



**TECHNICAL MATHEMATICS PROGRAMME FOR GRADE 10 LEARNERS FROM 18 MAY – 12 JUNE 2020**

**TOPIC: TRIGONOMETRY**

**MARKS IN EXAMINATION PAPER: 40 +/- 3 MARKS OF PAPER 2**

**MAIN RESOURCE(S) SUGGESTED: SASOL INZALO TEXTBOOK**

**ADDITIONAL RESOURCE(S): ANY APPROVED TEXTBOOK AND/OR STUDY GUIDE**

**MEDIA:**

- ECDOE WEBSITE.
- DBE WEBSITE.

**USE SASOL INZALO TEXTBOOK (PAGE 149 – 236)**

- Read and follow the explanation about the topic/ concept. Read Introduction on page 81.
- Follow and practice Examples indicated.
- Then do Investigations/ Exercises on Learner Guide (LG) without looking at the solutions first.
- Then do corrections.
- Double or triple check if you are able to do Activities on your own without looking at the solutions until you master the concept(s).

**WEEK 1: 18 – 22 MAY 2020**

DATE	EXAMPLES	EXERCISE	PAGE(S)
18/05	Example on page 152 (Length ratio)	Exercise on page 152	152
19/05	Read pages 153 – 155	Exercise on page 156	156
20/05	Worked examples on page 158 – 159	Exercise on page 160	160
21/05	Worked Example on page 161	Exercise on page 163	163
22/05	Learn more about Right Angled Triangles on page 164	Exercise on page 165	165

**WEEK 2: 25 – 29 MAY 2020**

DATE	EXAMPLES	EXERCISES	PAGE(S)
25/05	Read and follow 'Defining the Trigonometric functions on pages 166 – 168	Exercise on page 168	168
26/05	Worked Example on page 169	Exercise on page 170	170
27/05	Worked Example on page 170	Exercise on page 170 – 171	170 – 171
28/05	Worked Example on page 174	Exercise on page 174	174
29/05	Worked Examples on page 182 - 183	Exercise on page 183 – 184	183 – 184

**WEEK 3: 1 – 5 JUNE 2020**

DATE	EXAMPLES	EXERCISES	PAGE(S)
1/06	Worked Example on page 184 – 185	Exercise on page 185	185
2/06	Worked Examples on page 186 – 187	Exercise on page 188 – 189	188 – 189
3/06	Worked Example on page 189 – 190	Exercise on page 191 – 192	191 – 192
4/06	Worked Example on page 193	Exercise on page 194	194
5/06	Worked Example on page 195	Selected Exercises on page 196 – 200	196 – 200

**WEEK 4: 8 – 12 JUNE 2020**

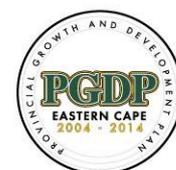
DATE	EXAMPLES	EXERCISES	PAGE(S)
8/06	Use your calculator to plot the graphs of sin and cos following guidance and exercises from page 201 to 205		201 – 205
9/06	Follow explanations and do exercises from page 206 to 209		206 – 209
10/06	Use your calculator to plot the graphs of sin and cos following guidance and exercises from page 210 to 218		210 – 218
11/06	Investigate the effects of $a$ and $q$ in the trigonometric graphs. Read and follow explanations and do exercises from 219 to 230		219 - 230
12/06	Write a Topic Test using the attached question paper on page 3 – 5 of this document.		3 – 5 of this document. Use Marking Guidelines on page 6 – 9 of this document to mark.

**USE ANY PREVIOUS YEARS' QUESTION PAPERS TO REVISE TRIGONOMETRY. USE ECDOE WEBSITE TO ACCESS PREVIOUS YEARS' QUESTION PAPERS IF YOU DO NOT HAVE HARD COPIES!**

**REMEMBER, PRACTICE MAKES PERFECT!**

**SO, PRACTICE, PRACTICE AND PRACTICE!**

building blocks for growth.



*Ikamva eliyaqambileyo!*

TRIGONOMETRY ON EXEMPLAR QUESTION PAPER 2016 QP  
QUESTION 2

2.1 If  $x = 43^\circ$  and  $y = 32,5^\circ$ , use a calculator to find the values of the following:

2.1.1  $\sin(x + y)$  (2)

2.1.2  $\sec\left(\frac{x - y}{2}\right)$  (2)

2.2 If  $13\sin \alpha + 5 = 0$  and  $90^\circ < \alpha < 270^\circ$ , determine the value of the following **with the aid of a sketch**:

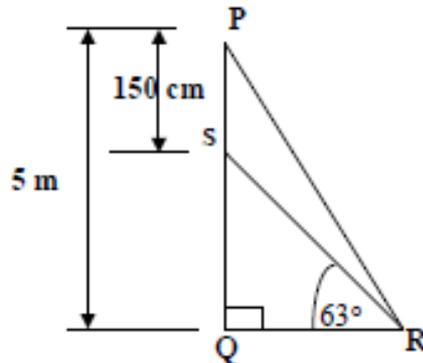
2.2.1  $\cot \alpha$  (4)

2.2.2  $\cos \alpha + \tan \alpha$  (3)

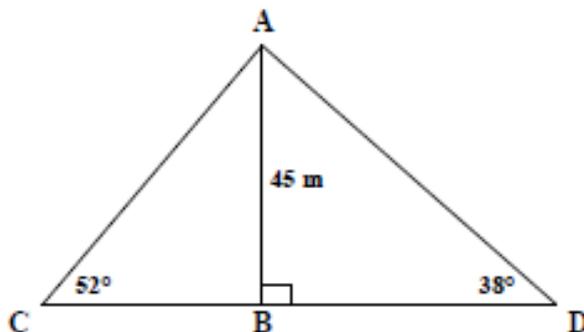
2.3 Solve for  $x$ , if  $\cot x = \tan 53^\circ + \sin 233^\circ$ . (3)  
[14]

### QUESTION 3

- 3.1 PQ is a vertical wall that is 5 m high. A ladder, SR, is placed against PQ such that S is 150 cm below P and the ladder forms an angle of  $63^\circ$  with the ground.



- 3.1.1 Calculate, in metres, the length of SQ. (1)
- 3.1.2 Calculate, in metres, the length of the ladder SR. (2)
- 3.1.3 Another ladder is placed at point R on the ground and reaches point P on the wall. This ladder makes an angle of  $15^\circ$  with the wall (that is  $\hat{SPR} = 15^\circ$ ). Calculate the length of the ladder in metres. (4)
- 3.2 AB, a vertical tower, is 45 m high. Two boys are standing on either side of the tower at C and D respectively, such that C, B and D lie in a straight line. The angle of elevation from C to A is  $52^\circ$  and the angle of elevation from D to A is  $38^\circ$ .



- 3.2.1 Calculate the length of BC. (3)
- 3.2.2 How far apart are the boys standing from each other? (3)
- [13]

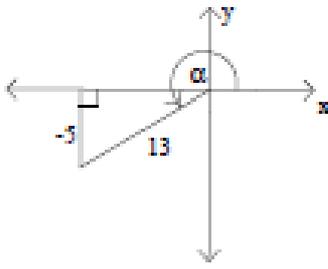
#### QUESTION 4

Given:  $f(x) = \frac{1}{2} \tan x$  and  $g(x) = \cos x + 1$

- 4.1 Use the set of axes provided on the attached DIAGRAM SHEET and draw the graph of  $f$  and  $g$  in the interval  $x \in [0^\circ; 360^\circ]$ . (5)
- 4.2 Write down the equation(s) of the asymptote(s) of  $f$  in the given interval. (1)
- 4.3 Write down the range of  $g$ . (2)
- 4.4 For which value(s) of  $x$  is  $f(x) = g(x)$  for  $x \in [90^\circ; 360^\circ]$ ? (2)
- 4.5 For which value(s) of  $x$  is  $f(x) > g(x)$  for  $x \in [90^\circ; 270^\circ]$ ? (2)
- [12]**

TRIGONOMETRY ON EXEMPLAR QUESTION PAPER 2016 MEMO

QUESTION 2

2.1.1	$\sin(x+y) = \sin(43+32,5)$ $= 0,97$	answer only full marks.	✓ substitution ✓ answer (2)
2.1.2	$\sec\left(\frac{x-y}{2}\right) = \sec\left(\frac{43-32,5}{2}\right)$ $= \frac{1}{\cos\left(\frac{21}{4}\right)}$ $= 1,00$	answer only full marks.	✓ changing to cos ✓ answer (2)
2.2.1	$13\sin \alpha + 5 = 0 \text{ and } 90^\circ < \alpha < 270^\circ$ $\sin \alpha = \frac{-5}{13}$ $x^2 + (-5)^2 = 13^2$ $\therefore x = -12$ $\therefore \cot \alpha = \frac{-12}{-5} = \frac{12}{5}$		✓ correct diagram ✓ $\frac{-5}{13}$ ✓ $x = -12$ ✓ answer (4)
2.2.2	$\cos \alpha + \tan \alpha = \frac{-12}{13} + \frac{5}{12}$ $= \frac{-144 + 65}{156}$ $= \frac{-79}{156}$		✓ $\frac{-12}{13}$ ✓ $\frac{5}{12}$ ✓ answer (3)
2.3	$\cot x = \tan 53^\circ + \sin 233^\circ$ $\frac{1}{\tan x} = \tan 53^\circ + \sin 233^\circ$ $\tan x = \frac{1}{\tan 53^\circ + \sin 233^\circ}$ $x = \tan^{-1}\left(\frac{1}{\tan 53^\circ + \sin 233^\circ}\right)$ $= 62,15^\circ \quad \text{Answer } 62,12^\circ \quad \text{two marks}$		✓ $\frac{1}{\tan x}$ ✓ $\tan^{-1}$ ✓ answer (3)
			<b>[14]</b>

**QUESTION 3**

3.1.1	$SQ = 5m - 1,5m = 3,5m$	✓ answer (1)
3.1.2	$\sin 63^\circ = \frac{SQ}{SR}$ $\sin 63^\circ = \frac{3,5}{SR}$ $\therefore SR = 3,93m$	✓ $\sin 63^\circ = \frac{3,5}{SR}$  ✓ answer (2)
3.1.3	$\cos 15^\circ = \frac{PQ}{PR}$ $PR = \frac{PQ}{\cos 15^\circ}$ $PR = \frac{5m}{\cos 15^\circ}$ $= 5,18m$ <p>Or</p> $\sin 75^\circ = \frac{PQ}{PR}$ $PR = \frac{PQ}{\sin 75^\circ}$ $= \frac{5m}{\sin 75^\circ}$ $= 5,18m$	✓ $\cos 15^\circ$  ✓ making PR the subject of the formula ✓ substitution  ✓ answer  OR ✓ $\sin 75^\circ$  ✓ making PR the subject of the formula ✓ substitution ✓ answer (4)
3.2.1	$\frac{AB}{BC} = \tan 52^\circ$ $\therefore \frac{45}{BC} = \tan 52^\circ$ $BC = \frac{45}{\tan 52^\circ}$ $\therefore BC = 35,16 m$	✓ $\frac{AB}{BC} = \tan 52^\circ$  ✓ $BC = \frac{45}{\tan 52^\circ}$  ✓ answer (3)
3.2.2	$\frac{AB}{BD} = \tan 38^\circ \therefore \frac{45}{BD} = \tan 38^\circ$ $\therefore BD = 57,60m$ $CD = 35,16m + 57,60m$ $CD = 92,76m$	✓ $\frac{45}{BD} = \tan 38^\circ$ ✓ length of BD  ✓ answer (3)
		[13]

### QUESTION 4

4.1		<ul style="list-style-type: none"> <li>✓ y-int of <math>g</math></li> <li>✓ shape of <math>g</math></li> <li>✓ x intercepts of <math>f</math></li> <li>✓ y intercept of <math>f</math></li> <li>✓ shape of <math>f</math></li> </ul> <p style="text-align: right;">(5)</p>
4.2	$x = 90^\circ$ and $x = 270^\circ$	<ul style="list-style-type: none"> <li>✓ answer</li> </ul> <p style="text-align: right;">(1)</p>
4.3	$y \in [0; 2]$ OR $0 \leq y \leq 2$	<ul style="list-style-type: none"> <li>✓✓ answer with correct notation</li> </ul> <p style="text-align: right;">(2)</p>
4.4	$(180^\circ; 0)$	<ul style="list-style-type: none"> <li>✓ <math>180^\circ</math></li> <li>✓ 0</li> </ul> <p style="text-align: right;">(2)</p>
4.5	$180^\circ < x < 270^\circ$ OR $x \in (180^\circ; 270^\circ)$	<ul style="list-style-type: none"> <li>✓✓ answer with correct notation</li> </ul> <p style="text-align: right;">(2)</p>
		<b>[12]</b>

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*Ikamva elinqambeleyo!*