

GAUTENG
DEPARTMENT OF EDUCATION

SENIOR CERTIFICATE EXAMINATION

TECHNICAL DRAWING HG 711-1/1 Z

(First Paper : Descriptive Geometry and Locus)

TIME : 3 hours

MARKS : 200

GAUTENGSE
DEPARTEMENT VAN ONDERWYS

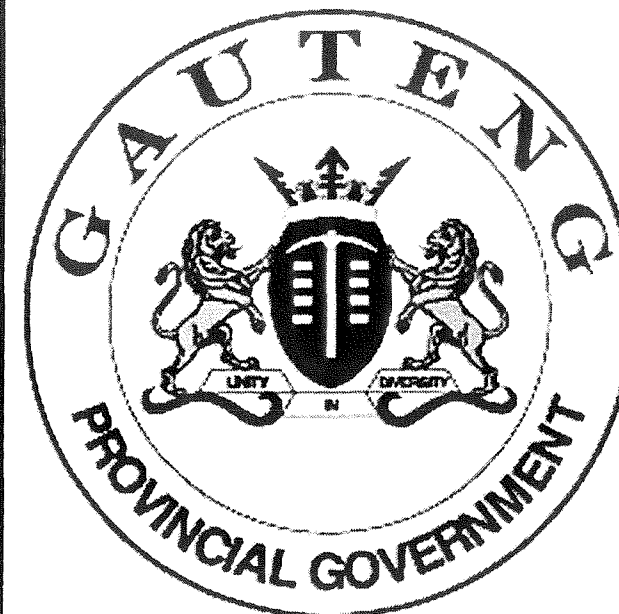
SENIORSERTIFIKAAT-EKSAMEN

TEGNIесе TEKENE HG 711-1/1 Z

(Eerste Vraestel : Beskrywende Meetkunde en Locus)

TYD : 3 uur

PUNTE : 200



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SLEGS VIR AMPTELIKE GEBRUIK

QUESTION VRAAG	MARKS PUNTE	MODERATED MODERATOR	MAXIMUM MAKSIMUM
1			35
2			30
3			35
4			30
5			20
6			30
7			10
PRESENTATION / AANBIEDING			10
TOTAL TOTAAL			200
CHECKED BY / GEKONTROLEER DEUR			%

EXAMINATION NUMBER
EKSAMENNOMMER

8	0	6								
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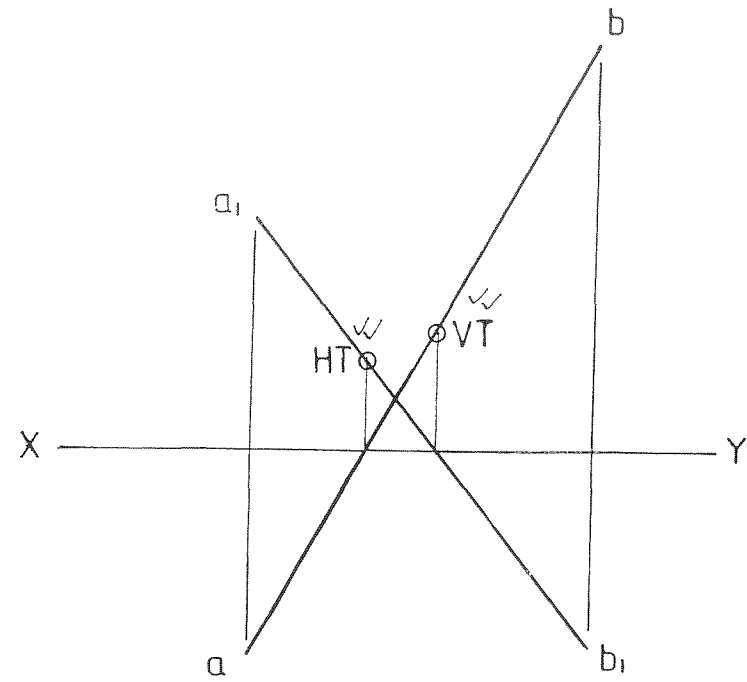


FIG. 1.1

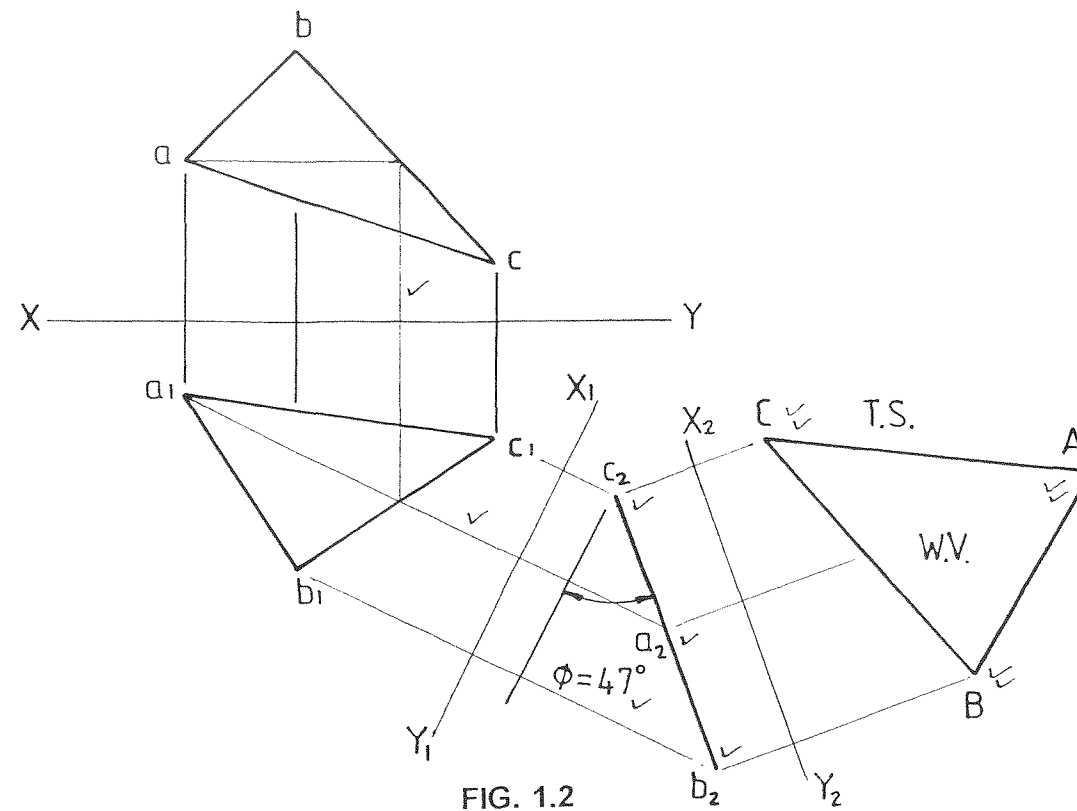


FIG. 1.2

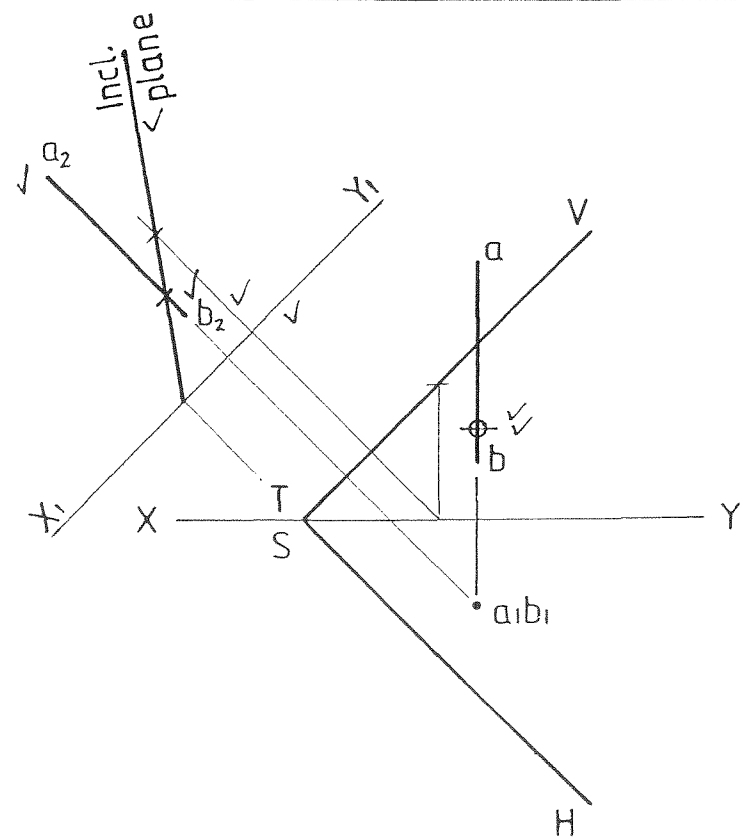


FIG. 1.3

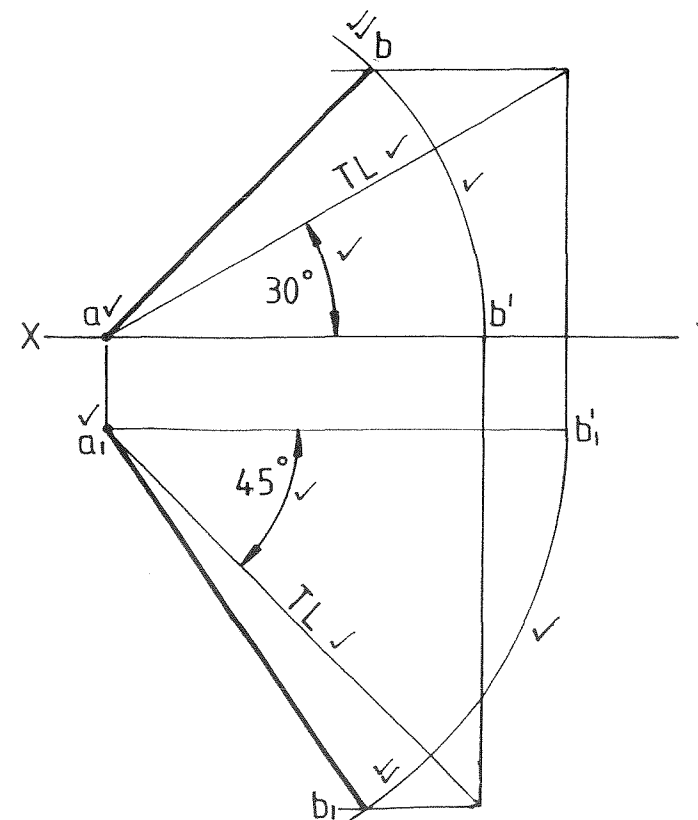
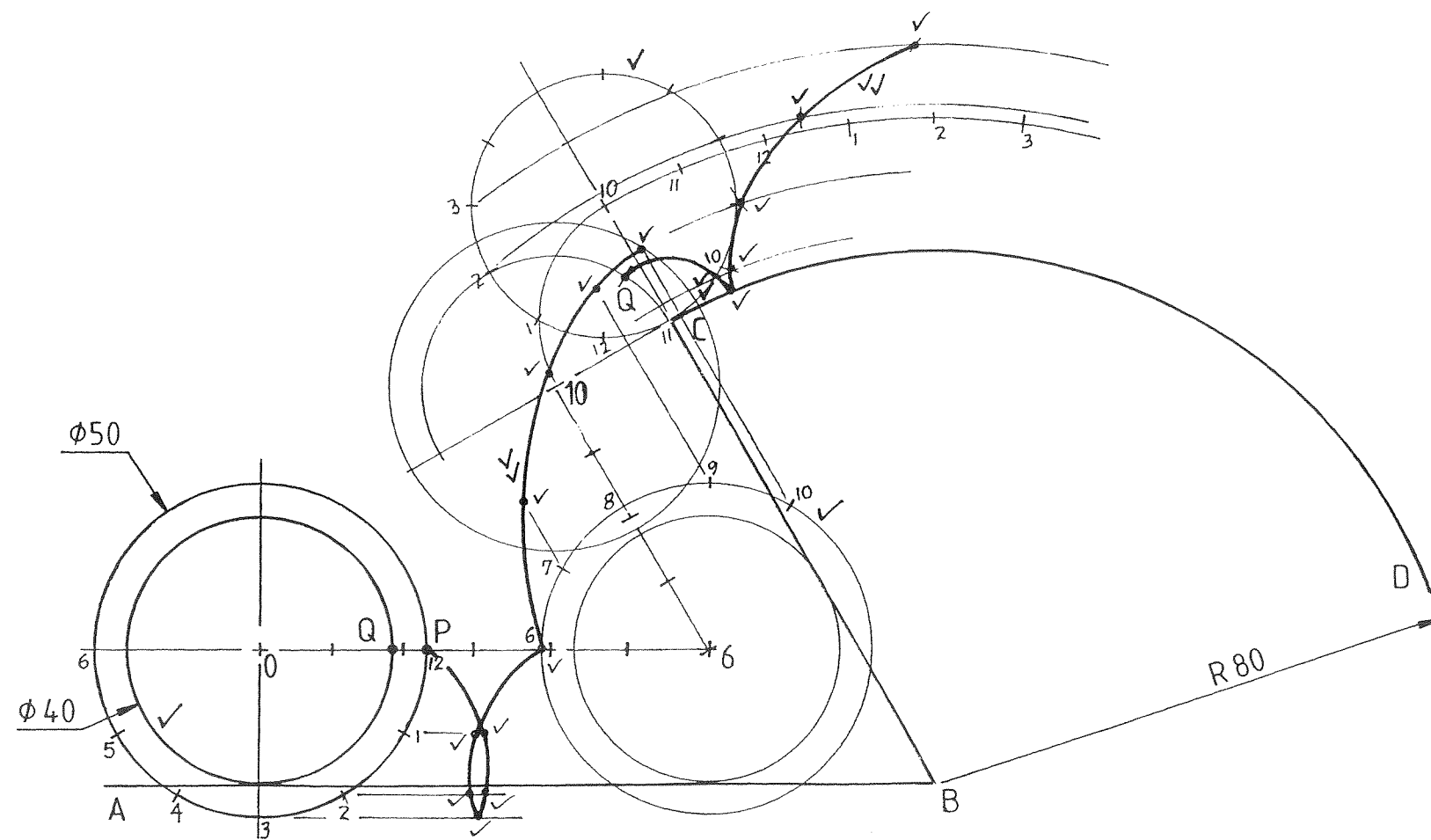


FIG. 1.4

QUESTION 1		MARKS
1.1	Determine and indicate the VT and HT of line segment AB shown in FIG 1.1.	4
1.2	In FIG 1.2 find the	
1.2.1	true angle between plane figure ABC and the HP.	6
1.2.2	true shape and size of plane figure ABC .	6
1.3	Determine the cutting trace between line segment AB and the oblique plane shown in FIG 1.3.	7
1.4	A line segment AB with true length of 70 mm is inclined to the HP and VP at 30° and 45° respectively. Point A lies in the HP and 12 mm in front of the VP. Complete the front view and the top view of line segment AB .	12
		35
VRAAG 1		PUNTE
1.1	Bepaal en toon die VS en HS aan van lynstuk AB aangetoon in FIG. 1.1.	4
1.2	In FIG 1.2 bepaal die	
1.2.1	ware hoek tussen vlakfiguur ABC en die HV.	6
1.2.2	ware vorm en grootte van vlakfiguur ABC .	6
1.3	Bepaal die snyspoor tussen lynstuk AB en die skuinsvlak soos getoon in FIG 1.3.	7
1.4	'n Lynstuk AB met ware lengte van 70 mm lê skuins t.o.v. beide die HV en VV teen 30° en 45° respektiewelik. Punt A lê in die HV en 12 mm voor die VV. Voltooi die vooraansig en die boaansig van lynstuk AB .	12
		35





Calculations / Berekeninge

$\frac{\pi d}{12} = \frac{3,14 \times 40}{12}$ $= 10,5\text{mm} \checkmark$	$\theta = \frac{r}{R} \times 30^\circ$ $= \frac{20}{80} \times 30^\circ = 7,5^\circ \checkmark$
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Name / Benoem

HIGHER TROCHOID HOËR TROGOÏED ✓	EPI-CYCLOID EPISIKLOÏED ✓
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QUESTION 2

Shown is the contour **ABCD** on which point **P** and **Q** on the cylindrical disc, must complete $1\frac{1}{4}$ revolutions, point **P** on the straight surface and point **Q** on the curved surface.
 Plot the curves and name the loci generated.
 Show all calculations.

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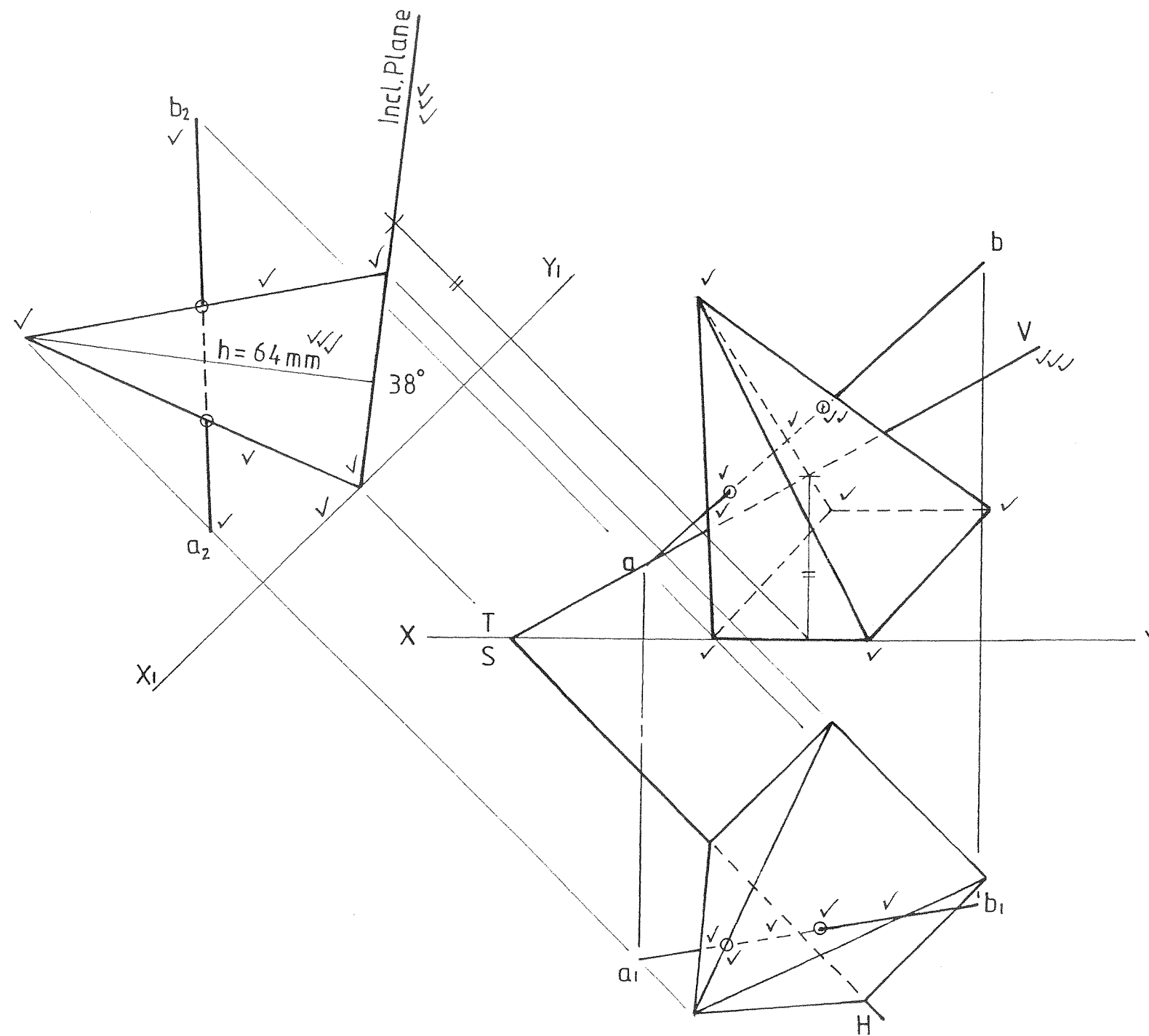
VRAAG 2

Getoon is die kontoer **ABCD** waarop die ronde skyf met punte **P** en **Q** $1\frac{1}{4}$ omwentelinge moet voltooi, punt **P** op die reguit oppervlak en punt **Q** oor die geboë oppervlak.
 Teken die kromme en benoem die lokusse wat gegeneer word.
 Toon alle berekeninge.

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4

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QUESTION 3

MARKS

The top view of a square pyramid with its base lying on the oblique plane is given. The HT of the oblique plane is shown as well as the front view and top view of line segment AB.

Draw

- 3.1 in the auxiliary view the pyramid with its base on top of the oblique plane if the angle between the oblique plane and the HP = 38°.
- 3.2 the VT of the oblique plane.
- 3.3 the front view of the pyramid showing the traces (points of intersection) between the line segment AB and the pyramid. Also show the traces of the line segment in the top view.
- 3.4 Measure and show the true height of the pyramid on your drawing. Show all hidden detail.

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3

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3

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PUNTE

VRAAG 3

Die boaansig van 'n vierkantige piramide met sy basis wat op die skuinsvlak rus, word getoon. Die HS van die skuinsvlak asook die vooraansig en boaansig van lynstuk AB word getoon.

Teken

- 3.1 in die hulpaansig die piramide met sy basis op die skuinsvlak indien die hoek tussen die skuinsvlak en die HV = 38° is.
- 3.2 die VS van die skuinsvlak.
- 3.3 die vooraansig van die piramide wat die snyspore (deurdringingspunte) tussen die lynstuk AB en die piramide toon. Toon die snyspore van die lynstuk ook in die boaansig.
- 3.4 Meet en toon die ware hoogte van die piramide op jou tekening. Toon alle verborge detail.

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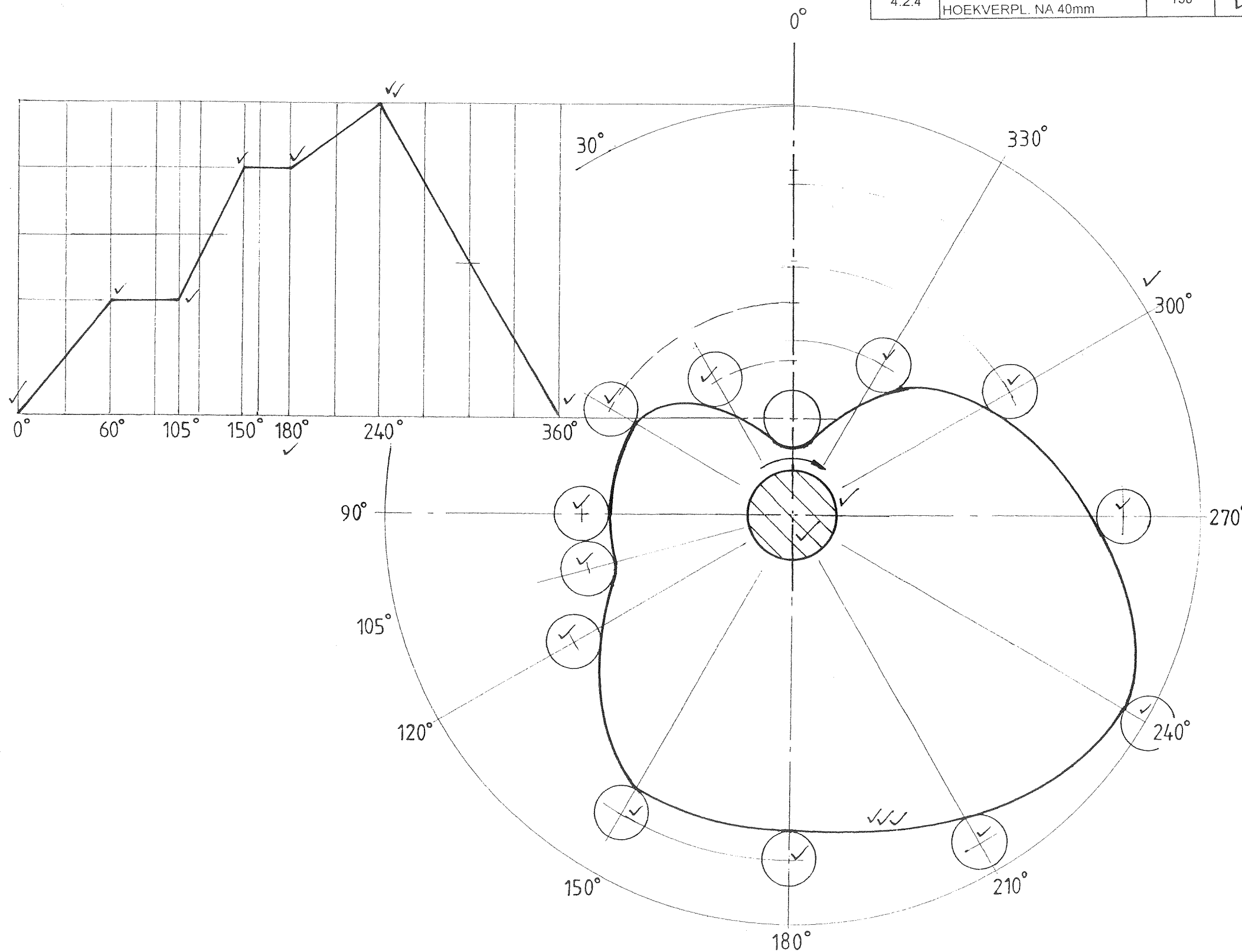
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3

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4.2.1	TOTAL TRAVEL TOTALE SLAG	142 mm	✓
4.2.2	DISPL. @ 160° VERPL. @ 160°	55 mm	✓
4.2.3	TRAVEL @ 300° SLAG @ 300°	106 mm	✓
4.2.4	ANG. DISP. AFTER 40mm HOEKVERPL. NA 40mm	130°	✓



QUESTION 4

Shown are the camshaft centre, direction of rotation and initial position of a roller-ended follower of a disc cam.

MARKS

4.1 Draw the profile and displacement graph of the disc cam which transmits reciprocating motion to a roller-ended follower given that:

- Diameter of roller = 12 mm
- Diameter of camshaft = 20 mm
- Minimum distance from cam shaft centre to the bottom of the roller = 15 mm

Cam follower specifications:

- Rises 26 mm for the first 60° rotation
- Rests for the next 45° rotation
- Rises a further 30 mm for the next 45° rotation
- Rests for the next 30° rotation
- Rises a further 15 mm for the next 60° rotation
- Returns to its original position for the last 120° rotation

The horizontal scale of the graph is to be 120 mm = 360° rotation.

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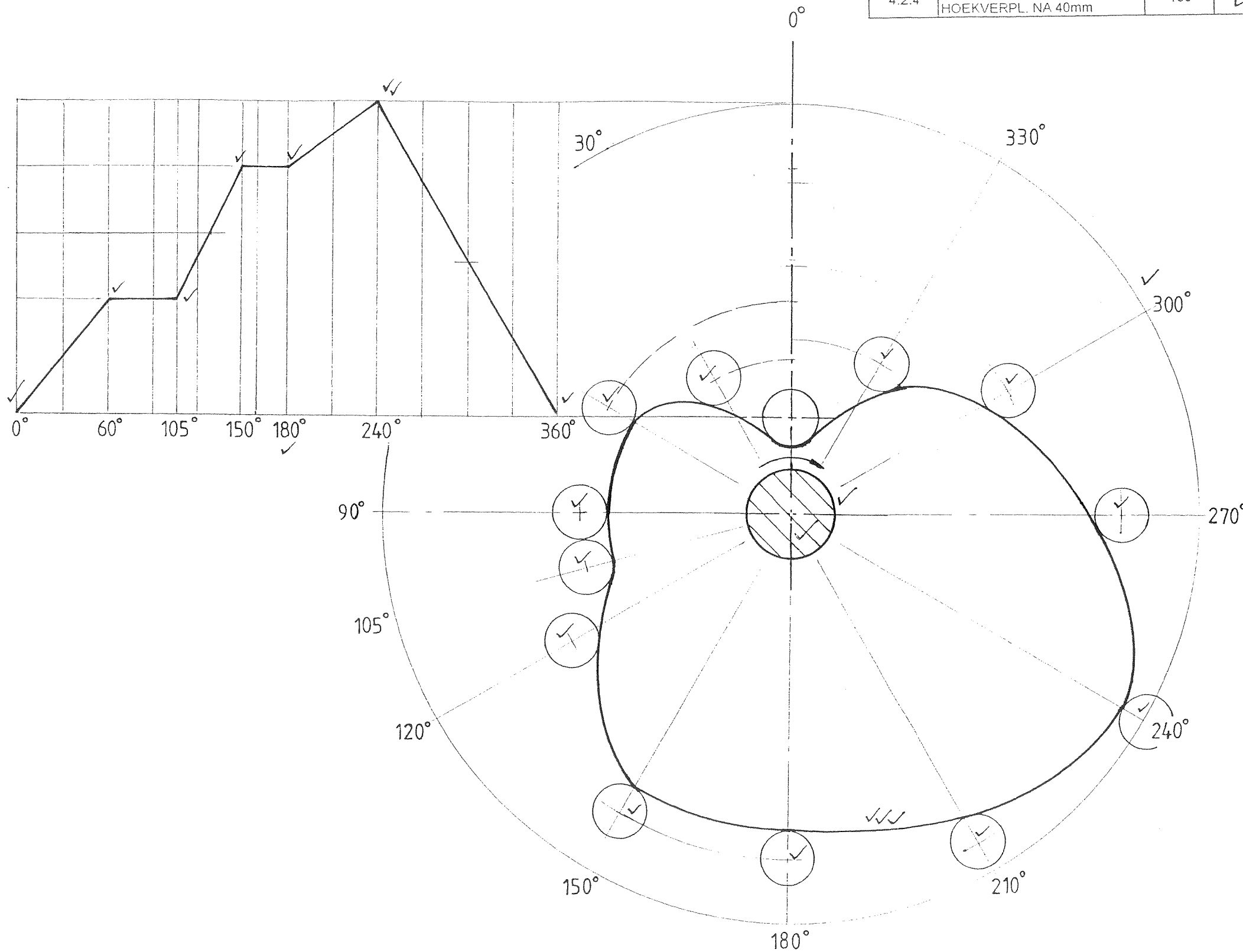
4.2 Determine:

- 4.2.1 Total travel of the follower 1
- 4.2.2 Displacement of follower after 180° rotation 1
- 4.2.3 Travel of the follower after the cam has rotated 300° 1
- 4.2.4 Angular displacement of the cam when the follower has travelled 40 mm 1

30



4.2.1	TOTAL TRAVEL TOTALE SLAG	142 mm	✓
4.2.2	DISPL. @ 180° VERPL. @ 180°	55 mm	✓
4.2.3	TRAVEL @ 300° SLAG @ 300°	106 mm	✓
4.2.4	ANG. DISP. AFTER 40mm HOEKVERPL. NA 40mm	130°	✓



VRAAG 4

Die nokas-middelpunt van 'n skyfnok, rigting van rotasie asook beginposisie van 'n roller-nokvolger word getoon.

PUNTE

4.1 Teken die profiel en verplasinggrafiek van die skyfnok wat wederkerige beweging aan 'n rollervolger oordra, gegewe die volgende:

- Roller diameter = 12 mm
- Nokas diameter = 20 mm
- Minimum afstand van die nokas-middelpunt na die onderpunt van die roller = 15 mm

Nokvolger-spesifikasies:

- Styg 26 mm vir die eerste 60° rotasie
- Verkeer in rus vir die volgende 45° rotasie
- Styg 'n verdere 30 mm vir die volgende 45° rotasie
- Verkeer in rus vir die volgende 30° rotasie
- Styg 'n verdere 15 mm vir die volgende 60° rotasie
- Keer terug na die oorspronklike posisie oor die laaste 120° rotasie

Die horisontale skaal van die verplasinggrafiek moet 120 mm = 360° wees.

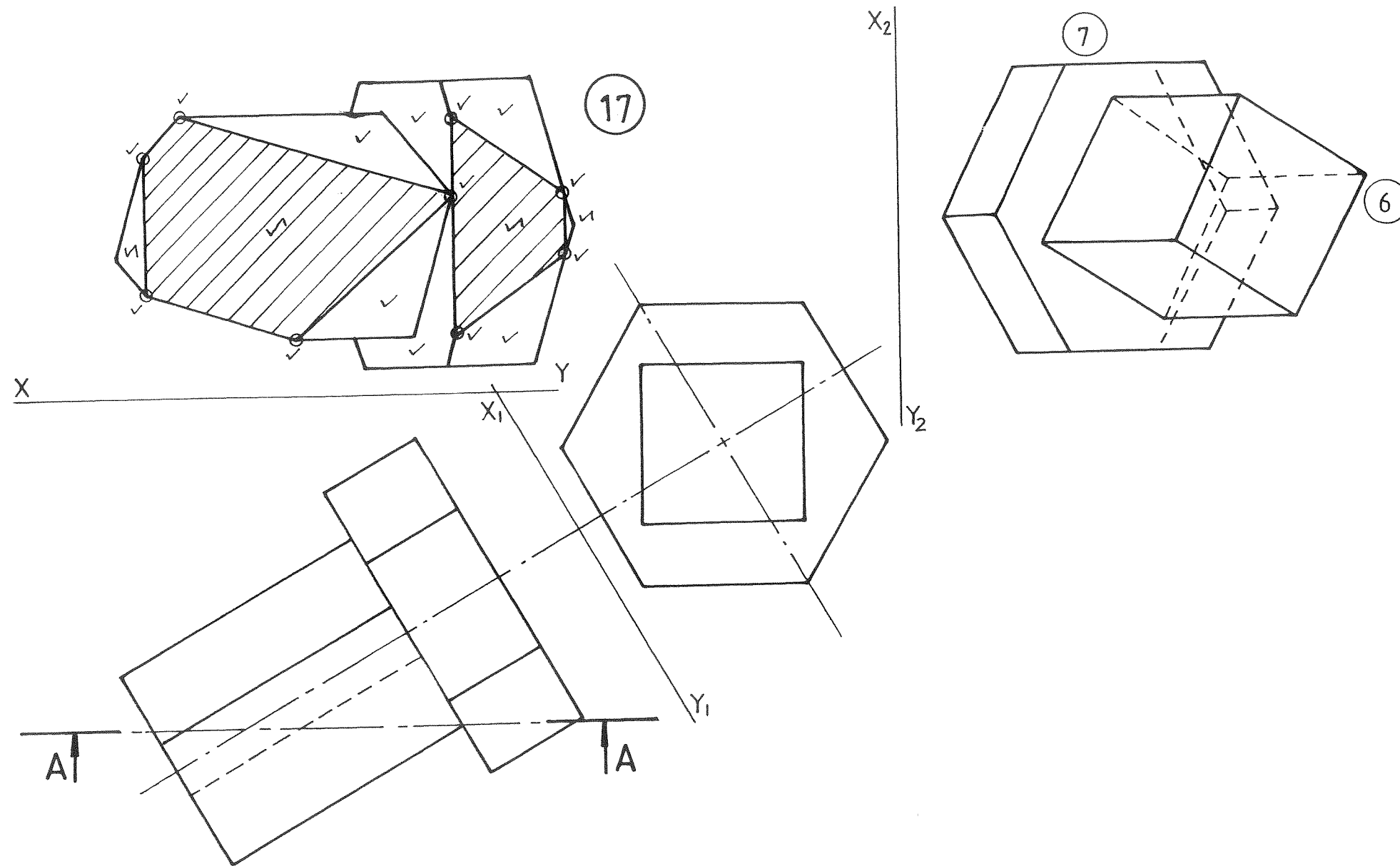
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4.2 Bepaal:

- 4.2.1 Die totale slag van die volger 1
- 4.2.2 Verplasing van die volger na 180° nokas-rotasie 1
- 4.2.3 Slag van die volger na 300° nokas-rotasie 1
- 4.2.4 Hoekverplasing van die nok indien die volger 40 mm beweeg het 1

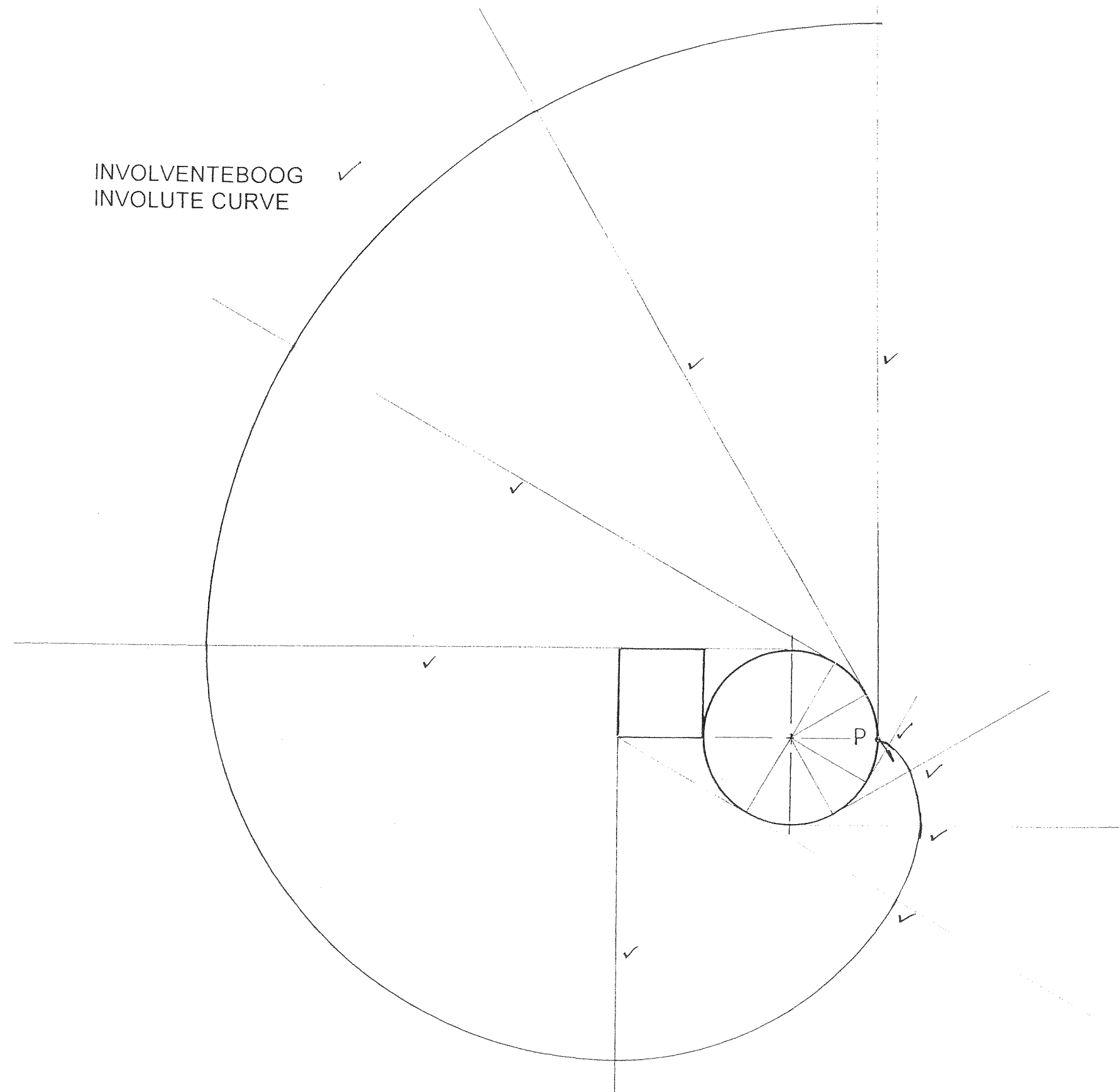
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QUESTION 6		MARKS	
The top view and auxiliary view of a casting is given. The casting consists of a hexagonal prism and a square prism.			
Determine:			
6.1	A sectional front view on cutting plane A-A. No hidden detail is required.	17	
6.2	Left view showing all hidden detail.	13	
		30	
VRAAG 6		PUNTE	
Die boaansig en hulpaansig van 'n gietstuk word getoon. Die gietstuk bestaan uit 'n seshoekige prisma en 'n vierkantige prisma.			
Bepaal:			
6.1	'n Deursnee-vooraansig op snyvlak A-A. Geen verborge detail hoef getoon te word nie.	17	
6.2	'n Linkeraansig wat alle verborge detail toon.	13	
		30	





INVOLVENTEBOOG ✓
 INVOLUTE CURVE

QUESTION 7		MARKS
A round disc and square are shown. A piece of string of negligible thickness, attached at P, is wrapped around the objects in an anti-clockwise direction ending at P.		
7.1	Construct the path generated by P as it unwinds in the direction indicated and ends on the vertical line. Show all constructions.	9
7.2	Name the locus generated.	1
		10
VRAAG 7		PUNTE
'n Ronde skyf en vierkant word getoon. 'n Stukkie tou van weglaatbare dikte, geheg by P, word om die voorwerpe gerol in 'n anti-klokgewyse rigting en eindig dan by P.		
7.1	Konstrueer die baan van P indien die tou afgerol word in die rigting aangetoon en eindig teen die vertikale lyn. Toon alle konstruksies.	9
7.2	Benoem die lokus gevorm.	1
		10

