



Province of the
EASTERN CAPE
EDUCATION

TECHNICAL MATHEMATICS PROGRAMME FOR GRADE 12 LEARNERS FROM 11 MAY – 29 MAY 2020

TOPIC: EUCLIDEAN GEOMETRY

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

EXAMINATION GUIDELINES ON EUCLIDEAN GEOMETRY REQUIRES THE FOLLOWING:

Candidates must be able to:

- State properties of special triangles (scalene, isosceles, equilateral and right-angled triangle) and quadrilaterals
- Define various polygons (including the scalene, isosceles, equilateral and right-angled triangle, the kite, parallelogram, rectangle, rhombus, square and trapezium)
- Apply circle theorems and their converses in calculations to solve geometry problems providing reasons for statements when required
- Apply the concept of similarity and proportionality
- Apply proportionality in triangles
- Apply mid-point theorem

NOTE: Proofs of theorems and their converses will not be examined.

MAIN RESOURCE(S) SUGGESTED: TECHNICAL MATHEMATICS TEXTBOOK AND 'YES I CAN' REVISION GUIDE

ADDITIONAL RESOURCES: ANY APPROVED TEXTBOOK AND/OR STUDY GUIDE

- Read and follow the explanation about the topic/ concept.
- Follow and practice Examples indicated .
- Then do Exercises without looking at the solutions first.
- Then check your solutions against solutions provided.
- 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).

DATE	WHAT TO LEARN	PAGE	WORKED EXAMPLE	EXERCISES	PAGES
11/05/2020	Revision of grade 10 work: <ul style="list-style-type: none"> Angles related of lines and triangles – (supplementary & complimentary angles) Vertically opposite angles Revolutionary angles Parallel lines 	Gr 12 Textbook Page 207	Gr 12 Textbook Page 207/208	Do exercise 6.1 Question 8	Gr 12 Textbook Page 221
12/5/2020	Congruency in triangles. Revise the 4 conditions <ul style="list-style-type: none"> SSS SAS SAA RHS 	Revise Gr 12 Textbook Page 209 Gr 10 Textbook Page 279	Gr 10 Textbook Page 280-282	Gr 10 Textbook Questions 22-26	Gr 10 Textbook Page 282-284 (You may use any resource with Explanation of Congruency since you may not have grade 10 textbook)
13/05/2020	Similar Polygons	Gr 12 Textbook pages 211-217	Study examples 6&7	Do exercise 6.1 Questions 4-7	Gr 12 Textbook Page 220
14/05/2020	Application of Proportionality and Similarity theorems. Equiangular triangles are similar.	Gr 12 Textbook Pages 221-222 Gr 12 Textbook pages 223-224	Gr 12 Textbook Pages 222-223 Gr 12 Textbook pages 223-224	Do exercise 6.2 Questions 1-6	Gr 12 Textbook Page 236-237

DATE	WHAT TO LEARN	PAGE	WORKED EXAMPLE	EXERCISES	PAGES
15/05/2020	Triangles with sides in proportion are similar.	Gr 12 Textbook pages 225	Gr 12 Textbook Examples 1 & 2 on pages 225-226	Do exercises 6.2 Questions 7-13	Gr 12 Textbook Page 238-239
	Midpoint Theorem.	Gr 12 Textbook pages 226	Gr 12 Textbook Examples 1 pages 226		
	Study the summary on page 227	Gr 12 Textbook Page 227	Gr 12 Textbook Examples 1-4 pages 228		
18/05/2020	Application of Similarity of triangles	Gr 12 Textbook Pages 240	Gr 12 Textbook Examples 1-3 on pages 241-243 Example 4 on Page 244: For higher order.	Gr 12 Textbook Do exercises 6.3 Questions 1-5	Gr 12 Textbook Page 248
19/05/2020	Application of Similarity of triangles	Gr 12 Textbook Pages 244-245		Gr 12 Textbook Do exercises 6.3 Questions 6-8	Gr 12 Textbook Page 249
20/05/2020	Review on worksheet 1 On grade 10 & 12 Euclidean Geometry	Review questions Questions 1-3	Gr 12 Textbook Page 251-252	Assignment Questions 1&2	Gr 12 Textbook Page 252
21/05/2020	Review on worksheet 1 On grade 10 & 12 Euclidean Geometry	Review questions Questions 5-5	Gr 12 Textbook Page 251-252		
22/05/2020	Review on worksheet 1 On grade 10 & 12 Euclidean Geometry	Review questions Questions 6-8	Gr 12 Textbook Page 251-252		

DATE	WHAT TO LEARN	PRACTICE	RESOURCE
25/05/2020	Revise grade 11 theorems on circles	QUESTIONS 7 – 8 FOCUSSING ON CIRCLES	2019 YES I CAN BOOKLET AND/OR ANY PREVIOUS YEARS' QUESTION PAPER
26/05/2020			
27/05/2020	Revise grade 10 and 12 theorems with special emphasis in Proportionality and Similarity	Proportionality and Similarity QUESTIONS: Usually QUESTION 9.	<ul style="list-style-type: none"> • 2019 YES I CAN BOOKLET AND/OR ANY PREVIOUS YEARS' QUESTION PAPER • Use questions from the next page (page 5) to the last page (page 10) of this document
28/05/2020			
29/05/2020	Write a Topic Test: Euclidean Geometry		

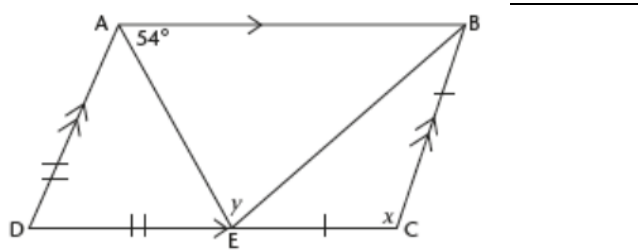


GRADE 12 TECHNICAL MATHEMATICS PERIOD MAY 2020

CONSOLIDATED WORKSHEET FOR GRADE 10 – 12

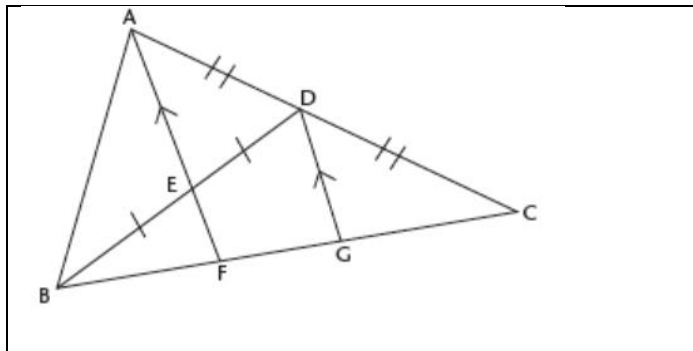
EUCLIDEAN GEOMETRY

- 1 Refer to the diagram below. ABCD is a parallelogram. $AD = DE$ and $CB = CE$.
Calculate x and y .



GR 10 text book
Page 311

- 2 In the diagram, D and E are the midpoints of AC and BD respectively.
Prove that $BF = FG = GC$.



3 ABEF is a parallelogram. Calculate x and y if $SA = SF$.

4 Triangles that are similar to a right-angled triangle with sides 3, 4, and 5 are often used in construction. The roof shown here is 36 m wide. The two halves of the roof are congruent.

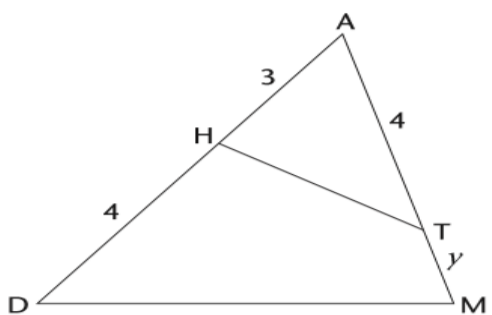
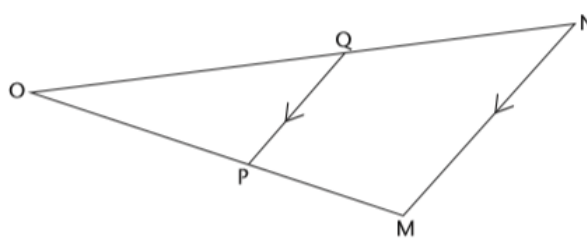
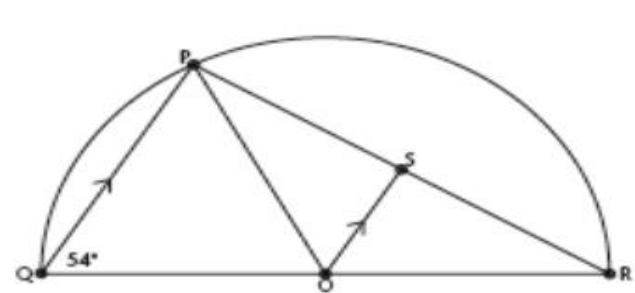

Each half is a right-angled triangle with sides proportional to 3, 4, and 5. The shorter side is the vertical side.

(a) How high above the attic floor should the roof peak be?

(b) How far is the roof peak from the roof edge?

(c) What is the shingled area of the roof if the building is 48 m long?



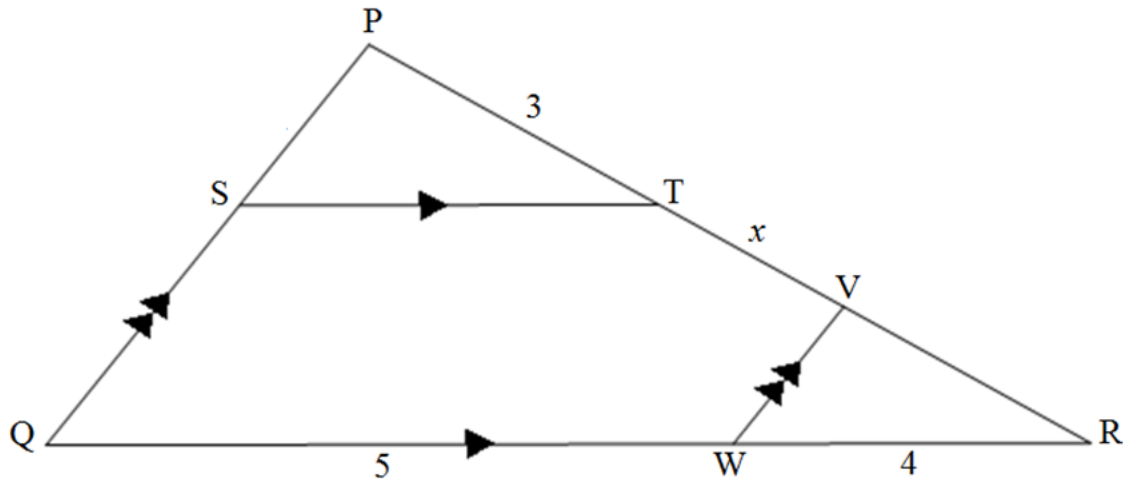
5.1	<p>If $\triangle MAD$ has a point H on AD joined to point T on AM. $\angle THA = \angle DMA = 70^\circ$</p>	
5.2	<p>In the diagram, line MN is parallel to line PQ ($MN \parallel PQ$).</p> <p>a) Show that $\triangle PQO$ and $\triangle MNO$ are similar.</p> <p>b) It is also given that $MN = 9$ units and $PQ = 6$ units</p> <ul style="list-style-type: none"> If $ON = 12$ units, how long is OQ? (Show your workings) If $OP = 19$ units, how long is PM? (Show your workings) 	
6	<p>Shown is a semi-circle with Centre O and diameter QR. $\triangle PQR$ is drawn, where P is any point on the arc of the semi-circle. Radius OP is drawn. Point S is chosen on PR so that OS is parallel to PQ. $\angle PQR = 54^\circ$.</p>	
	<p>(a) There are three other angles equal to 54°. Determine, with reasons, which ones they are.</p> <p>(b) Prove that $\triangle SOP$ is congruent to $\triangle SOR$.</p> <p>(c) Show that $\angle QPR$ is a right-angle. (Hint: what is the size of $\angle OPS$?)</p> <p>(d) What can you say about $\triangle RSO$ and $\triangle RPQ$?</p> <p>(e) What are the following ratios?</p> <ul style="list-style-type: none"> $RO:OQ$ $RS:RP$ $PQ:SO$ <p>(f) If the radius of the circle is 10 cm, calculate all the remaining lengths in the diagram.</p> <p>Use these to check your answers to (b), (d), and (e).</p> <p>building blocks for growth.</p>	

QUESTION 9 [ADAPTED FROM NSC JUNE 2019 EXAMINATIONS]

9.1 Complete the following theorem:

If a line divides two sides of a triangle in the same proportion, then the line is ... (1)

9.2 In the diagram below, $\triangle PQR$ is drawn with **S** on **PQ**, **T** and **V** on **PR** and **W** on **QR**.
 $ST \parallel QR$ and **$VW \parallel PQ$** .
 Furthermore, $PS : SQ = 1 : 3$
 $RW = 4$ units, $QW = 5$ units, $PT = 3$ units and $TV = x$ units.



9.2.1 Determine, with reason(s), the length of TR. (3)

9.2.2 (a) Express VR in terms of x. (1)

(b) Give the numerical value of $\frac{RV}{VP}$. (1)

(c) Hence, determine the numerical value of x. (3)

[9]

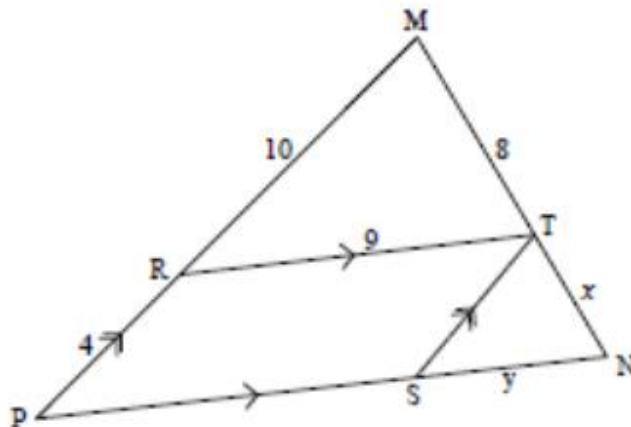
QUESTION 8

8.1 Complete the following theorem statement:

A line drawn parallel to one side of a triangle ... (1)

8.2 In the diagram $\triangle MNP$ with R on MP and T on MN is given such that $RT \parallel PN$.
 S is a point on PN such that $TS \parallel MP$.

- MR = 10 units
- RP = 4 units
- MT = 8 units
- RT = 9 units
- TN = x units
- SN = y units



8.2.1 Calculate, stating reasons, the numerical value of x . (3)

8.2.2 What type of quadrilateral is $RTSP$? Give a reason for the answer. (2)

8.2.3 Hence calculate, stating reasons, the numerical value of y . (3)

8.2.4 Hence, show with calculations, that $\triangle MRT \parallel \triangle TSN$. (4)

[13]



QUESTION 9

In the diagram, HLKF is a cyclic quadrilateral. The chords HL and FK are produced to meet at M. The line through F, parallel to KL, meets MH produced at G.

MK = 10 units

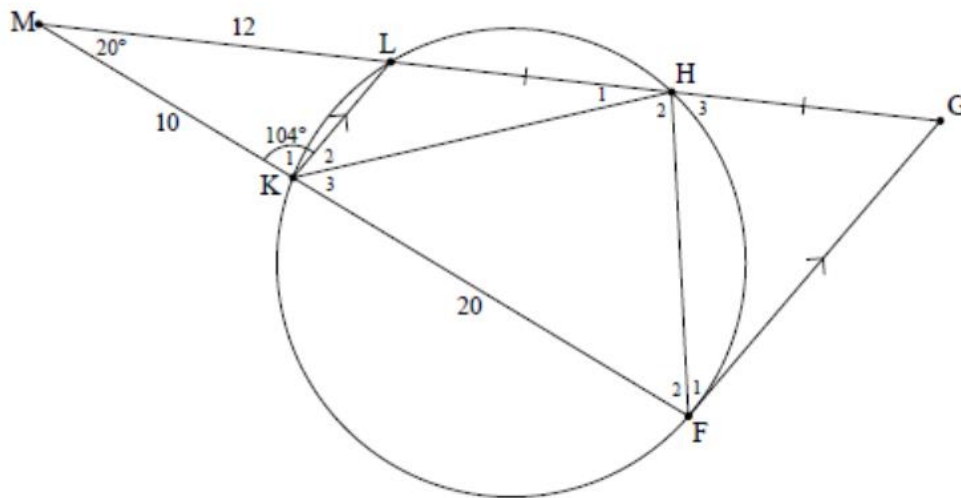
KF = 20 units

ML = 12 units

LH = HG

$\hat{M} = 20^\circ$

$\hat{K}_1 = 104^\circ$



- 9.1 Name, with reasons, TWO other angles that are equal to \hat{K}_1 . (3)
- 9.2 Determine the size of \hat{G} . (3)
- 9.3 Use calculations to prove that:
- 9.3.1 $MG = 36$ units (3)
- 9.3.2 (a) $\triangle MFH \parallel \triangle MGF$ (3)
- (b) Hence, complete: $\triangle MFH \parallel \triangle MGF \parallel \triangle \dots$ (1)
- [13]