0,85	0,35	0,91	0,73	0,34	0,61	0,59	0,78	0,90

2.1	$a = 0{,}0478072\ldots\ldots$ $b = 0{,}0067704\ldots\ldots$ $\hat{y} = 0{,}05 + 0{,}01x$ Answer only: full marks, but if *a* and *b* are swopped only 1/3 marks/ *Slegs antwoord : volpunte, maar as a en b omgeruil is, slegs 1/3*	✓ *a* ✓ *b* ✓ equation/*vergelyking* (3)
2.2	$\hat{y} = 0{,}0478072 + 0{,}0067704(110)$ $= 0{,}79255196$ $= 0{,}79$ OR $\hat{y} = 0{,}05 + 0{,}01(110)$ $= 1{,}15$ Answer only: full marks/ *Slegs antwoord : volpunte* Accept 1,15/*Aanvaar 1,15*	✓ substitute 110 into eq./*vervang 110 in vgl.* ✓ answer/*antwoord* (2)
2.3	No. This is extrapolation./*Nee. Dit is ekstrapolasie.*	✓ answer/*antwoord* ✓ reason/*rede* (2)
2.4	r = 0,97 No penalty for rounding/ *Geen penalisasie vir afronding*	✓ ✓r = 0,97 (2)
2.5	There is a positive strong correlation between the number of leg presses and leg strength of an eighteen-year-old boy./ *Daar is 'n positief sterk korrelasie tussen beendrukke en beenkrag van'n agtienjarige seun.*	✓ positive/*positief* ✓ strong/*sterk* (2)
		[11]

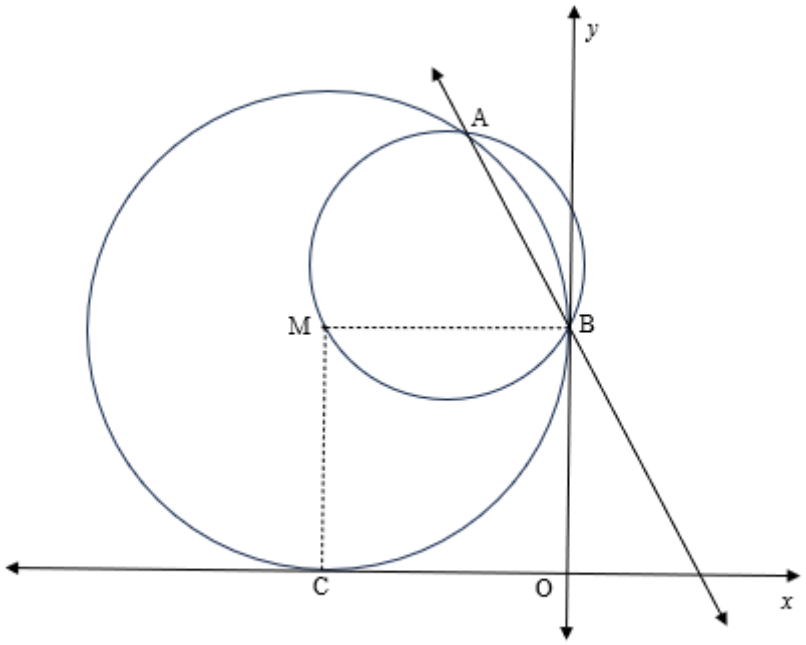
QUESTION/*VRAAG* 3



3.1	$AB = \sqrt{(2+4)^2 + (1-9)^2}$ $= \sqrt{100}$ $= 10$	✓subst./*vervang* ✓answer/*antwoord* (2)
3.2	AB = BC = 10 y-value 9 +10 BC∥ to y – axis C (– 4 ; 19) Answer only: full marks/ *Slegs antwoord: volpunte*	✓ $x = -4$ ✓ $y = 19$ (2)
3.3	$K = \left(\frac{2+(-4)}{2} ; \frac{1+19}{2}\right)$ $= (-1 ; 10)$ Answer only: full marks./ *Slegs antwoord: volpunte*	✓ subst./*vervang* ✓answer/*antwoord* (2)
3.4	$m_{AC} = \frac{19-1}{-4-2}$ $= \frac{18}{-6}$ $= -3$ through/$deur(2;1)$ $y - 1 = -3(x-2)$ $\therefore y = -3x + 7$	✓$m_{AC} = -3$ ✓subst./*vervang* $(2;1)$ ✓equation/*vergelyking* (3)

	OR/*OF* $m_{AC} = \frac{19-1}{-4-2}$ $= \frac{18}{-6}$ $= -3$ through/$deur(-4;19)$ $y - 19 = -3(x-(-4))$ $-19 = -3x - 12$ $\therefore y = -3x + 7$	✓$m_{AC} = -3$ ✓subst./*vervang* $(-4;19)$ ✓equation/*vergelyking* (3)
3.5	$tan\beta = m_{AC} = -3$ $refangle = 71{,}57°$ $\beta = 108{,}43°$ $\theta = 90° - 71{,}57°$ $= 18{,}43°$ **OR/*OF*** In a right angled triangle $\tan\theta = \frac{6}{18}$ $\theta = 18{,}43°$	✓$tan\beta = m_{AC} = -3$ ✓method/*metode* ✓answer/*antwoord* (3) ✓value of 6 ✓value of 18 ✓answer/*antwoord* (3)
3.6	AC = $6\sqrt{10}$ $\perp h = \sqrt{10}$ Area $\Delta ABC = \frac{1}{2}.b.\perp h$ $= \frac{1}{2}\,6\sqrt{10}\,.\,\sqrt{10}$ $= 30$ units^2/$eenhede^2$ **OR/*OF*** AC = $6\sqrt{10}$ BC = 10 Area $\Delta ABC = \frac{1}{2}$ BC. AC. sinC $= \frac{1}{2}.10.6\sqrt{10}.\sin 18{,}43°$ $= 29{,}99$ units^2/*eenhede*^{2}	✓ AC = $6\sqrt{10}$ ✓ $\perp h = \sqrt{10}$ ✓ substitution into correct formula/*substitusie in korrek formule* ✓answer/*antwoord* (4) ✓ AC = $6\sqrt{10}$ ✓ BC = 10 ✓ substitution into correct formula/*substitusie in korrek formule* ✓answer/*antwoord* (4)
3.7	D (2 ; 11)	✓*x* - value/waarde ✓*y* - value/waarde (2)
		[18]

QUESTION/*VRAAG* 4

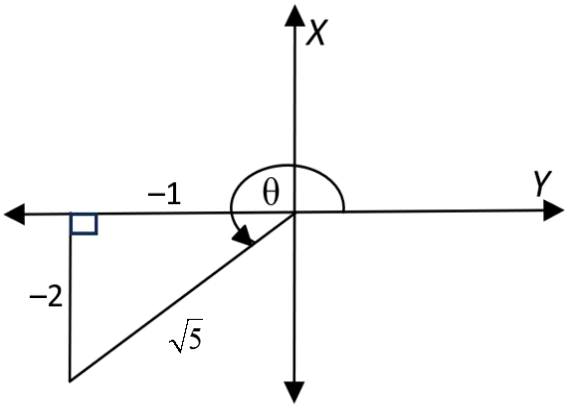


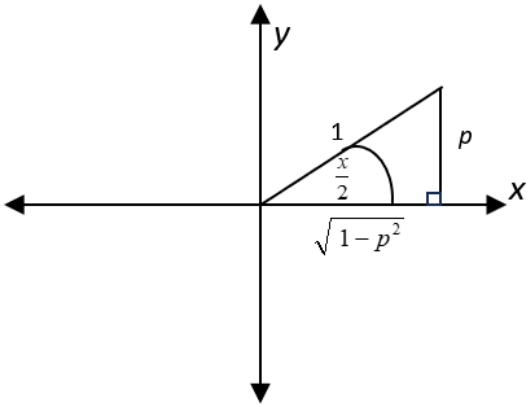
4.1	$x^2 + x + y^2 - 3y = -2$ $x^2 + x + \left(\frac{1}{2}\right)^2 + y^2 - 3y + \left(\frac{-3}{2}\right)^2$ $= -2 + \frac{1}{4} + \frac{9}{4}$ $\left(x + \frac{1}{2}\right)^2 + \left(y - \frac{3}{2}\right)^2 = \frac{1}{2}$ centre $\left(\frac{-1}{2}; \frac{3}{2}\right)$ radius $= \sqrt{\frac{1}{2}}$	✓ LHS/*LK* ✓ RHS/*RK* ✓centre/*middelpunt* ✓radius/*radius* (4)
4.2	$y = -x + 1 \ldots (1)$ $x^2 + x + y^2 - 3y + 2 = 0 \ldots\ldots (2)$ substitute(1) into (2) $x^2 + x + (-x + 1)^2 - 3(-x + 1) + 2 = 0$ $x^2 + x + x^2 - 2x + 1 + 3x - 3 + 2 = 0$ $2x^2 + 2x = 0$ $2x(x + 1) = 0$ $x = 0$ or $x = -1$ $A(-1; 2)$ **OR/*OF***	✓substitute *substitusie* ✓standard form/*standard vorm* ✓factors/*faktore* ✓value(s) of *x/waardes van x* ✓coordinates of A/*koördinate van A* (5)

	$x = -y + 1 \ldots . (1)$ $x^2 + 2x + y^2 - 2y + 1 = 0 \ldots \ldots . (2)$ substitute(1) into (2) $(-y + 1)^2 + 2(-y + 1) + y^2 - 2y + 1 = 0$ $y^2 - 2y + 1 - 2y + 2 + y^2 - 2y + 1 = 0$ $2y^2 - 6y + 4 = 0$ $2(y^2 - 3y + 2) = 0$ $(y - 2)(y - 1) = 0$ $y = 2$ or$/of$ $y = 1$ $A(-1; 2)$	✓substitute *substitusie* ✓standard form/*standaard vorm* ✓factors/*faktore* ✓value(s) of y/*waardes van y* ✓coordinates of A/*koördinate van A* (5)
4.3	y – intercept $x = 0$ $y -$ intercept $x = 0$ $(0)^2 + y^2 + (0) - 3y + 2 = 0$ $y^2 - 3y + 2 = 0$ $(y - 1)(y - 2) = 0$ $y = 2$ or $y = 1$ Centre M $(-1; 1)$ *p*asses through $(0\ ;\ 1)$ $(x + 1)^2 + (y - 1)^2 = r^2$ *substitute* $(0\ ;1)$ $(0 + 1)^2 + (1 - 1)^2 = r^2$ $r^2 = 1$ $(x + 1)^2 + (y - 1)^2 = 1$ $x^2 + 2x + 1 + y^2 - 2y + 1 - 1 = 0$ $x^2 + 2x + y^2 - 2y + 1 = 0$ **OR/*OF*** $y = -x + 1$ y – intercept $x = 0$ y- intercept (0 ;1) Centre M $(-1; 1)$ *p*asses through $(0\ ;\ 1)$ $(x + 1)^2 + (y - 1)^2 = r^2$ *substitute* $(0\ ;1)$ $(0 + 1)^2 + (1 - 1)^2 = r^2$ $r^2 = 1$ $(x + 1)^2 + (y - 1)^2 = 1$ $x^2 + 2x + 1 + y^2 - 2y + 1 - 1 = 0$ $x^2 + 2x + y^2 - 2y + 1 = 0$	✓substitute/*substitusie* $x = 0$ ✓factors/*faktore* ✓both *y*-values/*beide y-waardes* ✓substitute centre M and point/*substitusie in middelpunt M en punt* ✓equation/*vergelyking* (5) ✓substitute/*substitusie* $x = 0$ ✓point /*punt* $(0\ ;\ 1)$ ✓substitute centre M and point/*substitusie van middelpunt M en punt* ✓$r^2 = 1$ ✓equation/*vergelyking* (5)
4.4.1	$y = -x + k \ldots . (1)$ $x^2 + y^2 + 2x - 2y + 1 = 0 \ldots \ldots (2)$ substitute(1) *into* (2) $x^2 + (-x + k)^2 + 2x - 2(-x + k) + 1 = 0$ $x^2 + x^2 - 2kx + k^2 + 2x + 2x - 2k + 1 = 0$ $2x^2 - 2kx + 4x + k^2 - 2k + 1 = 0$ $2x^2 + (4 - 2k)x + (k^2 - 2k + 1) = 0$	✓substitute/*substitusie* ✓simplify/*vereenvoudig* ✓standard form/*standaard vorm* (3)

4.4.2	Equal roots $\Delta = 0$ $b^2 - 4ac = 0$ $(4-2k)^2 - 4(2)(k^2-2k+1) = 0$ $16 - 16k + 4k^2 - 8k^2 + 16k - 8 = 0$ $-4k^2 + 8 = 0$ $-4k^2 = -8$ $k^2 = 2$ $k = \pm\sqrt{2}$	✓$(4-2k)^2 - 4(2)(k^2-2k+1) = 0$ ✓ simplify/*vereenvoudig* ✓ standard form/*standaard vorm* ✓ $k = \sqrt{2}$ or/*of* 1,41 ✓ $k = -\sqrt{2}$ or/*of* –1,41 (5)
		[22]

QUESTION/*VRAAG* 5

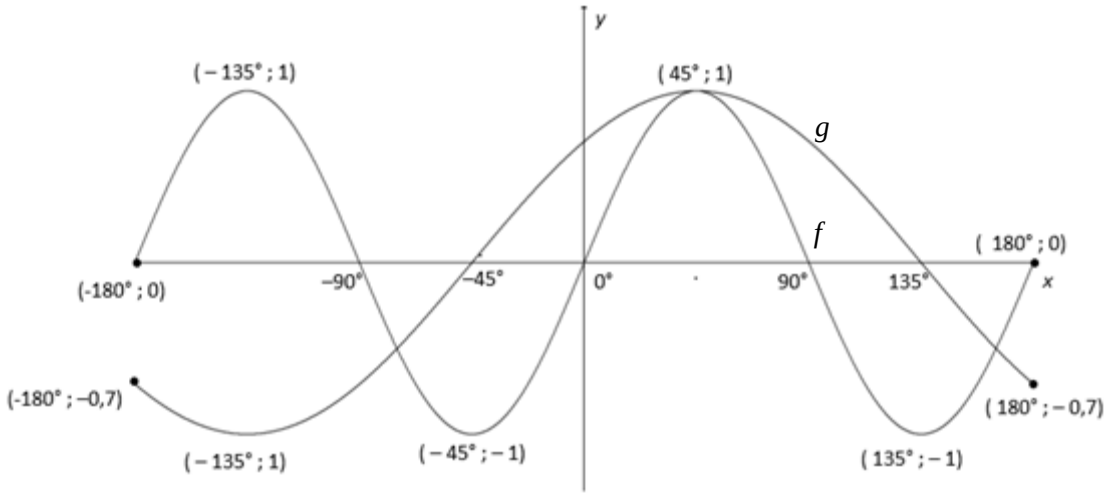
5.1.1	 $\tan\theta = \frac{-2}{-1}$ $= 2$	✓ $x = -1$ ✓ answer/*antwoord* (2)
5.1.2	$\cos 2\theta$ $= 2\cos^2\theta - 1$ $= 2\left(\frac{-1}{\sqrt{5}}\right)^2 - 1$ $= \frac{-3}{5}$ **OR/*OF*** $1 - 2\sin^2\theta$ $= 1 - 2\left(\frac{-2}{\sqrt{5}}\right)^2$ $= \frac{-3}{5}$ **OR/*OF*** $\cos^2\theta - \sin^2\theta$ $= \left(\frac{-1}{\sqrt{5}}\right)^2 - \left(\frac{-2}{\sqrt{5}}\right)^2$ $= \frac{-3}{5}$	✓ double angle identity/*dubbel hoek identitiet* ✓ substitution into correct formula/*substitusie in korrekte formule* ✓ answer/*antwoord* (3) ✓ double angle identity/*dubbel hoek identitiet* ✓ substitution into correct formula/*substitusie in korrekte formule* ✓ answer/*antwoord* (3) ✓ double angle identity *dubbel hoek identitiet* ✓ substitution into correct formula/*substitusie in korrekte formule* ✓ answer/*antwoord* (3)

5.2	$2\,cos^2 15° - 1 + \frac{2\sin 140°.}{\cos 310°}$ $= \cos 30° + \frac{(2\sin 40°)}{(\cos 50°)}$ $= \frac{\sqrt{3}}{2} + \frac{2\sin 40°}{\sin 40°}$ $= \frac{\sqrt{3}+4}{2}$	✓ $\cos 30°$ ✓ $\sin 40°$ ✓ $\cos 50°$ ✓ $\sin 40°$ ✓ answer/*antwoord* (5)
5.3	 $sin\,x - 1$ $= 2\,sin\frac{x}{2}cos\frac{x}{2} - 1$ $= 2\left(\frac{p}{1}\right)\left(\frac{\sqrt{1-p^2}}{1}\right) - 1$ $= 2p\sqrt{1-p^2} - 1$	✓ $x = \sqrt{1-p^2}$ ✓ double angle/*dubbelhoek* ✓ substitution/*substitusie* ✓ answer/*antwoord* (4)
5.4	$\frac{3\sin x + 2(2\sin x\cos x)}{2 + 3\cos x + 2(2\cos^2 x - 1)}$ $= \frac{\sin x\,.\,(3 + 4\cos x)}{4\cos^2 x + 3\cos x}$ $= \frac{\sin x\,.\,(3 + 4\cos x)}{\cos x\,.\,(4\cos x + 3)}$ $= \tan x$	✓$2\sin x\cos x$ ✓$2\cos^2 x - 1$ ✓$\sin x\,(3 + 4\cos x)$ ✓$\cos x\,(4\cos x + 3)$ (4)

5.5	$\frac{sin\,x + cos\,x}{sin\,x - cos\,x}$ $= \frac{\frac{sin\,x}{cos\,x} + \frac{cos\,x}{cos\,x}}{\frac{sin\,x}{cos\,x} - \frac{cos\,x}{cos\,x}}$ $= \frac{\tan x + 1}{\tan x - 1}$ $= \frac{\frac{p}{t} + 1}{\frac{p}{t} - 1}$ $= \frac{p + t}{t} \div \frac{p - t}{t}$ $= \frac{p + t}{t} \times \frac{t}{p - t}$ $= \frac{p + t}{p - t}$	✓divide numerator and denominator by cos *x/deel noemer en teller met cos x* ✓ $\frac{\tan x+1}{\tan x-1}$ ✓ $\frac{\frac{p}{t}+1}{\frac{p}{t}-1}$ ✓ $\frac{p+t}{t} \div \frac{p-t}{t}$ ✓$\frac{p+t}{t} \times \frac{t}{p-t}$ (5)
		[23]

QUESTION/*VRAAG* 6

6.1



✓ turning points/*draaipunte*
✓ *x*-intercepts/*x-afsnitte*
✓ end points/*eindpunte* (3)

6.2.1

$\sin 2x = \cos(x - 45°)$
$\sin 2x = \sin[90° - (x - 45°)]$
$\sin 2x = \sin(135° - x)$
$2x = 135° - x + k.360°; k \in Z$
$3x = 135° + k.360°; k \in Z$
$x = 45° + k.120°; k \in Z$

✓ $\sin 2x = \sin[90° - (x - 45°)]$

✓ $2x = 135° - x + k.360°; k \in Z$

✓ $x = 45° + k.120°; k \in Z$

OR/*OF*

$2x = 180° - (135° - x) + k,360; k \in Z$
$2x = 45° + x + k.360; k \in Z$
$x = 45° + k.360; k \in Z$

$x \in \{45°; 165°\}$

✓$2x = 180° - (135° - x) + k,360;$ $k \in Z$
$x = 45° + k.360;$
✓ $k \in Z$
✓ $x = 45°$
✓ $x = 165$ (7)

OR/*OF*

$\sin 2x = \cos(x - 45°)$
$\cos(90° - 2x) = \cos(x - 45°)$
$90° - 2x = x - 45° + k.360°; k \in Z$
$-3x = -135° + k.360°; k \in Z$
$x = 45° + k.120°;\ k \in Z$

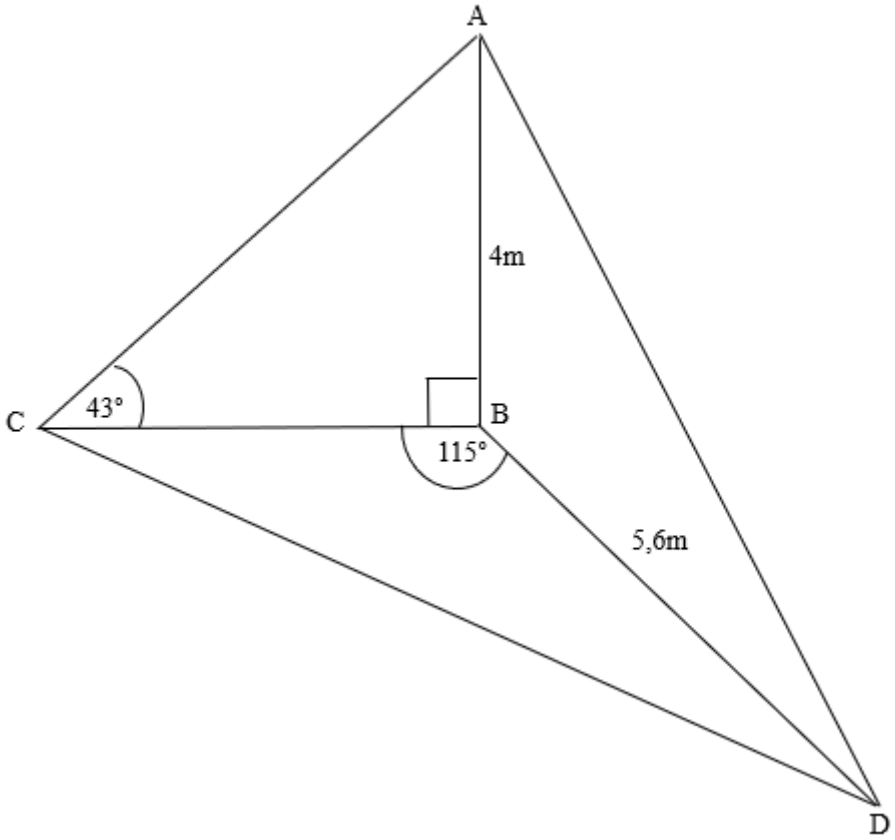
✓$\cos(90° - 2x) = \cos(x - 45°)$

✓ $-3x = -135° + k.360°; k \in Z$
✓ $x = 45° + k.120°; k \in Z$

✓$90° - 2x = 360° - (x - 45°) +$ $k.360°; k \in Z$
$x = -315° + k.360;$
✓ $k \in Z$
✓ $x = 45°$
✓ $x = 165$ (7)

	OR/*OF* $90° - 2x = 360° - (x - 45°) + k.360°; k \in Z$ $90° - 2x = 360° - x + 45° + k.360°; k \in Z$ $-x = 315° + k.360; k \in Z$ $x = -315° + k.360; k \in Z$ $x \in \{45°; 165°\}$	(7)
6.2.2	$x \in \{15°; 135°\}$	✓ $x = 15°$ ✓ $x = 135°$ (2)
6.2.3	$x \in (165°; 180°)$ **OR/*OF*** $165° < x < 180°$	(2) ✓✓ critical values & notation/*kritiese waardes en notasie* (2)
6.3	360°	✓answer/*antwoord* (1)
6.4	$\sqrt{2}\sin 2x = \cos x + \sin x$ $\sin 2x = \frac{\cos x + \sin x}{\sqrt{2}}$ $\sin 2x = \frac{1}{\sqrt{2}}\cos x + \frac{1}{\sqrt{2}}\sin x$ $\sin 2x = \cos x \cos 45° + \sin x \sin 45°$ $\sin 2x = \cos\ (x - 45°)$ $f(x) = g(x)$	✓ $\sin 2x = \frac{\cos x + \sin x}{\sqrt{2}}$ ✓$\sin 2x = \frac{1}{\sqrt{2}}cos\, x + \frac{1}{\sqrt{2}}sin\, x$ ✓$\sin 2x = \cos x \cos 45° + \sin x \sin 45°$ (3)
		[18]

QUESTION/*VRAAG* 7

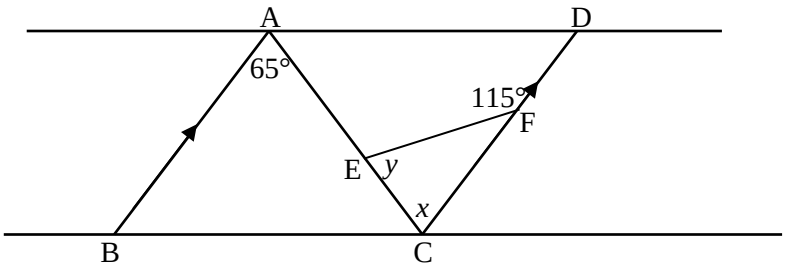


7.1	Tan 43° = $\frac{4}{CB}$ CB = $\frac{4}{\tan 43°}$ = 4,29 *m* **OR/*OF*** $\frac{CB}{sin\,47} = \frac{4}{sin\,43°}$ CB= $\frac{4 \sin 47°}{\sin 43°}$ $= 4{,}29\ m$	✓ substitution into the correct formula/*substitusie in korrek formule* ✓ CB subject of formula ✓ answer/*antwoord* (3) ✓ substitution into the correct formula/*substitusie in korrek formule* ✓ CB subject of formula ✓ answer/*antwoord* (3)

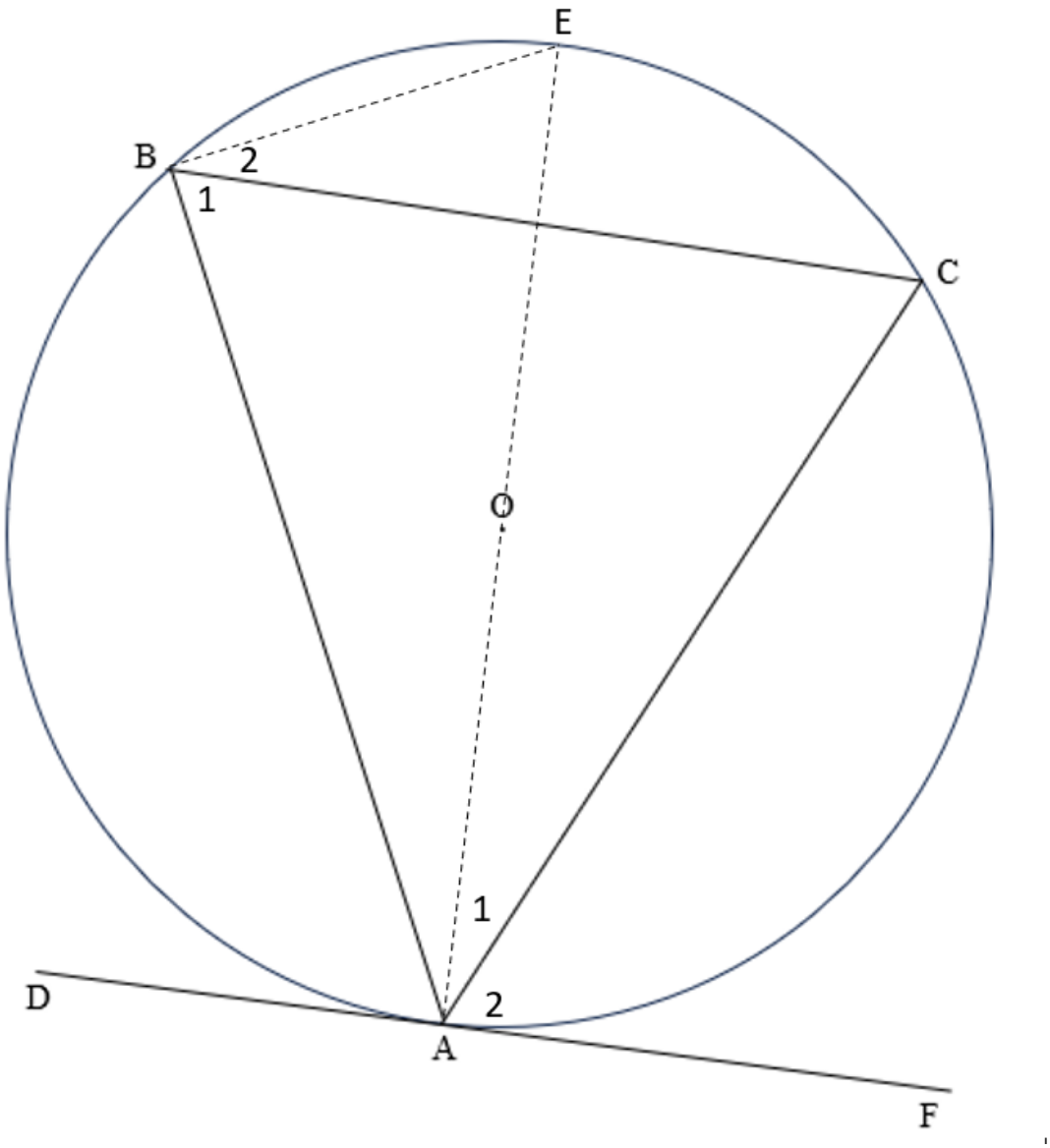
7.2	$CD^2 = CB^2 + BD^2 - 2CB.BD.\cos 115°$ $= (4{,}29)^2 + (5{,}6)^2 - 2(4{,}29)(5{,}6)\cos 115°$ $= 70{,}07006$ $CD = 8{,}37$ m	✓ substitution into correct formula/*substitusie in korrekte formule* ✓ simplification/*vereenvoudig* ✓ answer/*antwoord* (3)
7.3	$\text{Area}\,\Delta BCD = \frac{1}{2}CB.BD.\sin B$ $= \frac{1}{2}(4,29)(5,6)\sin 115°$ $= 10,89m^2$	✓ formula/ *formule* ✓ substitution into correct formula/*substitusie in korrekte formule* ✓answer/*antwoord* (3)
		[9]

GEOMETRY/*MEETKUNDE*

Please read carefully through the following table before marking **QUESTION 8–10**/
*Lees asseblief sorgvuldig deur die volgende tabel alvorens **VRAAG 8–10** nagesien word.*

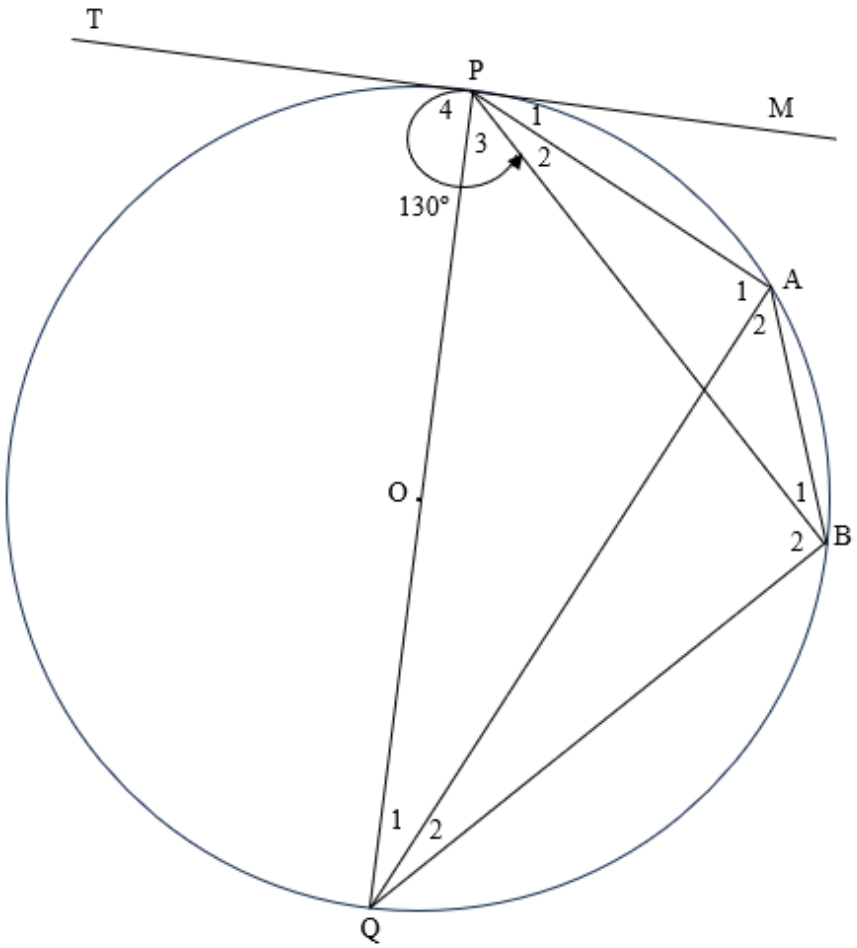
	The order in which the candidate answers a geometry question must follow logically/*Die volgorde waarin 'n kandidaat 'n meetkundevraag beantwoord moet logies volg.* **Example/*Voorbeeld*** Given/*Gegee* AB ‖ CD and/*en* $E\hat{F}D = 115°$  The candidate first needs to calculate *x* BEFORE he/she can calculate *y/Die kandidaat moet eerste vir x bereken VOORDAT hy/sy vir y kan bereken.*
S	A mark for a correct statement (A statement mark is independent of a reason)
	'n Punt vir 'n korrekte bewering *('n Punt vir 'n bewering is onafhanklik van die rede)*
R	A mark for the correct reason (A reason mark may only be awarded if the statement is correct)
	'n Punt vir 'n korrekte rede *('n Punt word slegs vir die rede toegeken as die bewering korrek is)*
S/R	Award a mark if the statement AND reason are both correct (Both MUST be correct to get one mark)
	Ken 'n punt toe as die bewering EN rede beide korrek is *(Beide MOET korrek wees om een punt te kry)*

QUESTION/*VRAAG* 8



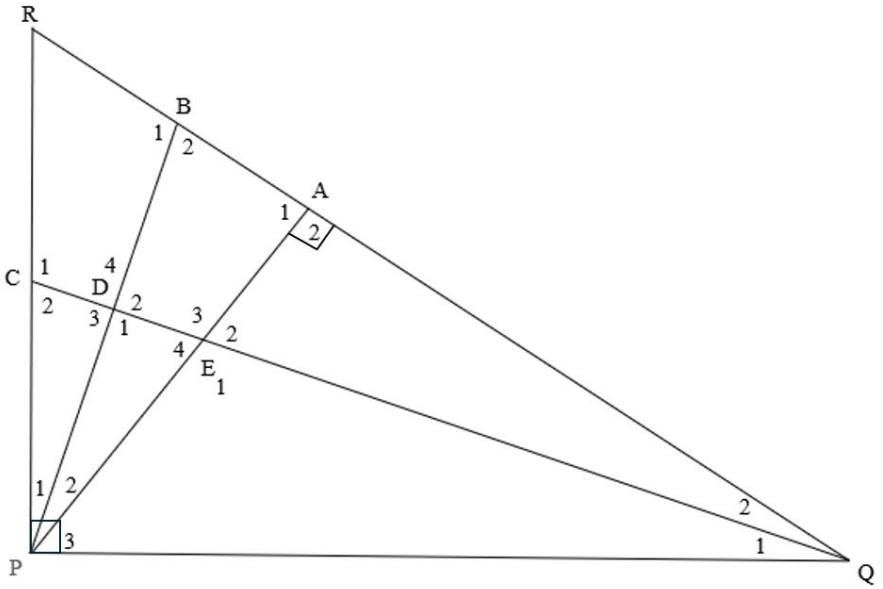
8.1	Construction/*Konstruksie*: Draw AE through O and join BE/*Trek AE deur O en verbind BE.*	✓ constr./ *konstr.*
	$\hat{A}_1 + \hat{A}_2 = 90°$ radius ⊥ tangent/$radius \perp raaklyn$	✓ S/R
	$\hat{B}_1 + \hat{B}_2 = 90°$ angles in a semi circle/*hoeke in halfsirkel*	✓ S/R
	$\hat{A}_1 = \hat{B}_2$ subtended by the same arc/$onderspan$ *deur dieselfde boog*	✓ S/R
	$\hat{A}_2 = \hat{B}_1$	✓ S (5)

8.2



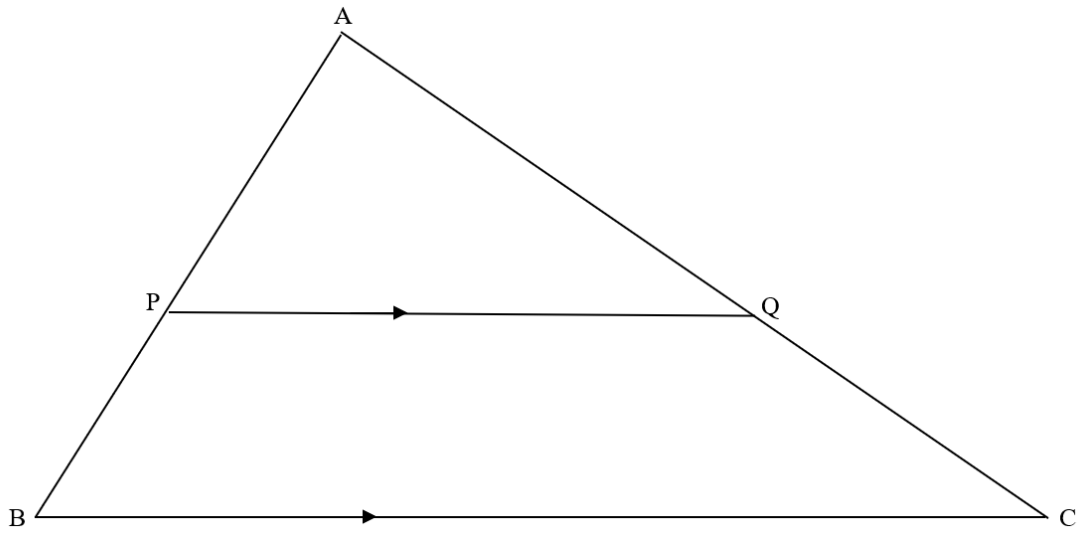
8.2.1	$\widehat{P}_4 = 90°$ radius ⊥ tangent/$radius \perp raaklyn$ $\widehat{P}_3 = 130° - 90°$ $= 40°$	✓S✓R ✓S (3)
8.2.2	$\widehat{B}_2 = 90°$ angles in semi-circle/$hoeke\ in\ halfsirkel$ $\widehat{Q}_1 + \widehat{Q}_2 = 50°$ sum of interior angles of Δ/$binnehoeke\ van\ \Delta$	✓S✓R ✓S/R (3)
8.2.3	$P\widehat{A}B = 130°$ opp. angles of cyclic quad OR tan chord theorem/ *teenoorst. hoeke van koordevierhoek* OF *tan koordstelling*	✓S✓R (2)
		[13]

QUESTION/*VRAAG* 9



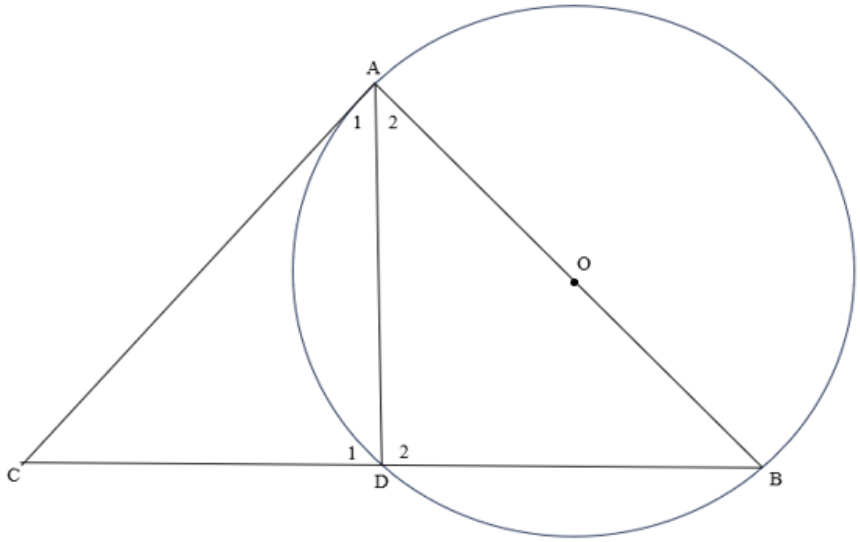
9.1.1	$P_1 + P_2 + P_3 = 90°$	given/*gegee*	✓S/R
	$\hat{Q}_1 + \hat{Q}_2 + \hat{P}_3 = 90°$	sum int ∠'s of Δ/*som van binne ∠'e van Δ*	✓S/R
	$\hat{Q}_1 + \hat{Q}_2 = \hat{P}_1 + \hat{P}_2$		✓S
	$\hat{Q}_1 = \hat{Q}_2$ and $\hat{P}_1 = \hat{P}_2$ $2\hat{Q}_1 = 2\hat{P}_2$ $\hat{Q}_1 = \hat{P}_2$	given/*gegee*	✓S ✓S
	PB is a tangent	angle between line and chord/*hoek tussen lyn en koord*	✓R (6)
9.1.2	$\hat{Q}_1 + \hat{Q}_2 = \hat{P}_1 + \hat{P}_2$ $2\hat{Q}_2 = 2\hat{P}_2$ $\hat{Q}_2 = \hat{P}_2$	given/*gegee*	✓S/R ✓S
	ADPQ is a cyclic quad	AD subtends equal ∠'s/*AD onderspan gelyke ∠'e*	✓R (3)

9.2



9.2	$\frac{AP}{AB}=\frac{AQ}{AC}=\frac{PQ}{BC}=\frac{4}{7}$ proportionality theorem PQ ∥ BC / *eweredigheidsstelling* $PQ \parallel BC$	✓S✓R
	$\frac{Area\ \Delta APQ}{Area\ \Delta ABC}=\frac{\frac{1}{2}\text{AP. AQ.}\sin A}{\frac{1}{2}\text{AB. AC.}\sin A}$	✓correct formula/*korrekte formule*
	$=\frac{\text{AP. AQ}}{\text{AB. AC}}$	
	$=\frac{4.4}{7.7}$	✓substitution/ *substitusie*
	$=\frac{16}{49}$	✓answer/*antwoord*
		(5)
		[14]

QUESTION/*VRAAG* 10



10.1	$\widehat{D}_2 = 90°$	angle in semi-circle/*hoek in halfsirkel*	✓S/R
	In ΔADC and ΔBDA		
	$\widehat{A}_1 = \widehat{B}$	tan chord theorem/*tankoord stelling*	✓S/R
	$\widehat{D}_1 = \widehat{D}_2 = 90°$	angles on str. line/*hoeke op reguitlyn*	✓S/R
	$\widehat{C} = \widehat{A}_2$	sum of int $\angle$'s of Δ/*som van binne$\angle$'e vanΔ*	
	$\Delta ADC \,///\, \Delta BDA$	[$\angle\angle\angle$]	✓S
	$\frac{AD}{BD} = \frac{DC}{DA} = \frac{AC}{BA}$	similar Δ's/*gelykvormige Δ'e*	✓S/R
	$AD^2 = BD.DC$ $= 3x.2x$ $= 6x^2$		✓S (6)
10.2	$\hat{A}_1 + \widehat{A}_2 = 90°$	radius $\perp$ tangent/*radius $\perp$ raaklyn*	
	$CB^2 = AC^2 + AB^2$	pythagoras' theorem/*stelling*	
	$(5x)^2 = AC^2 + AB^2$		
	$25x^2 = AC^2 + AB^2$		✓S
	$AC^2 + AB^2 + AD^2$		✓S
	$= 25x^2 + 6x^2$		✓Simplify/ *vereenv*
	$= 31x^2$		
	$\sqrt{AC^2 + AB^2 + AD^2} = \sqrt{31x^2}$ $= x\sqrt{31}$		✓S (4)
			[10]

TOTAL/*TOTAAL: 150*

Copyright reserved/*Kopiereg voorbehou*