



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 10

MATHEMATICS P2

NOVEMBER 2018

MARKS: 100

TIME: 2 hours

This question paper consists of 9 pages and a 12-page answer book.

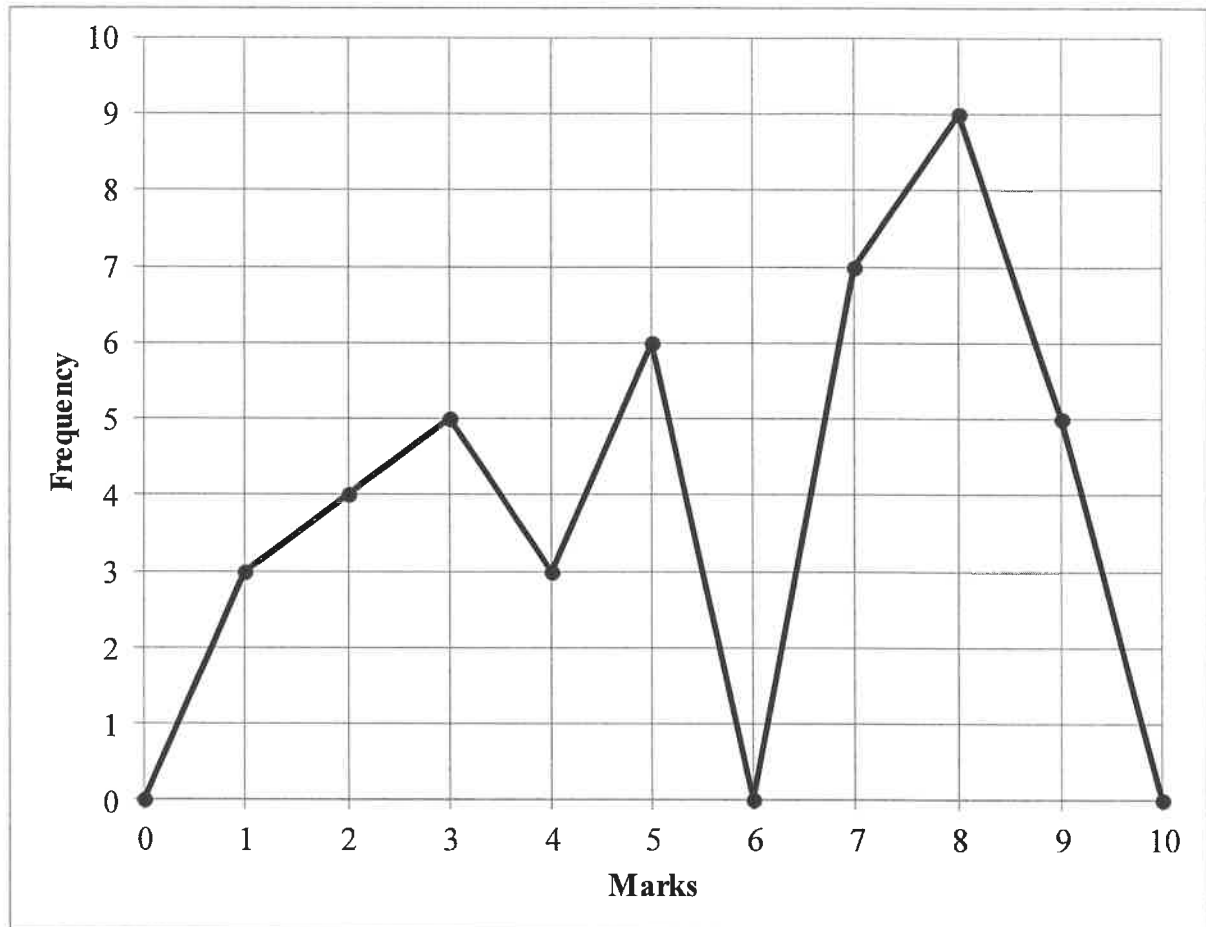
INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of EIGHT questions.
2. Answer ALL the questions in the SPECIAL ANSWER BOOK provided.
3. Clearly show ALL calculations, diagrams, graphs, etc. that you used to determine the answers.
4. Answers only will NOT necessarily be awarded full marks.
5. If necessary, round off answers to TWO decimal places, unless stated otherwise.
6. Diagrams are NOT necessarily drawn to scale.
7. You must use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
8. Write neatly and legibly.

QUESTION 1

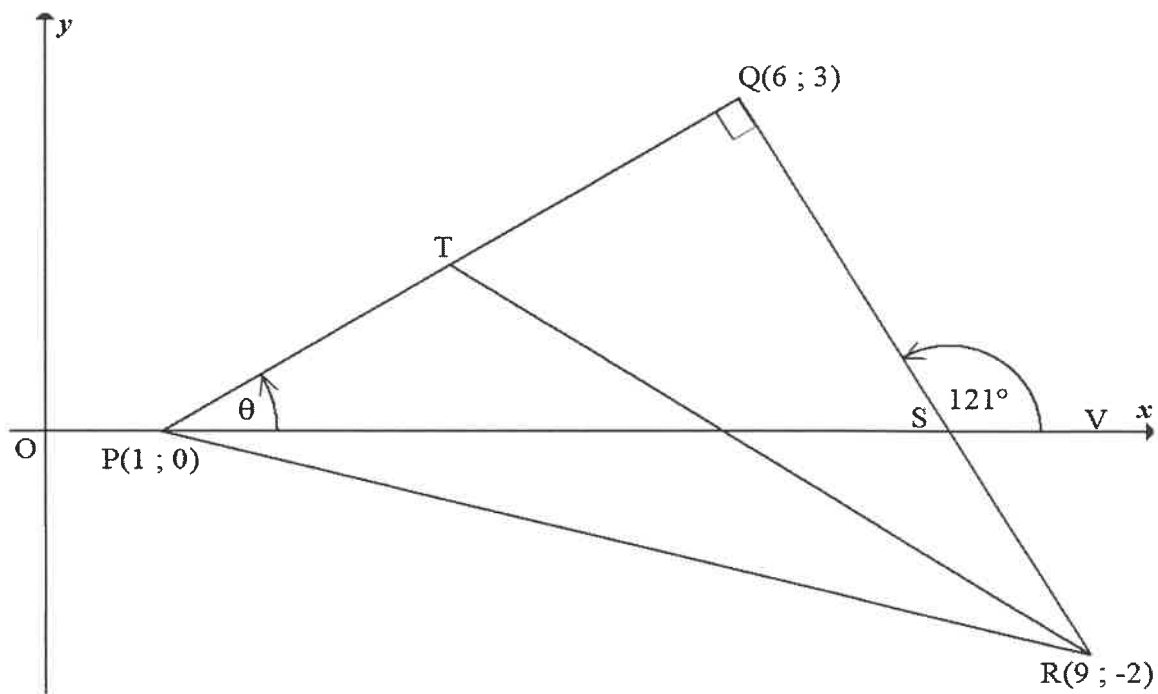
The line graph below shows test marks out of 10 obtained by a Grade 10 class.



- 1.1 Complete the frequency column in the table provided in the ANSWER BOOK. (2)
- 1.2 How many learners wrote the test? (1)
- 1.3 Calculate the:
- 1.3.1 Range for the data (2)
- 1.3.2 Mean for the test (3)
- 1.4 Determine the median for the data. (3)
- 1.5 Draw a box and whisker diagram for the data. (3)
- [14]**

QUESTION 2

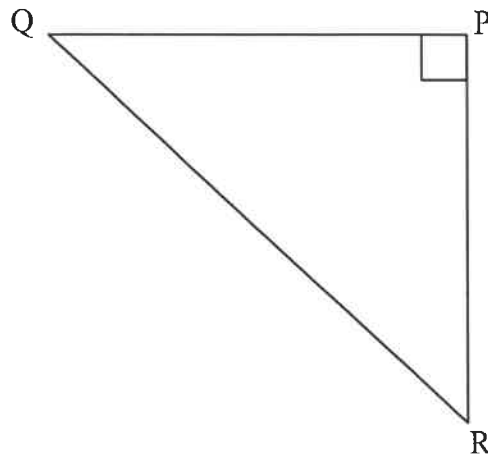
In the diagram below, $P(1 ; 0)$, $Q(6 ; 3)$ and $R(9 ; -2)$ are the vertices of a triangle such that $PQ = QR$ and $PQ \perp QR$. T is a point on PQ such that T is the midpoint of PQ . S is the point of intersection of RQ and the x -axis. V is a point on the x -axis such that $\widehat{QSV} = 121^\circ$. $\widehat{QPS} = \theta$



- 2.1 Determine the:
- 2.1.1 Length of PQ . Leave your answer in surd form. (2)
- 2.1.2 Gradient of PQ (2)
- 2.1.3 Coordinates of T (2)
- 2.2 Calculate the:
- 2.2.1 Area of $\triangle QTR$ (3)
- 2.2.2 Size of θ , with reasons (2)
- 2.2.3 Coordinates of S (3)
- 2.3 Determine, with reasons, the gradient of the line through T and the midpoint of PR . (3)
- [17]

QUESTION 3

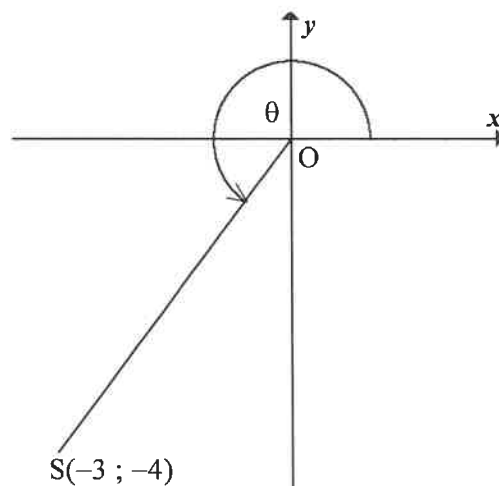
3.1 In the diagram below, $\triangle QPR$ is a right-angled triangle with $\widehat{QPR} = 90^\circ$.



3.1.1 Use the sketch to determine the ratio of $\tan(90^\circ - R)$. (1)

3.1.2 Write down the trigonometric ratio that is equal to $\frac{QR}{QP}$. (1)

3.2 $S(-3 ; -4)$ is a point on the Cartesian plane such that OS makes an angle of θ with the positive x -axis.



Calculate the following WITHOUT using a calculator:

3.2.1 The length of OS (2)

3.2.2 The value of $\sec \theta + \sin^2 \theta$ (3)

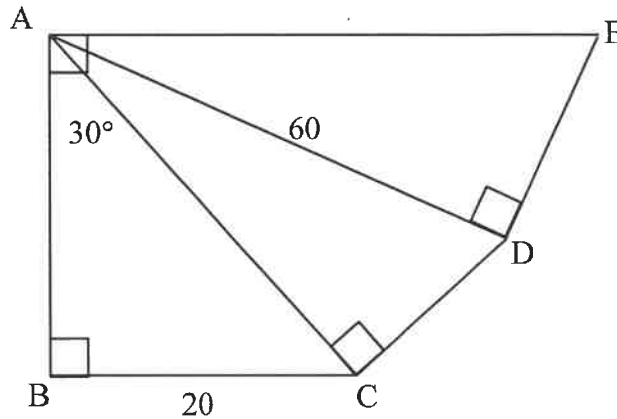
3.3 Determine the value of the following WITHOUT using a calculator:

$$\frac{\operatorname{cosec} 45^\circ}{\sin 90^\circ \cdot \tan 60^\circ} \quad (4)$$

[11]

QUESTION 4

- 4.1 In the diagram below, ABC , ACD and ADE are right-angled triangles.
 $\hat{BAE} = 90^\circ$ and $\hat{BAC} = 30^\circ$. $BC = 20$ units and $AD = 60$ units.



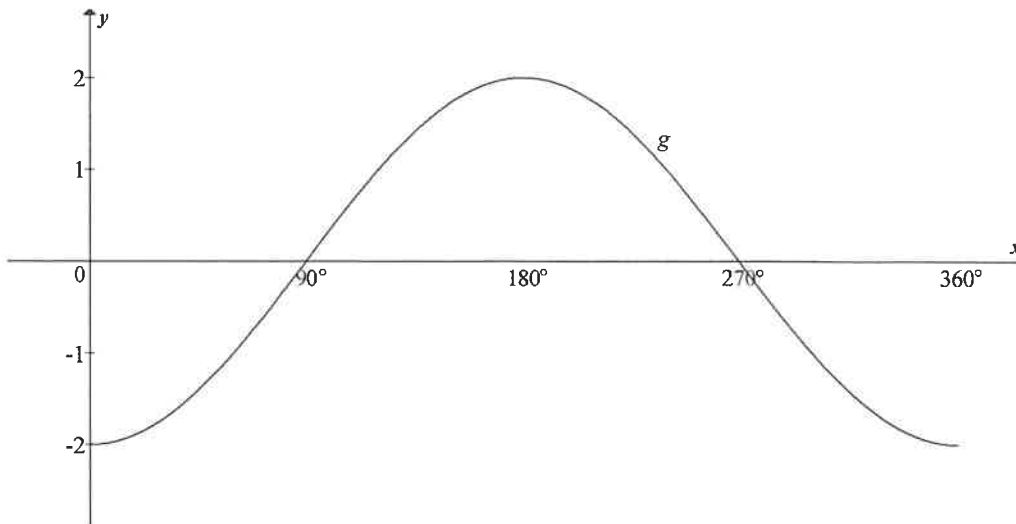
Calculate the:

- 4.1.1 Length of AC (2)
- 4.1.2 Size of \hat{CAD} (2)
- 4.1.3 Length of DE (3)
- 4.2 Solve for x , correct to ONE decimal place, where $0^\circ \leq x \leq 90^\circ$:
- 4.2.1 $\tan x = 2,01$ (2)
- 4.2.2 $5 \cos x + 2 = 4$ (3)
- 4.2.3 $\frac{\operatorname{cosec} x}{2} = 3$ (3)
- [15]**

QUESTION 5

- 5.1 Consider the function $f(x) = -3 \tan x$.
- 5.1.1 Sketch, on the grid provided in the ANSWER BOOK, the graph of f for $0^\circ \leq x \leq 360^\circ$. Clearly show ALL the intercepts and asymptotes. (3)
- 5.1.2 Hence, or otherwise, write down the:
- (a) Period of f (1)
- (b) Equation of h if h is the reflection of f about the x -axis (1)

5.2 Sketched below is the graph of $g(x) = a \cdot \cos b\theta$



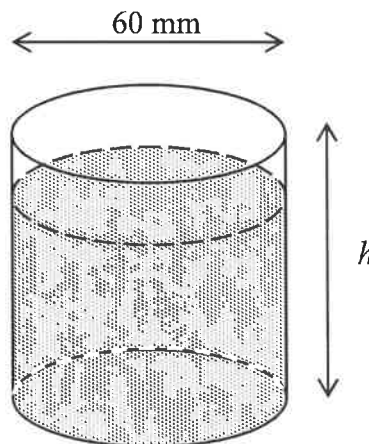
- 5.2.1 Write down the values of a and b . (2)
- 5.2.2 Use the graph to determine the value(s) of x for which $g(x) > 0$. (1)
- 5.2.3 Determine the range of h if h is the image of g if g is shifted down TWO units. (2)
- 5.2.4 Determine, using the graph, the value of:

$$-2(\cos 0^\circ + \cos 1^\circ + \cos 2^\circ + \dots + \cos 358^\circ + \cos 359^\circ + \cos 360^\circ)$$
 (2)

[12]

QUESTION 6

The diagram below shows a cup with a volume of $117\pi \text{ cm}^3$ and an inner diameter of 60 mm. Ignore the thickness of the cup.



Calculate the:

- 6.1 Height of the cup (3)
- 6.2 Total surface area of the water that touches the cup if the cup is 80% full with water (4)

[7]

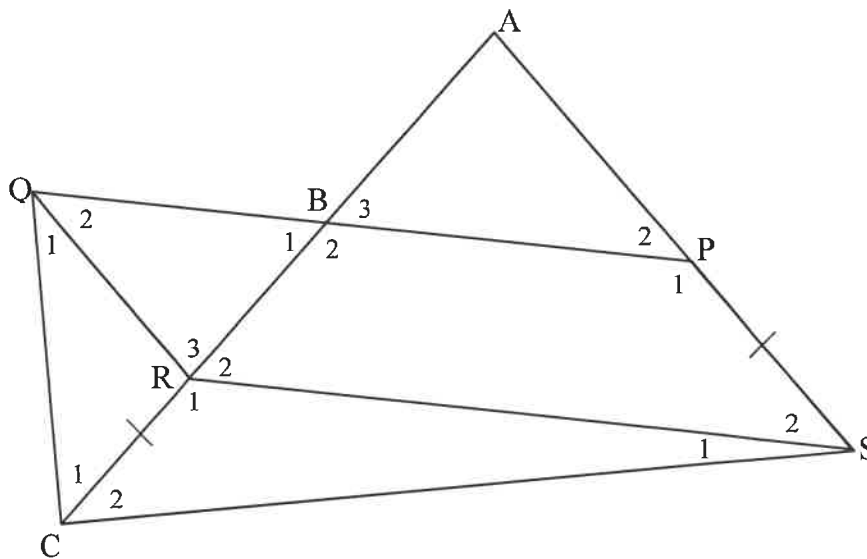
Give reasons for ALL geometry statements in QUESTIONS 7 and 8.

QUESTION 7

7.1 Complete the statement so that it is TRUE:

The line drawn from the midpoint of the one side of a triangle, parallel to the second side, ... (1)

7.2 ACS is a triangle. P is a point on AS and R is a point on AC such that PSRQ is a parallelogram. PQ intersects AC at B such that B is the midpoint of AR. QC is joined. Also, $CR = PS$, $\hat{C}_1 = 50^\circ$ and $BP = 60$ mm.



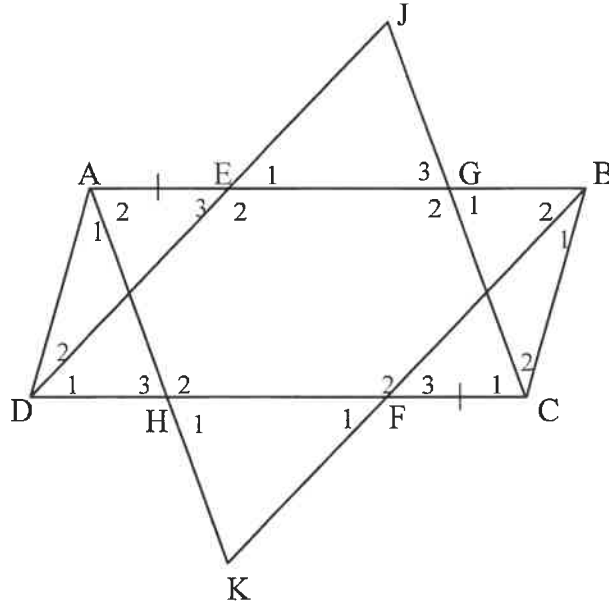
7.2.1 Calculate the size of \hat{A} . (5)

7.2.2 Determine the length of QP. (3)

[9]

QUESTION 8

8.1 ABCD is a parallelogram. E and F are points on AB and DC respectively such that AE = CF. DE is produced to J and CJ is drawn. BF is produced to K and AK is drawn.

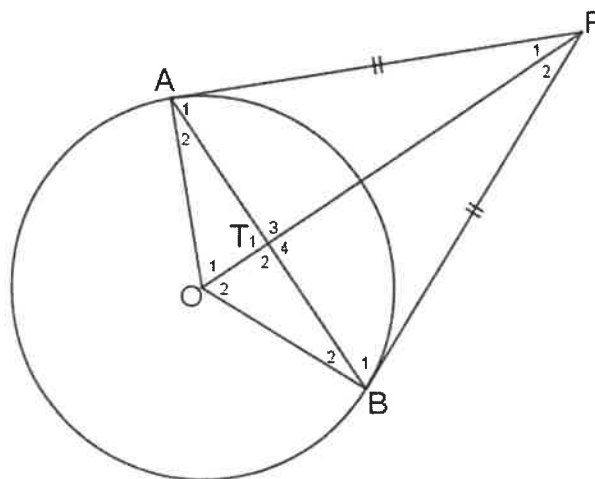


Prove that:

8.1.1 $DJ \parallel BK$ (5)

8.1.2 $\hat{E}_1 = \hat{F}_1$ (4)

8.2 In the diagram below O is the centre of the circle. A and B lie on the circumference of the circle. $AP = BP$.



Prove that:

8.2.1 $AT = BT$ (5)

8.2.2 $\hat{O}TA = 90^\circ$ (1)
[15]

TOTAL: 100

NAME OF LEARNER: <i>NAAM VAN LEERDER:</i>	
CLASS: <i>KLAS:</i>	

**NATIONAL SENIOR CERTIFICATE
*NASIONALE SENIOR SERTIFIKAAT***

MATHEMATICS P2/*WISKUNDE V2*

GRADE/*GRAAD* 10

NOVEMBER 2018

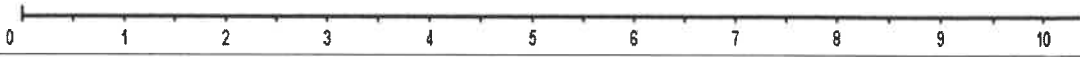
<p>SPECIAL ANSWER BOOK <i>SPESIALE ANTWOORDEBOEK</i></p>

QUESTION <i>VRAAG</i>	MARK <i>PUNT</i>			INITIAL <i>PARAAF</i>	MODERATION <i>MODERERING</i>			INITIAL <i>PARAAF</i>
1								
2								
3								
4								
5								
6								
7								
8								
TOTAL <i>TOTAAL</i> (100)								

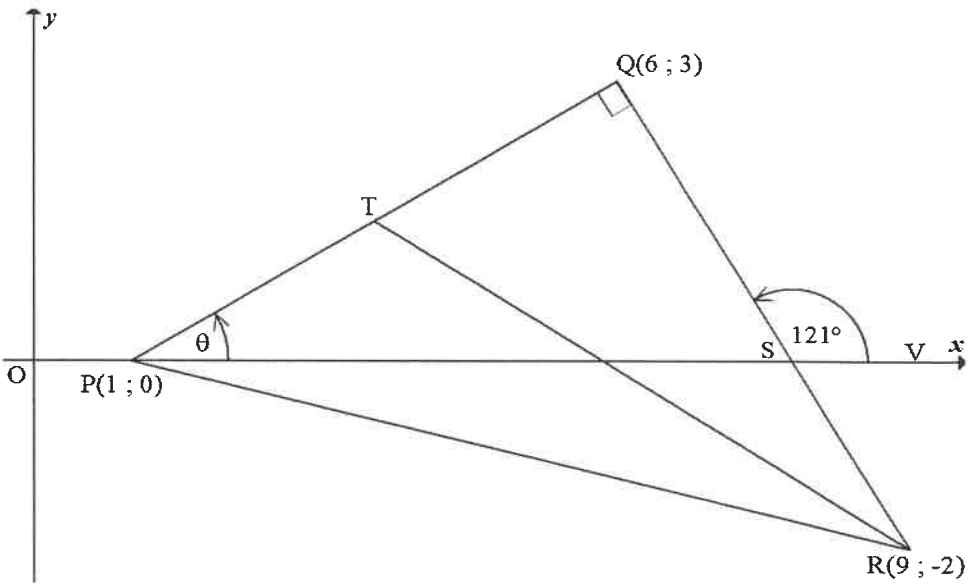
**This answer book consists of 12 pages.
*Hierdie antwoordeboek bestaan uit 12 bladsye.***

QUESTION/VRAAG 1

	Solution/Oplissing	Marks Punte																								
1.1	<table border="1"> <thead> <tr> <th>MARKS OBTAINED/ PUNTE BEHAAL</th> <th>FREQUENCY/ FREKWENSIE</th> </tr> </thead> <tbody> <tr><td>0</td><td></td></tr> <tr><td>1</td><td></td></tr> <tr><td>2</td><td></td></tr> <tr><td>3</td><td></td></tr> <tr><td>4</td><td></td></tr> <tr><td>5</td><td></td></tr> <tr><td>6</td><td></td></tr> <tr><td>7</td><td></td></tr> <tr><td>8</td><td></td></tr> <tr><td>9</td><td></td></tr> <tr><td>10</td><td></td></tr> </tbody> </table>	MARKS OBTAINED/ PUNTE BEHAAL	FREQUENCY/ FREKWENSIE	0		1		2		3		4		5		6		7		8		9		10		(2)
	MARKS OBTAINED/ PUNTE BEHAAL	FREQUENCY/ FREKWENSIE																								
	0																									
	1																									
	2																									
	3																									
	4																									
	5																									
	6																									
	7																									
	8																									
	9																									
	10																									
1.2		(1)																								
1.3.1		(2)																								
1.3.2		(3)																								

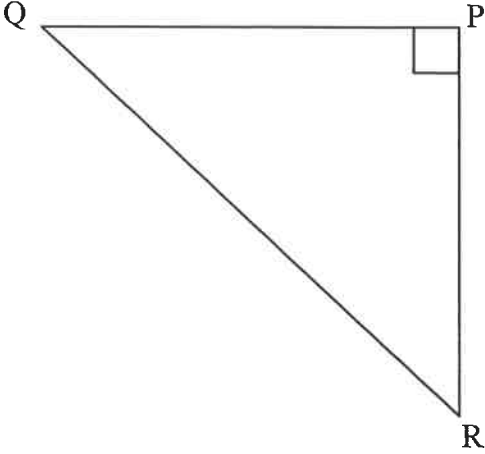
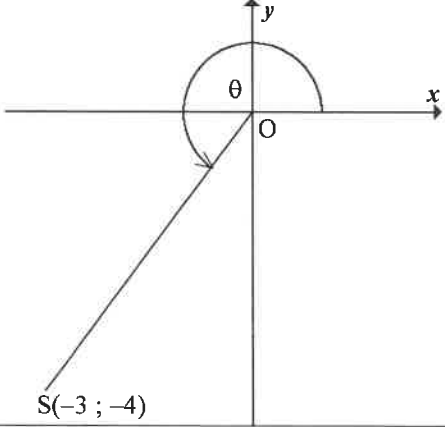
1.4		(3)
1.5		(3)
		
		[14]

QUESTION/VRAAG 2

<p>Solution/Oplissing</p> 		<p>Marks Punte</p>
2.1.1		(2)
2.1.2		(2)

2.1.3		(2)
2.2.1		(3)
2.2.2		(2)
2.2.3		(3)
2.3		(3)
	[17]	

QUESTION/VRAAG 3

	Solution/Oplissing	Marks Punte
		
3.1.1		
		(1)
3.1.2		
		(1)
3.2		
3.2.1		
		(2)
3.2.2		
		(3)

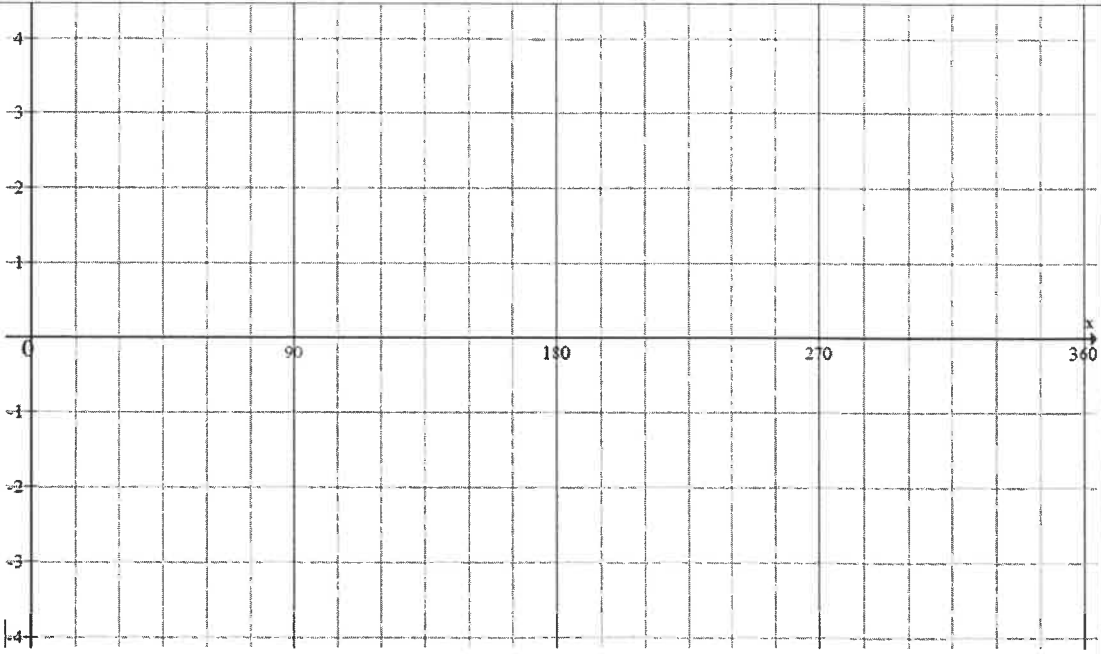
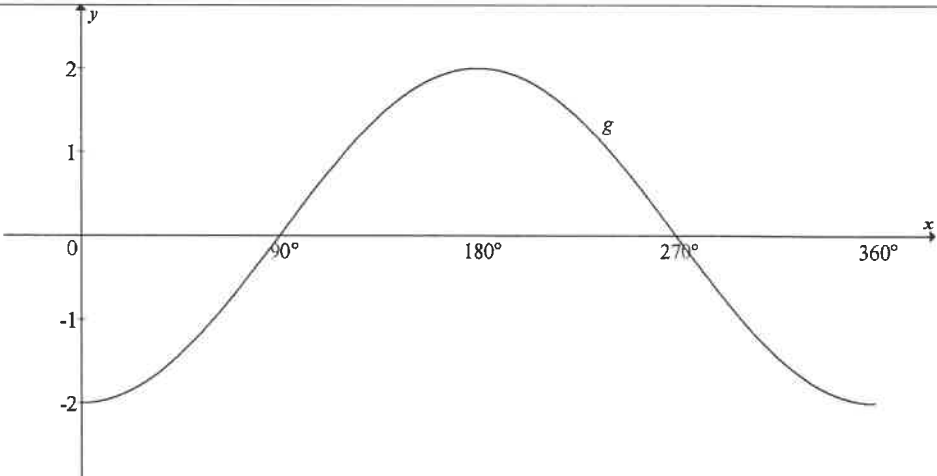
3.3		
		(4)
		[11]

QUESTION/VRAAG 4

	Solution/Oplissing	Marks Punte
	<p>The diagram shows a right-angled triangle ABE with the right angle at A. Point C is on BE such that $AC \perp CE$. Point D is on CE such that $AD \perp DE$. The length of BC is 20, and the length of AD is 60. The angle BAC is 30°.</p>	
4.1.1		(2)
4.1.2		(2)
4.1.3		(3)

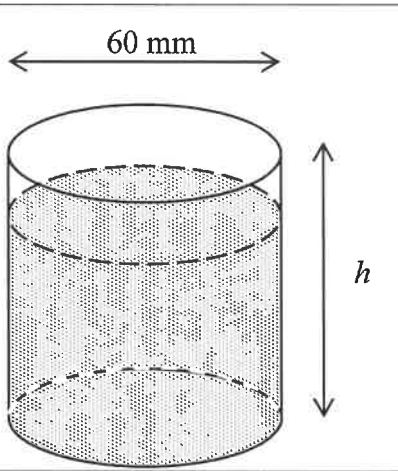
4.2.1		(2)
4.2.2		(3)
4.2.3		(3)
		[15]

QUESTION/VRAAG 5

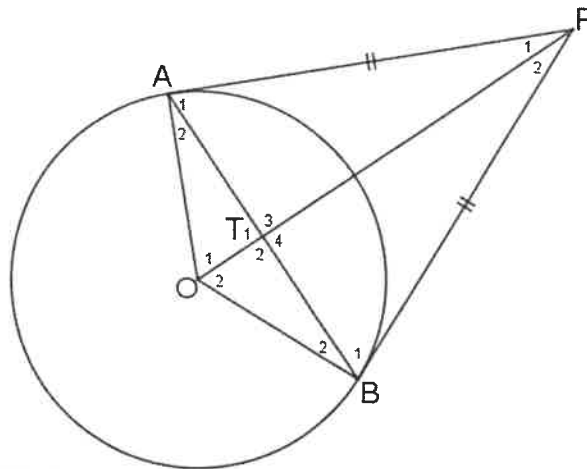
	Solution/Oplissing	Marks Punte
5.1.1		
5.1.2 (a)		(3)
5.1.2 (b)		(1)
5.2		
5.2.1		(2)
5.2.2		(1)

5.2.3		(2)
5.2.4		(2)
		[12]

QUESTION/VRAAG 6

	Solution/Oplissing	Marks Punte
	 <p>A diagram of a cylinder. A horizontal double-headed arrow above the top circular face is labeled "60 mm". A vertical double-headed arrow to the right of the cylinder is labeled "h". The cylinder is shaded with a stippled pattern.</p>	
6.1		(3)
6.2		(4)
		[7]

8.2



8.2.1

8.2.2

(5)

(1)

[15]

TOTAL/TOTAAL: 100



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE/
*NATIONALE
SENIOR SERTIFIKAAT***

GRADE/*GRAAD* 10

MATHEMATICS P2/*WISKUNDE V2*

NOVEMBER 2018

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 100

**These marking guidelines consist of 13 pages.
*Hierdie nasienriglyne bestaan uit 13 bladsye.***

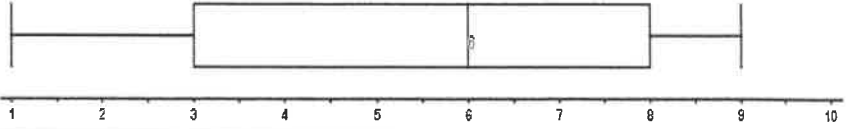
NOTE:

- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer.
- Consistent accuracy applies to ALL aspects of the marking guidelines.
- Assuming values/answers in order to solve a problem is unacceptable.

LET WEL:

- As 'n kandidaat 'n vraag TWEE keer beantwoord het, sien slegs die EERSTE poging na.
- As 'n kandidaat 'n antwoord deurgehaal en nie oorgedoen het nie, sien die deurgehaalde antwoord na.
- Volgehoue akkuraatheid is op ALLE aspekte van die nasienriglyne van toepassing.
- Dit is onaanvaarbaar om waardes/antwoorde te veronderstel om 'n probleem op te los.

QUESTION/VRAAG 1

1.1	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Marks/Punte</th> <th style="width: 50%;">Frequency/Frekwensie</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">0</td><td style="text-align: center;">0</td></tr> <tr><td style="text-align: center;">1</td><td style="text-align: center;">3</td></tr> <tr><td style="text-align: center;">2</td><td style="text-align: center;">4</td></tr> <tr><td style="text-align: center;">3</td><td style="text-align: center;">5</td></tr> <tr><td style="text-align: center;">4</td><td style="text-align: center;">3</td></tr> <tr><td style="text-align: center;">5</td><td style="text-align: center;">6</td></tr> <tr><td style="text-align: center;">6</td><td style="text-align: center;">0</td></tr> <tr><td style="text-align: center;">7</td><td style="text-align: center;">7</td></tr> <tr><td style="text-align: center;">8</td><td style="text-align: center;">9</td></tr> <tr><td style="text-align: center;">9</td><td style="text-align: center;">5</td></tr> <tr><td style="text-align: center;">10</td><td style="text-align: center;">0</td></tr> </tbody> </table>	Marks/Punte	Frequency/Frekwensie	0	0	1	3	2	4	3	5	4	3	5	6	6	0	7	7	8	9	9	5	10	0	<p>2 marks: all 11 values correct</p> <p>1 mark: 5 – 10 values correct</p> <p>0 marks: 0 – 4 values correct</p> <p style="text-align: right;">(2)</p>
Marks/Punte	Frequency/Frekwensie																									
0	0																									
1	3																									
2	4																									
3	5																									
4	3																									
5	6																									
6	0																									
7	7																									
8	9																									
9	5																									
10	0																									
1.2	42 learners/leerders	✓ answer/antwoord (1)																								
1.3.1	Range/Variasiewydte $= 9 - 1$ $= 8$ <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-left: 100px;">Answer only: 2/2 marks</div>	✓ max = 9 and min = 1 ✓ answer/antwoord (2)																								
1.3.2	$\bar{x} = \frac{(1 \times 3) + (2 \times 4) + (3 \times 5) + (4 \times 3) + (5 \times 6) + (7 \times 7) + (8 \times 9) + (9 \times 5)}{42}$ $= \frac{234}{42}$ $= 5,57$ <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-left: 100px;">Answer only: 3/3 marks</div>	✓ sum of (frequencies × values) ✓ ÷ n ✓ answer/antwoord (3)																								
1.4	Position of the median/Posisie van die mediaan = $\frac{n+1}{2}$ $= 21,5^{th/de}$ position/posisie $Q_2 = \frac{5+7}{2}$ $= 6$ <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-left: 100px;">Answer only: 3/3 marks</div>	✓ identification of 5 and 7 ✓ $\frac{5+7}{2}$ ✓ answer/antwoord (3)																								
1.5		✓ Q ₁ ✓ Q ₃ ✓ rest of the box (3)																								
		[14]																								

QUESTION/VRAAG 2

<p>2.1.1</p>	$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(1 - 6)^2 + (0 - 3)^2}$ $= \sqrt{25 + 9}$ $= \sqrt{34}$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">Answer only: 2/2 marks</div>	<p>✓ subst./verv.</p> <p>✓ answer/antwoord</p> <p style="text-align: right;">(2)</p>
<p>2.1.2</p>	$m_{PQ} = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{3 - 0}{6 - 1}$ $= \frac{3}{5}$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">Answer only: 2/2 marks</div>	<p>✓ subst./verv.</p> <p>✓ answer/antwoord</p> <p style="text-align: right;">(2)</p>
<p>2.1.3</p>	$x_T = \frac{x_1 + x_2}{2}$ $= \frac{1 + 6}{2}$ $= \frac{7}{2}$ $T\left(\frac{7}{2}; \frac{3}{2}\right)$ $y_T = \frac{y_1 + y_2}{2}$ $= \frac{0 + 3}{2}$ $= \frac{3}{2}$	<p>✓ x-value/x-waarde</p> <p>✓ y-value/y-waarde</p> <p style="text-align: right;">(2)</p>
<p>2.2.1</p>	$QR = QP = \sqrt{34}$ $QT = \frac{1}{2}PQ$ <p style="text-align: center;">OR/OF</p> $QT = \frac{1}{2}\sqrt{34}$ $QT = \sqrt{\left(\frac{7}{2} - 6\right)^2 + \left(\frac{3}{2} - 3\right)^2}$ $QT = \frac{\sqrt{34}}{2}$ $\text{Area of } \Delta QTR = \frac{1}{2}(QR)(QT)$ $= \frac{1}{2}(\sqrt{34})\left(\frac{1}{2}\sqrt{34}\right)$ $= \frac{17}{2} = 8,5 \text{ sq units/eenhede}$ <p>OR/OF</p>	<p>✓ $QR = \sqrt{34}$</p> <p>✓ $QT = \frac{1}{2}\sqrt{34}$</p> <p>✓ answer/antwoord</p> <p style="text-align: right;">(3)</p>

	$QR = QP = \sqrt{34}$ $\text{Area of } \Delta QTR = \frac{1}{2} \text{Area of } \Delta QPR$ $= \frac{1}{2} \left(\frac{1}{2} \cdot QR \cdot QP \right)$ $= \frac{1}{2} \times \frac{1}{2} \cdot (\sqrt{34}) (\sqrt{34})$ $= \frac{17}{2} \text{ sq units/eenhede}$	<p>✓ $QR = \sqrt{34}$</p> <p>✓ $\frac{1}{2} \sqrt{34}$</p> <p>✓ answer/antwoord (3)</p>
2.2.2	$\theta = 121^\circ - 90^\circ \quad (\text{ext } \angle \Delta / \text{buitehoek van } \Delta)$ $= 31^\circ$ <p>OR/OF</p> $\widehat{QSP} = 59^\circ \quad (\angle \text{ str line/hoek op reguitlyn})$ $\theta = 31^\circ \quad (\angle \text{ sum } \Delta / \text{binnehoek van } \Delta)$	<p>✓ reason</p> <p>✓ answer/antwoord (2)</p> <p>✓ \angle sum Δ / binnehoek van Δ</p> <p>✓ answer/antwoord (2)</p>
2.2.3	$\cos \theta = \frac{PQ}{PS} \qquad \sin \widehat{QSP} = \frac{PQ}{PS}$ $\cos 31^\circ = \frac{\sqrt{34}}{PS} \qquad \text{OR/OF} \qquad \sin 59^\circ = \frac{\sqrt{34}}{PS}$ $PS = \frac{\sqrt{34}}{\cos 31^\circ} \qquad PS = \frac{\sqrt{34}}{\sin 59^\circ}$ $PS = 6,80 \qquad PS = 6,80$ <p>S(6,8 + 1; 0)</p> <p>S(7,8; 0)</p> <p>OR/OF</p> $m_{QR} = -\frac{5}{3}$ $\frac{3-0}{6-x} = -\frac{5}{3}$ $9 = -30 + 5x$ $x = 7,8$ <p>OR/OF</p> $m_{QR} = -\frac{5}{3}$ <p>Equation of QR</p> $y - 3 = -\frac{5}{3}(x - 6)$ $y = -\frac{5}{3}x + 13$ $0 = -\frac{5}{3}x + 13$ $x = 7,8$ <p>S(7,8; 0)</p>	<p>✓ $\cos \theta = \frac{PQ}{PS}$ or/of</p> <p>$\sin \widehat{QSP} = \frac{PQ}{PS}$</p> <p>✓ x-value/x-waarde</p> <p>✓ y-value/y-waarde (3)</p> <p>✓ $m_{QR} = m_{QS}$</p> <p>✓ $y = 0$</p> <p>✓ x-value/x-waarde (3)</p> <p>✓ equation of QR/verhouding van QR</p> <p>✓ $y = 0$</p> <p>✓ x-value/x-waarde</p>

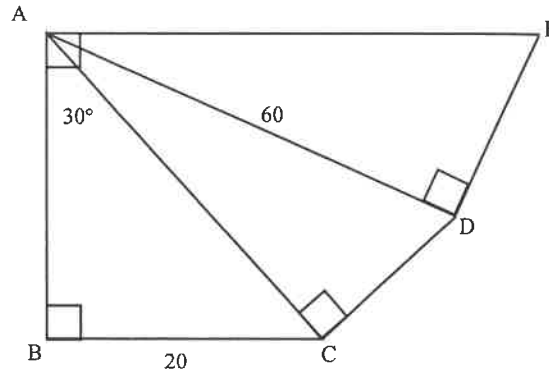
		(3)
2.3	$m_{QR} = \frac{3 - (-2)}{6 - (9)}$ $= -\frac{5}{3}$ $m_{T\text{-midpoint}} = m_{QR} \text{ (Midpoint Theorem)}$ $m_{T\text{-midpoint}} = -\frac{5}{3}$ <p>OR/OF</p> $\text{Midpoint PR} \left(\frac{9+1}{2}; \frac{-2+0}{2} \right)$ $\text{Midpoint PR}(5; -1)$ $m_{T \text{ and/en } PR} = \frac{\frac{3}{2} - (-1)}{\frac{7}{2} - (5)}$ $= -\frac{5}{3}$	<p>✓ m_{QR}</p> <p>✓ $m_{T\text{-midpoint}} = m_{QR}$</p> <p>✓ Midpoint theorem/ Middelpunt-stelling (3)</p> <p>✓ midpoint of PR</p> <p>✓ subst</p> <p>✓ answer (3)</p>
		[17]

QUESTION/VRAAG 3

3.1.1	$\tan(90^\circ - R) = \frac{PR}{QP}$ OR/OF $\frac{q}{r}$	<p>✓ answer/antwoord (1)</p>
3.1.2	<p>sec Q</p> <p>OR/OF</p> <p>cosec R</p> <p>OR/OF</p> <p>cosec (90° – Q)</p> <p>OR/OF</p> <p>sec (90° – R)</p>	<p>✓ answer/antwoord (1)</p> <p>✓ answer/antwoord (1)</p> <p>✓ answer/antwoord (1)</p> <p>✓ answer/antwoord (1)</p>
3.2.1	$OS = \sqrt{(-3)^2 + (-4)^2}$ (Pythagoras) = 5 <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 20px;">Answer only: 2/2 marks</div>	<p>✓ subst./verv.</p> <p>✓ answer/antwoord (2)</p>

<p>3.2.2</p>	$\sec\theta + \sin^2\theta$ $= -\frac{5}{3} + \left(-\frac{4}{5}\right)^2$ $= -\frac{5}{3} + \frac{16}{25}$ $= -\frac{77}{75}$	<p>✓ $-\frac{5}{3}$</p> <p>✓ $-\frac{4}{5}$</p> <p>✓ answer/antwoord (3)</p>
<p>3.3</p>	$\frac{\operatorname{cosec} 45^\circ}{\sin 90^\circ \cdot \tan 60^\circ}$ $= \frac{1}{\sin 45^\circ}$ $(1) \cdot (\sqrt{3})$ $= \frac{2}{\sqrt{2}} \div \sqrt{3}$ $= \frac{2}{\sqrt{2}} \times \frac{1}{\sqrt{3}}$ $= \frac{2}{\sqrt{6}}$ <p>OR/OF</p> $\frac{\operatorname{cosec} 45^\circ}{\sin 90^\circ \cdot \tan 60^\circ}$ $= \frac{1}{\sin 45^\circ}$ $(1) \cdot (\sqrt{3})$ $= \frac{\sqrt{2}}{\sqrt{3}}$	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>If the answer is left as $\frac{\sqrt{6}}{3}$ and no other rationalisation working is shown: max 3/4 marks</p> </div> <p>✓ $\frac{2}{\sqrt{2}}$</p> <p>✓ 1</p> <p>✓ $\sqrt{3}$</p> <p>✓ answer/antwoord (4)</p> <p>✓ $\sqrt{2}$</p> <p>✓ 1</p> <p>✓ $\sqrt{3}$</p> <p>✓ answer/antwoord (4)</p>
<p>[11]</p>		

QUESTION/VRAAG 4



<p>4.1.1</p>	$\sin 30^\circ = \frac{20}{AC}$ $AC = \frac{20}{\sin 30^\circ}$ $AC = 40$ <p>OR/OF</p> $\cos 60^\circ = \frac{20}{AC}$ $AC = \frac{20}{\cos 60^\circ}$ $AC = 40$	$\text{cosec } 30^\circ = \frac{AC}{20}$ $AC = \frac{20}{\sin 30^\circ}$ $AC = 40$ <p>OR/OF</p> $\sec 60^\circ = \frac{AC}{20}$ $AC = \frac{20}{\cos 60^\circ}$ $AC = 40$	$\checkmark \sin 30^\circ = \frac{20}{AC} \text{ or}$ $\text{cosec } 30^\circ = \frac{AC}{20}$ <p>\checkmark answer/antwoord (2)</p> $\checkmark \cos 60^\circ = \frac{20}{AC} \text{ or}$ $\sec 60^\circ = \frac{AC}{20}$ <p>\checkmark answer/antwoord (2)</p>
<p>4.1.2</p>	$\cos \hat{CAD} = \frac{AC}{60}$ $\cos \hat{CAD} = \frac{40}{60}$ $\hat{CAD} = 48,19^\circ$	$\checkmark \cos \hat{CAD} = \frac{AC}{60}$ <p>\checkmark answer/antwoord (2)</p>	$\checkmark \cos \hat{CAD} = \frac{AC}{60}$ <p>\checkmark answer/antwoord (2)</p>
<p>4.1.3</p>	$\hat{DAE} = 90^\circ - (30^\circ + \hat{CAD})$ $\hat{DAE} = 90^\circ - (30^\circ + 48,19^\circ)$ $= 11,81^\circ$ $\tan 11,81^\circ = \frac{DE}{60}$ $DE = 60 \tan 11,81^\circ$ $DE = 12,55$	$\checkmark \hat{DAE} = 11,8^\circ$ $\checkmark \tan 11,81^\circ = \frac{DE}{60}$ <p>\checkmark answer/antwoord (3)</p>	$\checkmark \hat{DAE} = 11,8^\circ$ $\checkmark \tan 11,81^\circ = \frac{DE}{60}$ <p>\checkmark answer/antwoord (3)</p>

4.2.1	$\tan x = 2,01$ $x = 63,5^\circ$	If the rounding is incorrect: max 1/2 marks	$\checkmark\checkmark$ answer/antwoord (2)
4.2.2	$5 \cos x + 2 = 4$ $5 \cos x = 2$ $\cos x = \frac{2}{5}$ $x = 66,4218\dots^\circ$ $x = 66,4^\circ$		$\checkmark 5 \cos x = 2$ $\checkmark \cos x = \frac{2}{5}$ \checkmark answer/antwoord (3)
4.2.3	$\frac{\operatorname{cosec} x}{2} = 3$ $\operatorname{cosec} x = 6$ $\frac{1}{\sin x} = 6$ $\sin x = \frac{1}{6}$ $x = 9,6^\circ$		$\checkmark \operatorname{cosec} x = 6$ $\checkmark \sin x = \frac{1}{6}$ \checkmark answer/antwoord (3)
			[15]

QUESTION/VRAAG 5

5.1.1		<ul style="list-style-type: none"> ✓ Tan graph passing through (45°; -3) or (135°; 3) or (225°; -3) or (315°; 3) ✓ x-intercepts/ x-snyppunte ✓ both asymptotes/ albei asimptote <p style="text-align: right;">(3)</p>
5.1.2(a)	180°	✓ answer/antwoord (1)
5.1.2(b)	$h(x) = 3 \tan x$	✓ answer/antwoord (1)
5.2.1	$a = -2$ $b = 1$	✓ a ✓ b (2)
5.2.2	$90^\circ < x < 270^\circ$ OR/OF $x \in (90^\circ ; 270^\circ)$	✓ answer/antwoord (1)
5.2.3	$-4 \leq y \leq 0$ OR/OF $y \in [-4 ; 0]$	✓ critical values/kritieke waardes ✓ notation/notasie (2)
5.2.4	$-2(\cos 0^\circ + \cos 1^\circ + \cos 2^\circ + \dots + \cos 358^\circ + \cos 359^\circ + \cos 360^\circ)$ $= -2(1)$ $= -2$	✓✓ answer/antwoord (2)
		[12]

QUESTION/VRAAG 6

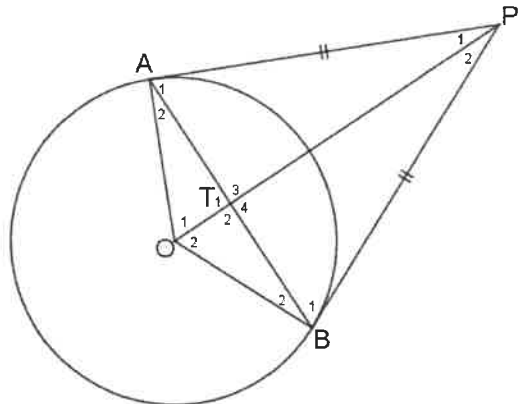
6.1	$r = 3 \text{ cm}$ $V = \pi r^2 h$ $117\pi = \pi(3)^2 h$ $h = 13 \text{ cm}$	<ul style="list-style-type: none"> ✓ $r = 3 \text{ cm}$ ✓ subst./verv. ✓ answer/antwoord <p style="text-align: right;">(3)</p>
6.2	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> TSA/TBO $= \pi r^2 + 2\pi r h$ $= \pi(3)^2 + 2\pi(3)(13) \times 0,8$ $= 224,31 \text{ cm}^2$ </div> <div style="width: 10%; text-align: center;">OR/OF</div> <div style="width: 45%;"> TSA/TBO $= \pi r^2 + 2\pi r h$ $= \pi(3)^2 + 2\pi(3)(10,4)$ $= 224,31 \text{ cm}^2$ </div> </div>	<ul style="list-style-type: none"> ✓ $\pi r^2 + 2\pi r h$ ✓ subst./verv. ✓ 80% of height/van hoogte ✓ answer <p style="text-align: right;">(4)</p>
		[7]

QUESTION/VRAAG 7

7.1	Bisects the third side/ <i>Halveer die derde sy</i>	✓ answer/ <i>antwoord</i> (1)
7.2		
7.2.1	<p>CR = PS (given) PS = QR (opp sides //m =) CR = QR $\hat{Q}_1 = \hat{C}_1 = 50^\circ$ (\angles opp = sides) $\hat{R}_3 = 100^\circ$ (ext \angle Δ) $\hat{A} = 100^\circ$ (alt \angles; QR AS)</p>	<p>✓ CR = QR ✓ $\hat{Q}_1 = \hat{C}_1 = 50^\circ$ ✓ $\hat{R}_3 = 100^\circ$ ✓ $\hat{A} = 100^\circ$ ✓ Reason (5)</p>
7.2.2	<p>AP = PS (line from midpoint // to one side of triangle) RS = 120 (midpoint theorem) QP = 120 (opp sides //m =)</p> <p>OR/OF</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">Answer only: 1/3 marks</div> <p>In ΔQBR and ΔPBA</p> <ol style="list-style-type: none"> 1. $\hat{R}_3 = \hat{A}$ (proven) or (alt \angles; QR QS) 2. $\hat{B}_1 = \hat{B}_3$ (vert opp \angles) 3. BR = BA (given) <p>$\Delta QBR \equiv \Delta PBA$ ($\angle$$\angle$S) QB = BP = 60 (\equiv Δs) QP = 120</p>	<p>✓ AP = PS ✓ Reason ✓ QP = 120 (3)</p> <p>✓ $\Delta QBR \equiv \Delta PBA$ ✓ QB = BP ✓ QP = 120 (3)</p>
		[9]

QUESTION/VRAAG 8		
8.1.1	<p> $AB = DC$ $AE + EB = DF + FC$ (opp sides of a parallelogram equal) $AE = FC$ (given) $\therefore EB = DF$ $DF \parallel EB$ (opp sides parallelogram parallel) $EDFB$ is a parallelogram (one pair opp sides = and \parallel) $\therefore ED \parallel FB$ $\therefore DJ \parallel BK$ </p> <p>OR/OF</p> <p>In $\triangle AED$ and $\triangle CFB$</p> <ol style="list-style-type: none"> $FC = AE$ (given) $\hat{C}_1 + \hat{C}_2 = \hat{A}_1 + \hat{A}_2$ (opp $\angle \parallel m =$) $BC = AD$ (opp sides $\parallel m =$) <p>$\triangle AED \equiv \triangle CFB$ (S\angleS)</p> <p>$\hat{E}_3 = \hat{F}_3$ ($\equiv \Delta s$)</p> <p>$\hat{E}_3 = \hat{D}_1$ (alt $\angle s$; $AB \parallel DC$)</p> <p>$\hat{F}_3 = \hat{D}_1$</p> <p>$DJ \parallel BK$ (corres $\angle s =$)</p>	<p> \checkmark S/R \checkmark $EB = DF$ \checkmark S/R \checkmark R \checkmark $ED \parallel FB$ </p> <p>(5)</p> <p> \checkmark $\triangle AED \equiv \triangle CFB$ \checkmark $\hat{E}_3 = \hat{F}_3$ \checkmark S/R \checkmark $\hat{F}_3 = \hat{D}_1$ \checkmark R </p> <p>(5)</p>

	<p>OR/OF In $\triangle AED$ and $\triangle CFB$ 1. $FC = AE$ (given) 2. $\widehat{C}_1 + \widehat{C}_2 = \widehat{A}_1 + \widehat{A}_2$ (opp \angle m =) 3. $BC = AD$ (opp sides m =) $\triangle AED \equiv \triangle CFB$ (S\angleS) $DE = FB$ ($\equiv \Delta$s) $AB = DC$ $AE + EB = DF + FC$ (opp sides of a parallelogram equal) $AE = CF$ (given) $\therefore EB = DF$ EDFB is a parallelogram (both pairs opp sides =) $DE \parallel FB$ (opp sides m) $DJ \parallel KB$</p>	<p>$\checkmark \triangle AED \equiv \triangle CFB$ $\checkmark DE = FB$ \checkmark S/R $\checkmark EB = DF$ \checkmark Reason</p>
<p>8.1.2</p>	<p>$\widehat{E}_1 = \widehat{D}_1$ (corres. \angle's, AB DC) $\widehat{F}_1 = \widehat{D}_1$ (alt. \angle's, DE FB) $\therefore \widehat{E}_1 = \widehat{F}_1$</p> <p>OR/OF $\widehat{E}_3 = \widehat{D}_1$ (alt. \angle's, AB DC) $\widehat{F}_1 = \widehat{D}_1$ (alt. \angle's, DE FB) $\therefore \widehat{E}_3 = \widehat{F}_1$ $\widehat{E}_3 = \widehat{E}_1$ (vert. opp. \angle's) $\therefore \widehat{E}_1 = \widehat{F}_1$</p> <p>OR/OF $\widehat{E}_1 = \widehat{D}_1$ (corres \angle's, AB DC) $\widehat{F}_3 = \widehat{D}_1$ (corres \angle's, DE FB) $\therefore \widehat{E}_3 = \widehat{F}_1$ $\widehat{F}_3 = \widehat{F}_1$ (vert. opp. \angle's) $\therefore \widehat{E}_1 = \widehat{F}_1$</p> <p>OR/OF EDFB is a parallelogram (proven in 8.1.1) $\widehat{E}_2 = \widehat{F}_2$ (opp \angles m =) $\widehat{E}_1 = \widehat{F}_1$ (\angles on straight line)</p>	<p>\checkmarkS \checkmarkR \checkmarkS \checkmarkR (4)</p> <p>\checkmarkS \checkmarkR \checkmarkS \checkmark S/R (4)</p> <p>\checkmarkS \checkmarkR \checkmarkS \checkmark S/R (4)</p> <p>\checkmarkS \checkmarkR \checkmarkS \checkmarkR (4)</p>

<p>8.2</p>		
<p>8.2.1</p>	<p> $AP = BP$ (given) $OA = OB$ (radii) $OAPB$ is a kite (two pairs adj sides =) $AT = TB$ (one diag of kite bisects the other) OR/OF In $\triangle OAP$ and $\triangle OBP$ 1. $AP = BP$ (given) 2. $OA = OB$ (radii) 3. OP is common $\therefore \triangle OAP \cong \triangle OBP$ (SSS) $\hat{O}_1 = \hat{O}_2$ ($\cong \Delta s$) In $\triangle OAT$ and $\triangle OBT$ 1. $\hat{O}_1 = \hat{O}_2$ ($\cong \Delta s$) 2. $OA = OB$ (radii) 3. OT is common $\therefore \triangle OAT \cong \triangle OBT$ (S\angleS) $AT = TB$ ($\cong \Delta s$) </p> <p> $\hat{P}_1 = \hat{P}_2$ ($\cong \Delta s$) In $\triangle PAT$ and $\triangle PBT$ 1. $\hat{P}_1 = \hat{P}_2$ ($\cong \Delta s$) 2. $AP = PB$ (given) 3. PT is common $\triangle PAT \cong \triangle PBT$ (S\angleS) </p>	<p> ✓ S ✓ $OA = OB$ ✓ $OAPB$ is a kite/'n vlieër ✓ two pairs adj sides = ✓ reason/rede (5) ✓ $AP = BP$ ✓ $OA = OB$ ✓ $\hat{O}_1 = \hat{O}_2$ or $\hat{P}_1 = \hat{P}_2$ ($\cong \Delta s$) ✓ $\therefore \triangle OAT \cong \triangle OBT$ or $\triangle PAT \cong \triangle PBT$ ✓ $\cong \Delta s$ (5) </p>
<p>8.2.2</p>	<p> $\hat{O}TA = 90^\circ$ (properties of a kite) OR/OF $\hat{O}TA = \hat{O}TB$ ($\triangle OTA \cong \triangle OTB$) but: $\hat{O}TA + \hat{O}TB = 180^\circ$ ($\angle s$ on a str.line) $\therefore \hat{O}TA = 90^\circ$ </p>	<p> ✓ R (1) ✓ R (1) </p>
<p>[15]</p>		

TOTAL/TOTAAL: 100