



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 10**

**NOVEMBER 2019**

**MATHEMATICS P2 (EXEMPLAR)**

**MARKS: 100**

**TIME: 2 hours**

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This question paper consists of 9 pages and an answer book of 15 pages.

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**INSTRUCTIONS AND INFORMATION**

Read the following instructions carefully before answering the questions.

1. This question paper consists of 7 questions.
2. Answer ALL the questions in the SPECIAL ANSWER BOOK provided.
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, round off answers to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. Write neatly and legibly.

**QUESTION 1**

- 1.1 A tuck shop at a particular school sells soft drink cans. The economic friendly club of this school collected soft drink cans for recycling for a period of 20 days. The number of cans collected was recorded and the data is given below:

48	50	52	59	60	68	73	76	76	76
78	79	80	81	82	82	84	91	92	98

- 1.1.1 Determine the median of the cans collected. (1)
- 1.1.2 Determine the value of the upper and lower quartiles. (2)
- 1.1.3 Calculate the interquartile (IQR) range of the data. (2)
- 1.1.4 Write down the minimum and maximum value of the data. (1)
- 1.1.5 Represent the 5 number summary on a box and whisker diagram. (3)
- 1.1.6 Comment on the box and whisker diagram. (1)
- 1.2 Telkom conducted a survey regarding the duration of telephone calls made by people in a certain community. The information was then tabulated as indicated below:

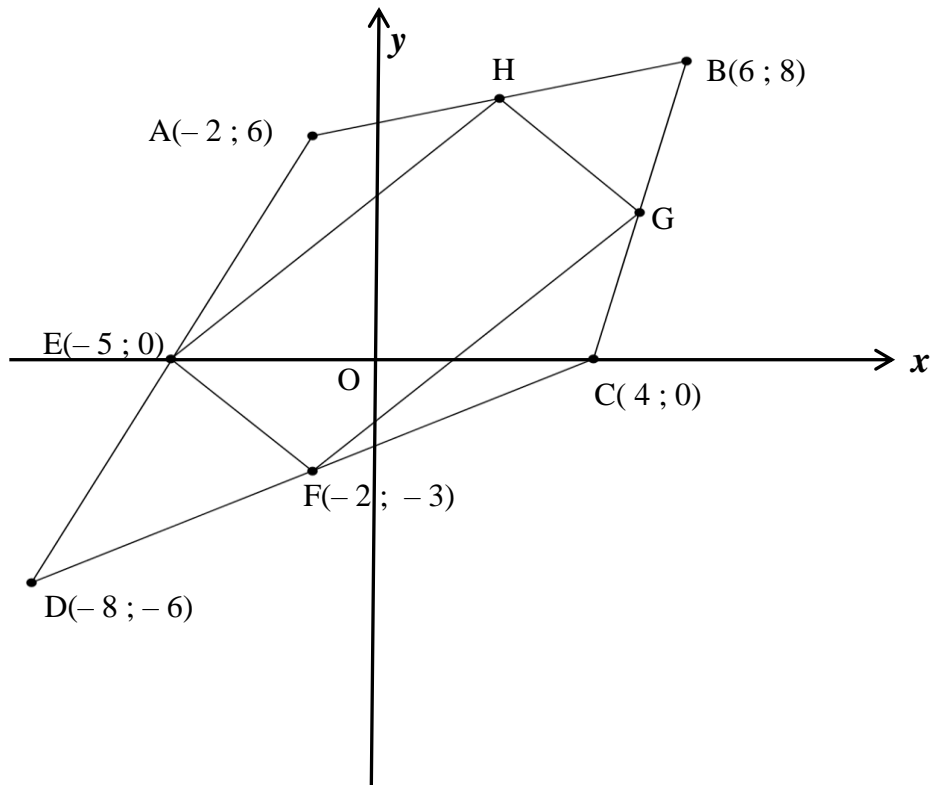
Duration (min)	No of calls ( $f_1$ )	Midpoint ( $x_1$ )	$(f_1) \times (x_1)$
$2 \leq t < 5$	47	3,5	164,5
$5 \leq t < 8$	139	6,5	903,5
$8 \leq t < 11$	211	9,5	2004,5
$11 \leq t < 14$	102	12,5	1275
$14 \leq t < 17$	58	15,5	899
$17 \leq t < 20$	19	<b>A</b>	<b>B</b>

- 1.2.1 Calculate the values of **A** and **B**. (2)
- 1.2.2 Determine the approximate mean for the duration of the telephone calls. (3)
- 1.2.3 In which interval does the 75<sup>th</sup> percentile lie? (2)

**[17]**

## QUESTION 2

In the diagram below, H and G are the midpoints of AB and BC respectively. The coordinates of A(-2 ; 6) , B(6 ; 8) , C(4 ; 0) , D(-8 ; -6) , E (-5 ; 0) and F(-2 ; -3) are given. The diagram is not necessarily drawn to scale.

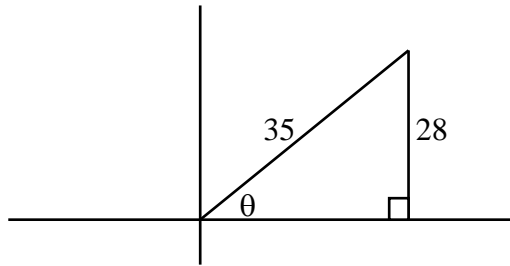


- 2.1 Show by calculation that  $AB = BC$ . (5)
- 2.2 If it is further given that  $AD = DC$ , what type of quadrilateral is ABCD? Motivate your answer. (2)
- 2.3 Determine the coordinates of G and H. (5)
- 2.4 If line BD is drawn and it is also given that  $EH \parallel BD$ , prove that  $\triangle AEH \parallel \triangle CDB$ . (4)

[16]

**QUESTION 3**

3.1 In the diagram below, the value of  $\sin \theta = \frac{28}{35}$



3.1.1 Without calculating the value of  $\theta$ , determine the value of  $\cos \theta$ . (3)

3.1.2 Hence, or otherwise, prove that:  $\sin^2 \theta + \cos^2 \theta = 1$  (3)

3.2 If  $37 \sin \theta + 35 = 0$  and  $\tan \theta > 0$ , determine with the help of a diagram, the value of  $24 \sec \theta - 70 \cot \theta$ . (6)

3.3 Solve for  $x$ , if  $x \in [0^\circ; 90^\circ]$ . Give your answer correct to 1 decimal place.

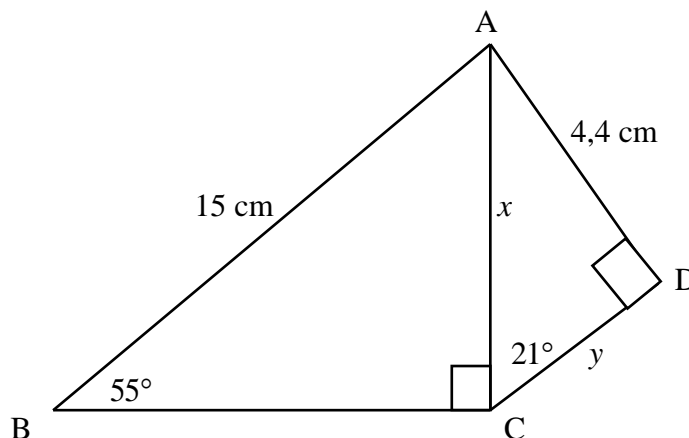
3.3.1  $8 \cos(x+10^\circ) = 5$  (3)

3.3.2  $\operatorname{cosec} 2x = 2$  (3)

3.4 Prove the following without the use of a calculator:

$$\frac{\sin 30^\circ \times \tan 60^\circ}{\tan 30^\circ \times \cos 60^\circ} = 3 \quad (5)$$

3.5 In the diagram below,  $\hat{A}CB = 90^\circ$ ,  $AB = 15 \text{ cm}$ ,  $AD = 4,4 \text{ cm}$ ,  $\hat{B} = 55^\circ$ ,  $\hat{A}CD = 21^\circ$  and  $\hat{A}DC = 90^\circ$ .



Determine the value of:

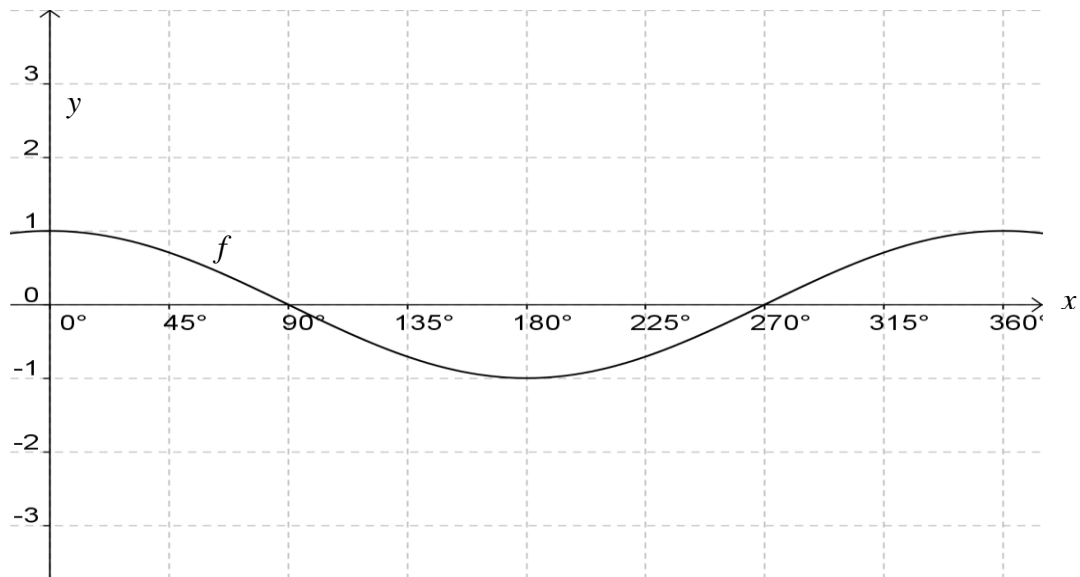
3.5.1  $x$  (2)

3.5.2  $y$  (2)

[27]

## QUESTION 4

In the diagram below, the graph of  $f(x) = \cos x$  is drawn for  $x \in [0^\circ; 360^\circ]$



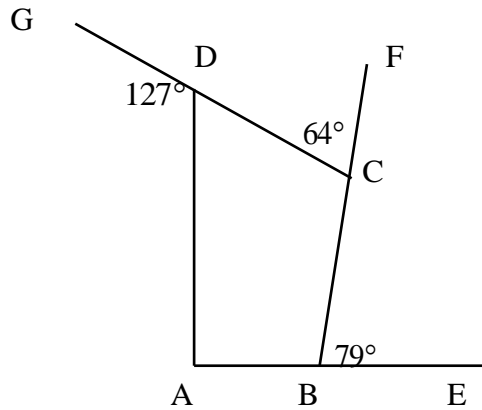
- 4.1 Sketch on the same axis the graph of  $g(x) = 2\sin x$  for  $x \in [0^\circ; 360^\circ]$ . (3)
- 4.2 Write down the period of  $g$ . (1)
- 4.3 Write down the range of  $m(x)$  if  $m(x) = -3f(x) + 1$ . (3)
- 4.4 For which value(s) of  $x$  is  $g$  decreasing? (2)
- 4.5 For which value(s) of  $x$  is  $f(x) \times g(x) < 0$ ? (3)

**[12]**

Give reasons for all statements and calculations in QUESTIONS 5 and 6.

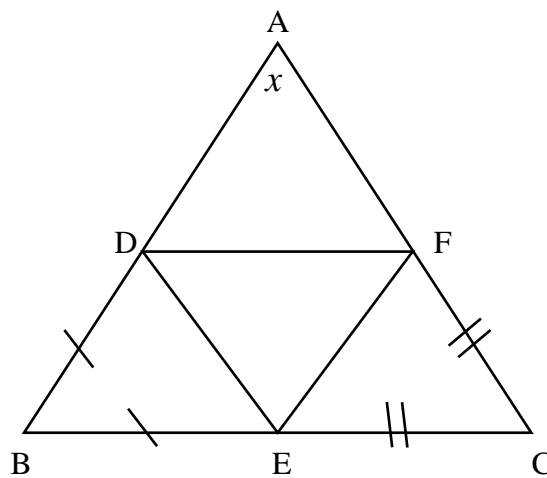
QUESTION 5

5.1 The sides of a quadrilateral ABCD are produced such that AB is produced to E, BC is produced to F and CD is produced to G.



If  $\hat{EBC} = 79^\circ$ ,  $\hat{FCD} = 64^\circ$  and  $\hat{GDA} = 127^\circ$ , calculate the value of  $\hat{BAD}$ . (4)

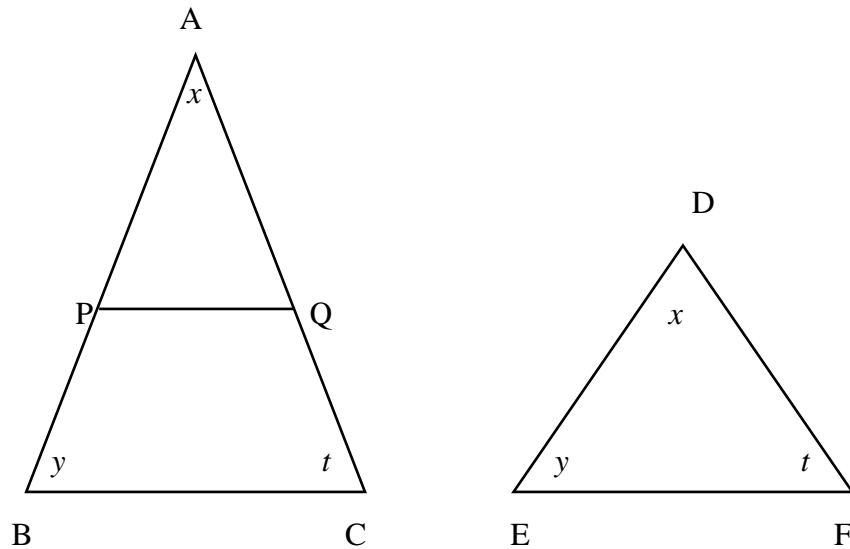
5.2 In  $\triangle ABC$ , D, E and F lie on sides AB, BC and CA respectively, so that  $BD = BE$  and  $CE = CF$ .



If  $\hat{A} = x$ , showing all calculations, determine the size of  $\hat{DEF}$  in terms of  $x$ . (4)  
[8]

## QUESTION 6

6.1 In the diagram below,  $\triangle ABC \parallel \triangle DEF$ . ( $\hat{A} = \hat{D} = x$ ,  $\hat{B} = \hat{E} = y$  and  $\hat{C} = \hat{F} = t$ ).

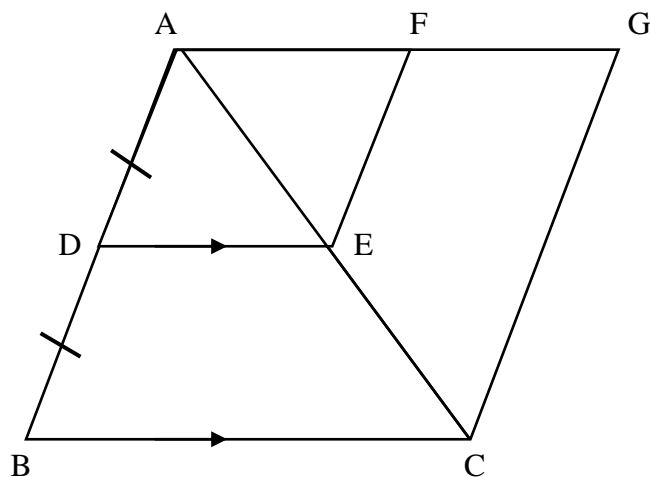


6.1.1 If it is further given that  $AP = DE$  and  $AQ = DF$ , prove that  $\triangle APQ \cong \triangle DEF$ . (3)

6.1.2 Hence, or otherwise, prove that  $PQ \parallel BC$ . (3)

6.1.3 If it is further given that  $AP = 3,5$  cm,  $PB = 4$  cm and  $AC = 8$ cm, determine the length of  $DF$ . (4)

6.2 In the diagram below,  $D$  is the midpoint of  $AB$  and  $DE \parallel BC$ .



6.2.1 Give a reason why  $E$  is the midpoint of  $AC$ . (1)

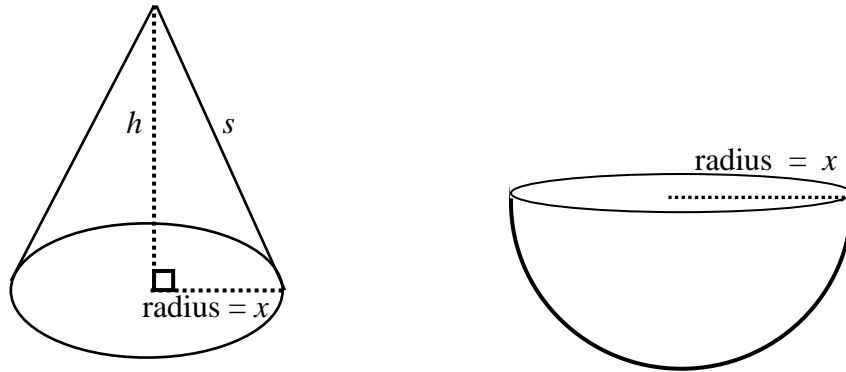
6.2.2 If it is further given that  $F$  is the midpoint of  $AG$ ,  $ADEF$  is a parallelogram and that  $BD = \sqrt{32}$ , determine the length of  $CG$ . (5)

[16]



**QUESTION 7**

A fowl run is designed in the shape of a cone. A hemispherical bowl of water is placed close by for the chickens to drink from it. The cone and the hemisphere are drawn as shown below.



Total surface area of a cone =  $\pi r^2 + \pi rs$ , where  $s$  is the slant height of the cone.

Total surface area of the hemisphere =  $3\pi r^2$ .

The radius of both the cone and the hemisphere is given as  $x$  units and it is further given that the total surface area of the cone = total surface area of the hemisphere .

Find an expression for  $h$ , the height of the cone, in terms of  $x$ .

(4)

[4]

**TOTAL: 100**



Province of the  
**EASTERN CAPE**  
EDUCATION

**LEARNER'S NAME /**  
**LEERDER SE NAAM**

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

**MATHEMATICS P2 / WISKUNDE V2 (EXEMPLAR)**

**GRADE 10 / GRAAD 10**

**NOVEMBER 2019**

**SPECIAL ANSWER BOOK**  
**SPEZIALE ANTWOORDEBOEK**

<b>QUESTION VRAAG</b>	<b>MARKS PUNTE</b>	<b>MARKER'S INITIAL NASIENER SE VOORLETTERS</b>	<b>MOD. MARKS/ PUNTE</b>	<b>INITIALS MOD/ VOORLETTERS MOD</b>
1				
2				
3				
4				
5				
6				
7				
8				
<b>TOTAL/TOTAAL</b>	<b>100</b>			

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**This answer book consists of 15 pages./Hierdie antwoordeboek bestaan uit 15 bladsye.**

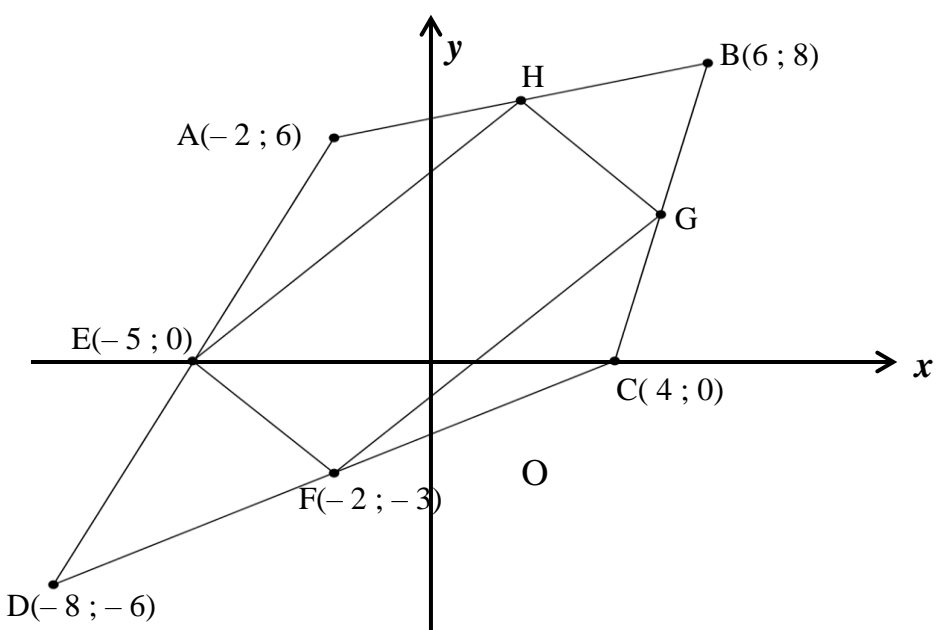
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QUESTION/VRAAG 1

	<i>Solution/Oplossing</i>	<b>Marks Punte</b>																				
	<table border="1"> <tr> <td>48</td><td>50</td><td>52</td><td>59</td><td>60</td><td>68</td><td>73</td><td>76</td><td>76</td><td>76</td> </tr> <tr> <td>78</td><td>79</td><td>80</td><td>81</td><td>82</td><td>82</td><td>84</td><td>91</td><td>92</td><td>98</td> </tr> </table>	48	50	52	59	60	68	73	76	76	76	78	79	80	81	82	82	84	91	92	98	
48	50	52	59	60	68	73	76	76	76													
78	79	80	81	82	82	84	91	92	98													
1.1.1		(1)																				
1.1.2		(2)																				
1.1.3		(2)																				
1.1.4		(1)																				
1.1.5		(3)																				

1.1.6					(1)																																
1.2.1	<table border="1"><thead><tr><th>Duration/Tydsduur</th><th>No. of calls <i>Aantal oproepe</i></th><th>Midpoint <i>Middelpunt</i></th><th><math>(f_i) \times (x_i)</math></th></tr></thead><tbody><tr><td><math>2 &lt; x \leq 5</math></td><td>47</td><td>3,5</td><td>164,5</td></tr><tr><td><math>5 &lt; x \leq 8</math></td><td>139</td><td>6,5</td><td>903,5</td></tr><tr><td><math>8 &lt; x \leq 11</math></td><td>211</td><td>9,5</td><td>2004,5</td></tr><tr><td><math>11 &lt; x \leq 14</math></td><td>102</td><td>12,5</td><td>1275</td></tr><tr><td><math>14 &lt; x \leq 17</math></td><td>58</td><td>15,5</td><td>899</td></tr><tr><td><math>17 &lt; x \leq 20</math></td><td>19</td><td><b>A =</b></td><td><b>B =</b></td></tr><tr><td><b>TOTAL/TOTAAL:</b></td><td></td><td></td><td></td></tr></tbody></table>				Duration/Tydsduur	No. of calls <i>Aantal oproepe</i>	Midpoint <i>Middelpunt</i>	$(f_i) \times (x_i)$	$2 < x \leq 5$	47	3,5	164,5	$5 < x \leq 8$	139	6,5	903,5	$8 < x \leq 11$	211	9,5	2004,5	$11 < x \leq 14$	102	12,5	1275	$14 < x \leq 17$	58	15,5	899	$17 < x \leq 20$	19	<b>A =</b>	<b>B =</b>	<b>TOTAL/TOTAAL:</b>				(2)
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<b>TOTAL/TOTAAL:</b>																																					
1.2.2				(3)																																	
1.2.3				(2)																																	
				[17]																																	

QUESTION/VRAAG 2

	Solution/Oplissing	Marks Punte
		
2.1	<div style="border: 1px solid black; height: 100px; width: 100%;"></div>	(5)
2.2	<div style="border: 1px solid black; height: 100px; width: 100%;"></div>	(2)

2.3		(5)
2.4		(4)
	<b>[16]</b>	

## QUESTION/VRAAG 3

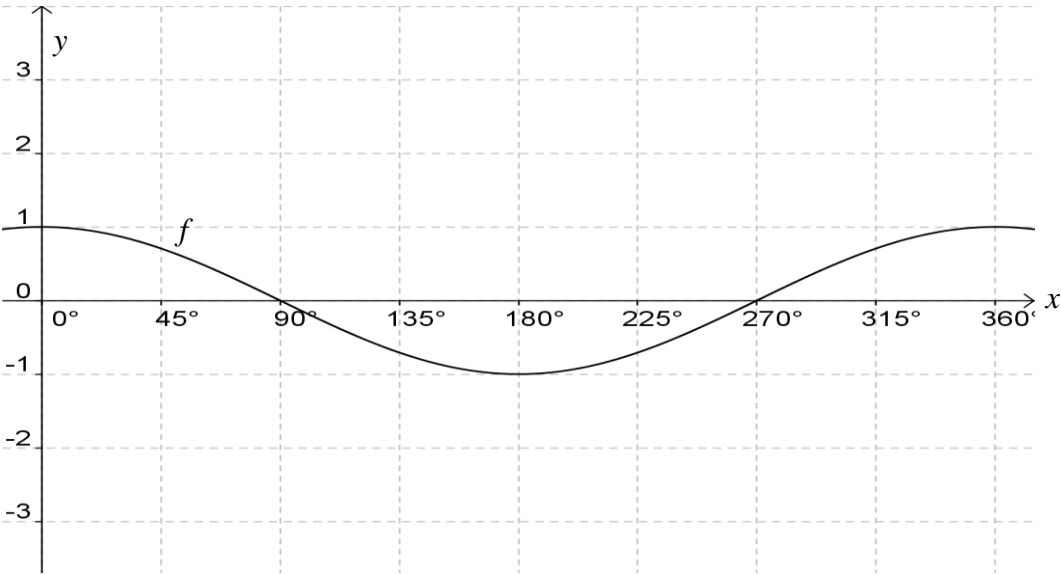
	<i>Solution/Oplissing</i>	<b>Marks Punte</b>
3.1.1		(3)
3.1.2		(3)
3.2		(6)

3.3.1		(3)
3.3.2		(3)
3.4		(5)

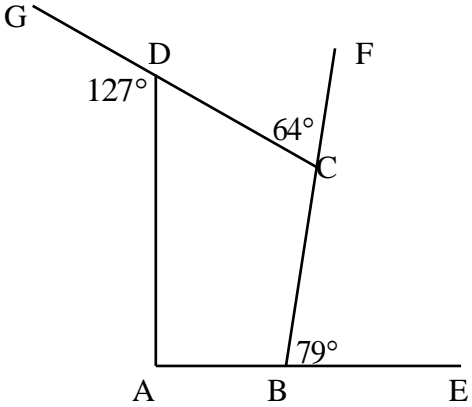
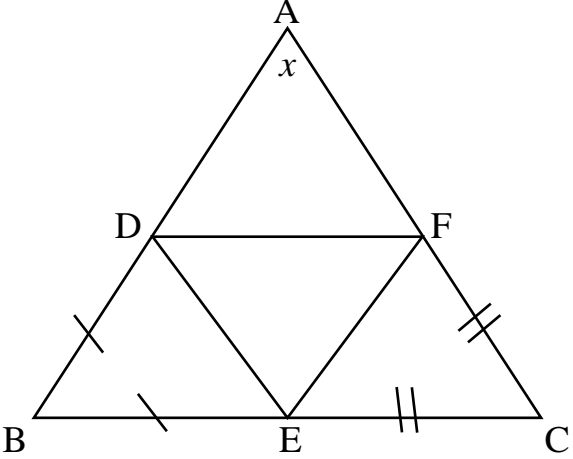


3.5.1		(2)
3.5.2		(2)
		[27]

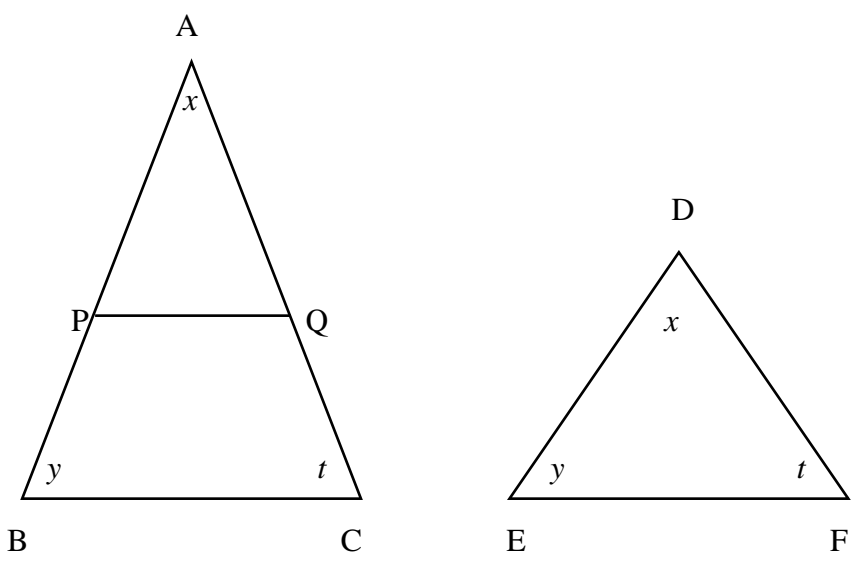
QUESTION/VRAAG 4

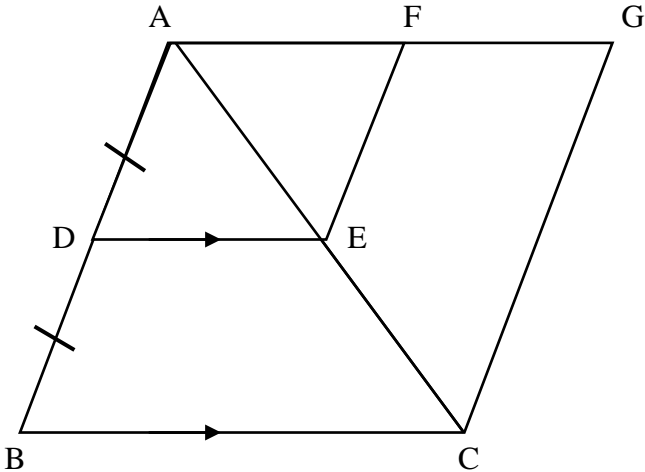
	Solution/Oplissing	Marks Punte
4.1		(3)
4.2		(1)
4.3		(3)
4.4		(2)
4.5		(3)
		<b>[12]</b>

QUESTION/VRAAG 5

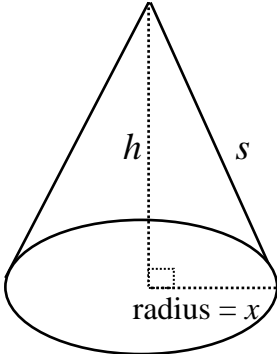
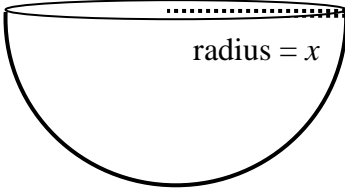
	Solution/Oplissing	Marks Punte
		
5.1	<hr/> <hr/> <hr/> <hr/> <hr/>	(4)
5.2		
	<hr/> <hr/> <hr/> <hr/>	(4)
		<b>[8]</b>

QUESTION/VRAAG 6

	Solution/Oplissing	Marks Punte
		
6.1.1		(3)
6.1.2		(3)
6.1.3		(4)

<p>6.2</p>		
<p>6.2.1</p>		<p>(1)</p>
<p>6.2.2</p>		<p>(5)</p>
		<p>[16]</p>

QUESTION/VRAAG 7

	Solution/Oplissing	Marks Punte
	<div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p data-bbox="256 779 1334 904">                     Total surface area of a cone = <math>\pi r^2 + \pi rs</math>, where <math>s</math> is the slant height of the cone.                      Totale buite-oppervlakte van 'n keël = <math>\pi r^2 + \pi rs</math>, waar <math>s</math> die skuinshoogte van die keël is.                 </p> <p data-bbox="256 947 903 1032">                     Total surface area of a hemisphere = <math>3\pi r^2</math>.                      Totale buite-oppervlakte van 'n hemisfeer = <math>3\pi r^2</math>.                 </p> <div style="border: 1px solid black; height: 100px; margin-top: 20px;"></div>	<p data-bbox="1401 1653 1442 1686">(4)</p> <p data-bbox="1401 1688 1442 1720"><b>[4]</b></p>



Additional space/Bykomende ruimte		Marks Punte

TOTAL/TOTAAL: 100





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**NATIONAL  
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**GRADE 10**

**NOVEMBER 2019**

**MATHEMATICS P2  
MARKING GUIDELINE (EXEMPLAR)**

**MARKS: 100**

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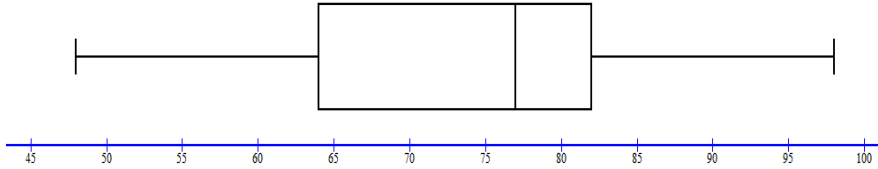
This marking guideline consists of 8 pages.

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Consistent accuracy (CA) marking, applies in ALL aspects of the marking guideline.

### QUESTION 1

48	50	52	59	60	68	73	76	76	76
78	79	80	81	82	82	84	91	92	98

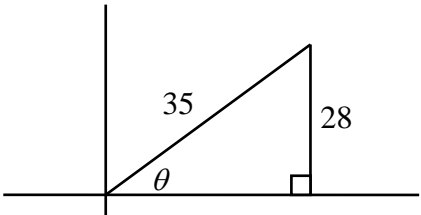
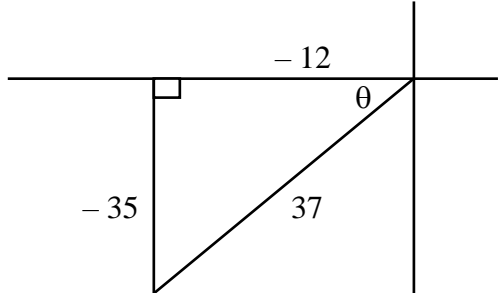
1.1.1	Median = $\frac{76 + 78}{2} = 77$	✓ answer (1)
1.1.2	Lower quartile = $\frac{60 + 68}{2} = 64$ Upper quartile = 82	✓ lower quartile ✓ upper quartile (2)
1.1.3	Interquartile range ( IQR ) = $Q_3 - Q_1$ = $82 - 64 = 18$	✓ substitution ✓ answer (2)
1.1.4	Min = 48 and max = 98	✓ min and max (1)
1.1.5		✓ min and max ✓ $Q_1$ and $Q_3$ ✓ $Q_2$ (3)
1.1.6	Skewed to the left or negatively skewed	✓ answer (1)

1.2	Duration (min)	No of calls ( $f_1$ )	Midpoint ( $x_1$ )	$(f_1) \times (x_1)$	
	$2 \leq t < 5$	47	3,5	164,5	
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	$14 \leq t < 17$	58	15,5	899	
	$17 \leq t < 20$	19	<b>A</b>	<b>B</b>	
		576		5598	
1.2.1	<b>A</b> = 18,5 and <b>B</b> = 351,5				✓ answer of A ✓ answer of B (2)
1.2.2	approximate mean = $\frac{\text{sum of } f_1 \times x_1}{\text{sum of } f_1}$ = $\frac{5598}{576}$ = 9,7 minutes				✓ sum of all $(f_1) \times (x_1)$ ✓ sum of all $(f_1)$ ✓ answer (3)
1.2.3	75 <sup>th</sup> percentile lie = $\frac{75}{100} \times 576 = 432$ In the interval $11 \leq t < 14$				✓ 432 ✓ interval (2)
					<b>[17]</b>

QUESTION 2

<p>2.1</p>	<p><math>A(-2; 6)</math>, <math>B(6; 8)</math> and <math>C(4; 0)</math></p> $d_{AB} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(6 - (-2))^2 + (8 - 6)^2}$ $= 2\sqrt{17}$ $d_{BC} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(4 - 6)^2 + (0 - 8)^2}$ $= 2\sqrt{17}$ <p><math>\therefore AB = BC.</math></p>	<p>✓ formula                  ✓ substitution                  ✓ distance AB</p> <p>✓ substitution                  ✓ distance of BC</p> <p>(5)</p>
<p>2.2</p>	<p>ABCD is a kite                  adjacent sides are equal</p>	<p>✓ kite                  ✓ motivation</p> <p>(2)</p>
<p>2.3</p>	<p><math>A(-2; 6)</math>, <math>B(6; 8)</math> and <math>C(4; 0)</math></p> <p>Midpoint of BC = <math>\left(\frac{x_2 + x_1}{2}; \frac{y_2 + y_1}{2}\right)</math></p> $= \left(\frac{-2+6}{2}; \frac{8+6}{2}\right) = G(2; 7)$ <p>Midpoint of AB = <math>\left(\frac{x_2 + x_1}{2}; \frac{y_2 + y_1}{2}\right)</math></p> $= \left(\frac{4+6}{2}; \frac{0+8}{2}\right) = H(5; 4)$	<p>✓ formula                  ✓ substitution                  ✓ coordinates of G, mdpt of BC</p> <p>✓ substitution                  ✓ coordinates of H, mdpt of AB</p> <p>(5)</p>
<p>2.4</p>	<p><math>\hat{BAD} = \hat{BCD}</math> (opposite <math>\angle</math>'s of a kite are =)  <math>\hat{AEH} = \hat{EDB}</math> (corresponding <math>\angle</math>'s, <math>EG \parallel DB</math>)                  but <math>\hat{EDB} = \hat{BDC}</math> (diagonals of a kite)  <math>\therefore \hat{AEG} = \hat{BDC}</math>  <math>\therefore \Delta AEG \parallel \Delta CDB.</math> (A A A)</p>	<p>✓ S ✓R</p> <p>✓ SR</p> <p>✓ 3<sup>rd</sup> angle or reason</p> <p>(4)</p>
		<p>[16]</p>

## QUESTION 3

3.1.1	$x^2 = 35^2 - 28^2$ $x = 21$ $\therefore \cos \theta = \frac{21}{35}$ 	✓ sub in Pythagoras ✓ $x = 21$ ✓ $\frac{21}{35}$ (3)
3.1.2	$\sin^2 \theta + \cos^2 \theta = \left(\frac{28}{35}\right)^2 + \left(\frac{21}{35}\right)^2$ $= 1$ $= \text{RHS}$	✓ $\left(\frac{28}{35}\right)^2$ ✓ $\left(\frac{21}{35}\right)^2$ ✓ 1 (3)
3.2	If $37 \sin \theta + 35 = 0$ $\therefore \sin \theta = -\frac{35}{37}$ $x^2 = 37^2 - 35^2$ $x = 12$  $24 \sec \theta - 70 \cot \theta$ $= 24\left(\frac{37}{-12}\right) - 70\left(\frac{-12}{-35}\right)$ $= -74 - 24$ $= -98$	✓ $\sin \theta = \frac{-35}{37}$ ✓ 3 <sup>rd</sup> quadrant ✓ $x$ value = $-12$ ✓ ✓ substitution ✓ answer (6)
3.3.1	$8 \cos(x + 10^\circ) = 5$ $\cos(x + 10^\circ) = \frac{5}{8}$ $x + 10^\circ = 51,32^\circ$ $x = 41,32^\circ$	✓ $\cos(x + 10^\circ)$ ✓ $x + 10^\circ$ ✓ answer (3)

<p>3.3.2</p>	$\operatorname{cosec} 2x = 2$ $\sin 2x = \frac{1}{2}$ $2x = 30^{\circ}$ $x = 15^{\circ}$	<p>✓ <math>\sin 2x = \frac{1}{2}</math>                  ✓ <math>2x = 30^{\circ}</math>                  ✓ answer</p> <p>(3)</p>
<p>3.4</p>	$\frac{\sin 30^{\circ} \times \tan 60^{\circ}}{\tan 30^{\circ} \times \cos 60^{\circ}} = \frac{\frac{1}{2} \times \sqrt{3}}{\frac{1}{\sqrt{3}} \times \frac{1}{2}}$ $= 3$ $= \text{RHS}$	<p>✓ <math>\frac{1}{2}</math>                  ✓ <math>\sqrt{3}</math>                  ✓ <math>\frac{1}{\sqrt{3}}</math>                  ✓ <math>\frac{1}{2}</math>                  ✓ answer</p> <p>(5)</p>
<p>3.5.1</p>	$\sin 55^{\circ} = \frac{x}{15}$ $x = 15 \times \sin 55^{\circ}$ $= 12,29^{\circ}$ <p style="text-align: center;"><b>OR</b></p> $\cos 35^{\circ} = \frac{x}{15}$ $x = 12,29^{\circ}$	<p>✓ using <math>\sin 55^{\circ}</math>                  ✓ answer</p> <p>(2)</p> <p>✓ using <math>\cos 35^{\circ}</math>                  ✓ answer</p> <p>(2)</p>
<p>3.5.2</p>	$\tan 21^{\circ} = \frac{4,4}{y}$ $y = \frac{4,4}{\tan 21^{\circ}}$ $= 11,46$ <p style="text-align: center;"><b>OR</b></p> $\tan 69^{\circ} = \frac{y}{4,4}$ $y = 11,46$ <p style="text-align: center;"><b>OR</b></p> $y^2 = 12,29^2 - 4,4^2$ $y = 11,48$	<p>✓ using <math>\tan 21^{\circ}</math>                  ✓ answer</p> <p>(2)</p> <p>✓ Pythagoras                  ✓ answer</p> <p>(2)</p>
		<p>[27]</p>

## QUESTION 4

4.1		<ul style="list-style-type: none"> <li>✓ intercepts</li> <li>✓ turning pts</li> <li>✓ shape</li> </ul> <p style="text-align: right;">(3)</p>
4.2	period of $g = 360^0$	<ul style="list-style-type: none"> <li>✓ answer</li> </ul> <p style="text-align: right;">(1)</p>
4.3	range of $m(x)$ if $m(x) = -3f(x) + 1$ range of $-3 f(x)$ : $-3 \leq y \leq 3$ range of $m(x)$ : $-2 \leq y \leq 4$	<ul style="list-style-type: none"> <li>✓ notation</li> <li>✓✓ endpoints</li> </ul> <p style="text-align: right;">(3)</p>
4.4	$g$ decreasing: $90^0 < x < 270^0$	<ul style="list-style-type: none"> <li>✓ notation</li> <li>✓ endpoints</li> </ul> <p style="text-align: right;">(2)</p>
4.5	$f(x) \times g(x) < 0$ $90^0 < x < 180^0$ or $270^0 < x < 360^0$	<ul style="list-style-type: none"> <li>✓ notation</li> <li>✓ endpoints</li> <li>✓ endpoints</li> </ul> <p style="text-align: right;">(3)</p>
		<b>[12]</b>

**QUESTION 5**

<p>5.1</p>	<p><math>\hat{A}DC = 53^\circ</math> (<math>\angle</math>s on a straight line)  <math>\hat{D}CB = 116^\circ</math> (supplementary adj <math>\angle</math>s)  <math>\hat{C}BA = 101^\circ</math> (<math>\angle</math>s on a straight line)  <math>\hat{B}AD = 360^\circ - 53^\circ - 116^\circ - 101^\circ</math>  <math>= 90^\circ</math> (<math>\angle</math>s of a quad = <math>360^\circ</math>)</p> <p>Answer only: full marks, provided one reason is given</p>	<p>✓ SR                  ✓ SR                  ✓ SR                  ✓ answer</p> <p>(4)</p>
<p>5.2</p>	<p>Let <math>\hat{D}EB = y</math> and <math>\hat{F}EC = k</math>  <math>\therefore \hat{B} = 180^\circ - 2y</math> and <math>\hat{C} = 180^\circ - 2k</math> (<math>\angle</math>s of a <math>\Delta = 180^\circ</math>)                  In <math>\Delta ABC</math>: <math>x + 180^\circ - 2y + 180^\circ - 2k = 180^\circ</math>  <math>2y + 2k = x + 180^\circ + 180^\circ - 180^\circ</math>  <math>y + k = \frac{1}{2}x + 90^\circ</math>  <math>\hat{D}EF = 90^\circ - \frac{1}{2}x</math> (<math>\angle</math>s on a straight line)</p>	<p>✓ SR                  ✓ SR                  ✓ S                  ✓ SR</p> <p>(4)</p>
<p>[8]</p>		

**QUESTION 6**

<p>6.1.1</p>	<p><math>AP = DE</math> and <math>AQ = DF</math> (given)  <math>\hat{A} = \hat{D}</math> (given)  <math>\Delta APQ \equiv \Delta DEF</math> (SAS)</p>	<p>✓ given                  ✓ <math>\Delta</math>'s similar                  ✓ reason</p> <p>(3)</p>
<p>6.1.2</p>	<p><math>\hat{A}PQ = \hat{E}</math> (<math>\Delta APQ \equiv \Delta DEF</math>)                  But <math>\hat{B} = \hat{E}</math> (given)  <math>\therefore \hat{A}PQ = \hat{B}</math>  <math>\therefore PQ \parallel BC</math> (a pair of corresponding <math>\angle</math>s are =)</p>	<p>✓ Statement                  ✓ Statement                  ✓ Reason</p> <p>(3)</p>
<p>6.1.3</p>	<p><math>\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}</math> (<math>\Delta ABC \parallel \Delta DEF</math>)  <math>\frac{7,5}{3,5} = \frac{8}{DF}</math>  <math>DF = \frac{8 \times 3,5}{7,5}</math>  <math>= 3,7</math></p>	<p>✓ SR                  ✓ substitution                  ✓ simplification                  ✓ answer</p> <p>(4)</p>
<p>6.2.1</p>	<p>Converse of midpoint theorem</p>	<p>✓ answer</p> <p>(1)</p>

6.2.2	$BD = \sqrt{32} \therefore AD = \sqrt{32}$ $\therefore EF = \sqrt{32}$ (opp sides of a parallelogram) $\therefore CG = 2\sqrt{32}$ (midpt theorem) $= 8\sqrt{2}$	✓ $BD = AD$ ✓ $S \checkmark R$ ✓ $SR$ ✓ answer (5)
		<b>[16]</b>

**QUESTION 7**

TSA of cone = TSA of hemisphere $\pi r^2 + \pi r s = 3\pi r^2$ $\pi r s = 2\pi r^2$ $s = 2x \quad (r = x)$ but $s^2 = h^2 + x^2$ $\therefore h^2 + x^2 = 4x^2$ $\therefore h = \sqrt{4x^2 - x^2}$ $= \sqrt{3}x$	✓ equating the TSA  ✓ use of Pythagoras ✓ substituting $s = 2x$ ✓ h subject of formula (4)	
		<b>[4]</b>
<b>TOTAL:</b>		<b>100</b>