



**KWAZULU-NATAL PROVINCE**

**EDUCATION**  
REPUBLIC OF SOUTH AFRICA

# **HARRY GWALA DISTRICT**

## **FET MATHEMATICS**

### **GRADE 10 LOCKDOWN HOLIDAY LEARNER REVISION BOOKLET AUGUST 2020**

*Compiled by Harry Gwala FET Mathematics Advisors  
Mr. M. Govender, Mr. S. Ngubo, Mr. N. Gopichund*

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## INTRODUCTION

An unprecedented Pandemic of COVID19 has hit South Africa and the World. This has put the lives of learners and teachers at risk and has negatively affected the education system. In KZN Grade 10 learners were taught the First Term Content and will only return to school on the 24 August 2020

In an effort to assist teachers and learners to use this time away from school effectively, Harry Gwala FET Mathematics Advisors have decided to compile a booklet to enable learners to revise the important content that was already taught in Term 1 namely: **Algebra Equations & Inequalities; Euclidean Geometry and Trigonometry**. This booklet includes these sections and contains work to be done daily by learners for 3 weeks from the 3<sup>rd</sup> August to 21<sup>st</sup> August and utilizes the DBE Final Examination Papers for the past four years. In an effort to let learners work independently the answers (not solutions) are provided at the back. These answers are just a guideline and it is envisioned that learners will complete daily tasks where they will provide the complete solutions to educators. Their efforts must be submitted to educators via social media where a control could be kept. In the event where learners cannot submit work daily then they should present hard copies of all work to the educator on returning to school on the 24<sup>th</sup> August.

It is hoped that this booklet will allow teachers and learners to work in an effective and systematic way during the extended break so that when they return to school they will be ready to proceed with the remainder of the year's work.

In conclusion we would like to extend an earnest plea to all teachers and learners to abide by guidelines set by the NCCC and WHO to stay safe and prevent the spread of COVID19 . We pray for your health and safety and look forward to continuing to assist you when you return in the new term. God Bless.

Kind Regards,

***Mr. M. Govender, Mr. S. Ngubo & Mr. N. Gopichund***  
(Harry Gwala FET Mathematics Advisors)

**WEEK 1 (3<sup>rd</sup> – 7<sup>th</sup> AUGUST 2020)****ALGEBRA, EQUATIONS AND INEQUALITIES****MONDAY 3<sup>rd</sup> AUGUST**

DBE 2016

**QUESTION 1**

1.1 Factorise the following expressions fully:

1.1.1  $x^2 - x$  (1)

1.1.2  $3x^2 + 3px - 2mx - 2mp$  (3)

1.1.3  $2p^2 - 2p - 12$  (3)

1.2 Simplify the following:

1.2.1  $\frac{2^{a+1} - 2^{a-1}}{2^a}$  (3)

1.2.2  $\frac{x^2 - x + 1}{x^3 + 1} + \frac{2x}{2x + 2}$  (4)  
[14]

**QUESTION 2**2.1 Solve for  $x$ :

2.1.1  $x(x-1) = 20$  (4)

2.1.2  $\frac{3x-2}{2} = x+1$  (3)

2.2 Given:  $-4 \leq -\frac{1}{2}m < 5$  where  $m \in R$ 

2.2.1 Solve for  $m$ . (3)

2.2.2 Write the answer to QUESTION 2.2.1 in interval notation. (1)

2.3 Given:  $4x^2 - y^2 = 171$  and  $2x - y = 9$ 

2.3.1 Calculate the value of  $2x + y$ . (2)

2.3.2 Solve simultaneously for  $x$  and  $y$ . (3)

[16]

**TUESDAY 4<sup>TH</sup> AUGUST**

DBE 2017

**QUESTION 1**

1.1 Given:  $q = \sqrt{b^2 - 4ac}$

1.1.1 Determine the value of  $q$  if  $a = 2$ ,  $b = -1$  and  $c = -4$ .  
Leave your answer in simplest surd form. (2)1.1.2 State whether  $q$  is rational or irrational. (1)1.1.3 Between which TWO consecutive integers does  $q$  lie? (1)

1.2 Factorise the following expressions fully:

1.2.1  $t^2(r - s) - r + s$  (3)

1.2.2  $\frac{x^3 + 1}{x^2 - x + 1}$  (2)

1.3 Simplify the following completely:

1.3.1  $(2y + 3)(7y^2 - 6y - 8)$  (2)

1.3.2  $\frac{3}{x^2 - 9} + \frac{2}{(x - 3)^2}$  (3)

1.3.3  $\frac{3^t - 3^{t-2}}{2 \cdot 3^t - 3^t}$  (3)  
[17]

**QUESTION 2**2.1 Given:  $4 - 2x < 16$  where  $x \in R$ 

2.1.1 Solve the inequality. (2)

2.1.2 Hence, represent your answer to QUESTION 2.1.1 on a number line. (1)

2.2 Solve simultaneously for  $x$  and  $y$ :

$$-2x - y = 10 \text{ and } 3x - 4y = -4$$
 (4)

2.3 Solve for  $x$ :

2.3.1  $\frac{x(x - 5)}{6} - 1 = 0$  (3)

2.3.2  $c = \sqrt{a + 2x}$  (2)

2.4 Tabela is currently four times as old as his daughter, Linda. Six years from now, Tabela will be three times as old as Linda.

Calculate Linda's age currently. (4)  
[16]

**WEDNESDAY 5<sup>TH</sup> AUGUST**

DBE 2018

**QUESTION 1**

1.1 Factorise the following expressions fully:

1.1.1  $4x - x^3$  (2)

1.1.2  $x^2 + 15x - 54$  (2)

1.1.3  $y - xy + x - 1$  (3)

1.2 Simplify the following expressions fully:

1.2.1  $(x + 2)(x^2 - x + 3)$  (2)

1.2.2  $\frac{5}{x+3} - \frac{3}{2-x}$  (3)

1.2.3  $\frac{25^{-x} \cdot 15^{x+1}}{3^x \cdot 5^{-x}}$  (3)

1.3 Determine the value of  $(3p + q)^2$  if  $9p^2 + q^2 = 12$  and  $pq = -3$ . (3)  
**[18]****QUESTION 2**2.1 Solve for  $x$ :

2.1.1  $px + qx = a$  (2)

2.1.2  $2x^2 - 5x + 2 = 0$  (3)

2.1.3  $\left(\frac{1}{2}\right)^{3x+1} = 32$  (3)

2.2 Given:  $-11 \leq 3m - 8 < 4$ 2.2.1 Solve for  $m$ . (2)

2.2.2 Hence, write down the number of integers that satisfy the inequality. (1)

2.3 Solve simultaneously for  $x$  and  $y$  if:

$5x + 4y = 21$  and  $2x = 3 - y$  (4)

**[15]**

**THURSDAY 6<sup>TH</sup> AUGUST**

DBE 2019

**QUESTION 1**

1.1 Factorise the following expressions fully:

1.1.1  $3y^2 + y$  (1)

1.1.2  $x^2 - 10x - 24$  (2)

1.1.3  $9x^2 - y^2 + 10y - 25$  (3)

1.2 Simplify the following expressions fully:

1.2.1  $\left(4 + \frac{1}{x}\right)\left(2 - \frac{3}{x}\right)$  (2)

1.2.2  $\frac{5x - 5}{5x}$  (2)

1.2.3  $\frac{3^{x+1} + 3^x}{27 \cdot 3^{-1+x}}$  (3)  
[13]

**QUESTION 2**2.1 Solve for  $x$ :

2.1.1  $2x^2 - 10x = 0$  (2)

2.1.2  $px - kx = k - p$  (3)

2.1.3  $2^{\frac{x}{3}} = \frac{1}{128}$  (3)

2.2 Given:  $\frac{x+5}{2} > -2$ 2.2.1 Solve for  $x$ . (2)2.2.2 If  $x \in R$ , represent the solution to QUESTION 2.2.1 on a number line. (1)2.3 Solve simultaneously for  $x$  and  $y$  if:

$$x(x - 3) + y(3 - x) = 0$$
 (4)

2.4 During a fundraising event, only R10, R20 and R50 notes were collected. In the final count, there were twice as many R20 notes as there were R50 notes, and 15 more R10 notes than R50 notes.

If R10 150 was collected in total, determine the number of R10, R20 and R50 notes that were collected. (4)

[19]

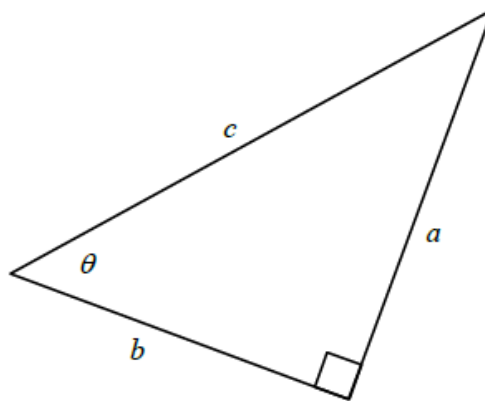
**FRIDAY 7<sup>TH</sup> AUGUST – REVISION & CONSOLIDATION OF WEEK'S WORK**

**WEEK 2 (10<sup>th</sup> – 14<sup>th</sup> AUGUST 2020)****TRIGONOMETRY****MONDAY 10<sup>TH</sup> AUGUST**

DBE 2016

**QUESTION 4**

4.1 A right-angled triangle has sides  $a$ ,  $b$  and  $c$  and the angle  $\theta$ , as shown below.



4.1.1 Write the following in terms of  $a$ ,  $b$  and  $c$ :

(a)  $\cos \theta$  (1)

(b)  $\tan \theta$  (1)

(c)  $\sin(90^\circ - \theta)$  (2)

4.1.2 If it is given that  $a = 5$  and  $\theta = 50^\circ$ , calculate the numerical value of  $b$ . (2)

4.2 Given that  $\hat{A} = 38,2^\circ$  and  $\hat{B} = 146,4^\circ$ .

Calculate the value of  $2\operatorname{cosec}A + \cos 3B$ . (3)

4.3 Simplify fully, WITHOUT the use of a calculator:

$$\frac{\sin 45^\circ \cdot \tan^2 60^\circ}{\cos 45^\circ} \quad (4)$$

4.4 Given that  $5\cos \beta - 3 = 0$  and  $0^\circ < \beta < 90^\circ$ .

If  $\alpha + \beta = 90^\circ$  and  $0^\circ < \alpha < 90^\circ$ , calculate the value of  $\cot \alpha$ . (4)

[17]



**TUESDAY 11<sup>TH</sup> AUGUST**

DBE 2017

**QUESTION 4**4.1 Given  $4 \cot \theta + 3 = 0$  and  $0^\circ < \theta < 180^\circ$ .

4.1.1 Use a sketch to determine the value of the following. DO NOT use a calculator.

(a)  $\cos \theta$  (4)

(b)  $\frac{3 \sin \theta \sec \theta}{\tan \theta}$  (4)

4.1.2 Hence, show that  $\sin^2 \theta - 1 = -\cos^2 \theta$ . (3)

4.2 Simplify the following expression WITHOUT using a calculator:

$$\cos 30^\circ \tan 60^\circ + \operatorname{cosec}^2 45^\circ \sin^2 60^\circ$$
 (3)

4.3 Solve for  $\theta$  correct to TWO decimal places, if

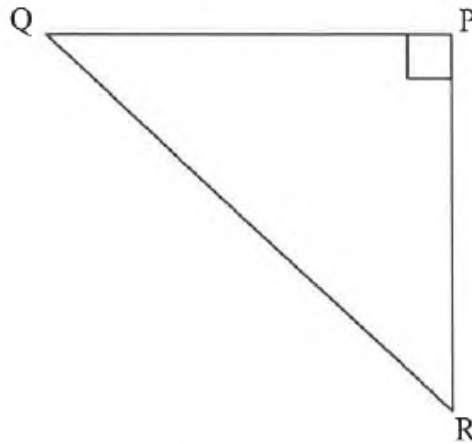
$$\frac{4}{3} \sin \theta = \cos 37^\circ \text{ and } 0^\circ \leq \theta \leq 90^\circ.$$
 (2)  
**[16]**

**WEDNESDAY 12<sup>TH</sup> AUGUST**

DBE 2018

**QUESTION 3**

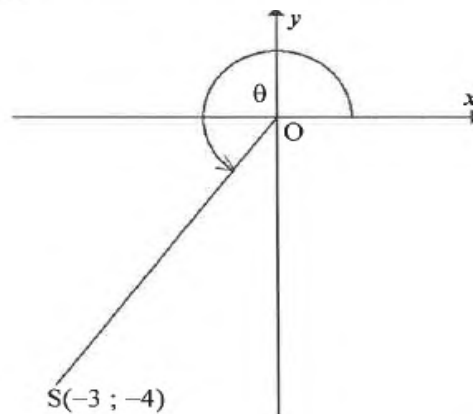
3.1 In the diagram below,  $\triangle QPR$  is a right-angled triangle with  $\hat{Q}PR = 90^\circ$ .



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  $\theta$  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]

**THURSDAY 13<sup>TH</sup> AUGUST**

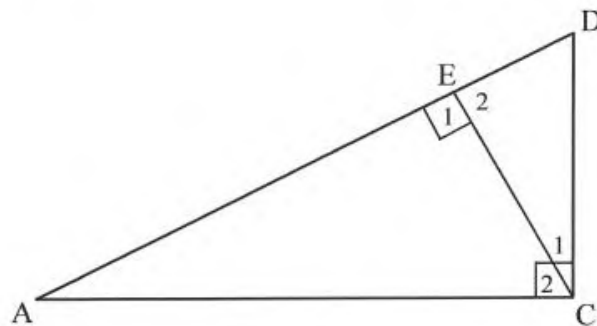
DBE 2019

**QUESTION 3**

3.1 If  $x = 37^\circ$  and  $y = 44^\circ$ , calculate the value of  $\sin^2 x + 2 \cos y$ . (1)

3.2 WITHOUT using a calculator, determine the value of  $\frac{\sin 30^\circ \cdot \cot 45^\circ}{\cos 30^\circ \cdot \tan 60^\circ}$  (3)

3.3 In the diagram below,  $\triangle ACD$  is right-angled at  $C$ .  $E$  lies on  $AD$  such that  $CE$  is perpendicular to  $AD$ .



3.3.1 Write down the ratio for  $\cos D$  in  $\triangle ACD$ . (1)

3.3.2 Write down the ratio for  $\cos D$  in  $\triangle CED$ . (1)

3.3.3 If  $AD = 13$  units and  $DC = 5$  units, calculate the length of  $ED$ . (2)

3.4 Given that  $\cos \theta = \frac{5}{13}$  and  $\sin \theta < 0$ .

With the aid of a diagram and WITHOUT using a calculator, determine the value of:

3.4.1  $\sin \theta$  (3)

3.4.2  $\sec \theta + \tan^2 \theta + 1$  (4)

**[15]****FRIDAY 14<sup>TH</sup> AUGUST – REVISION & CONSOLIDATION OF WEEK'S WORK**

**WEEK 3 (17<sup>TH</sup> – 21<sup>ST</sup> AUGUST 2020)**

**EUCLIDEAN GEOMETRY**

**MONDAY 17<sup>TH</sup> AUGUST**

DBE 2016

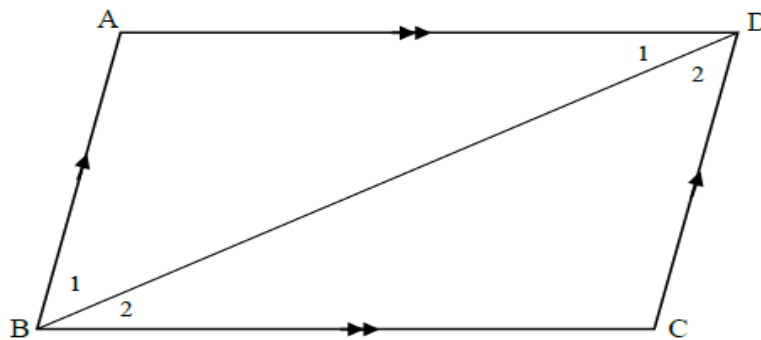
Give reasons for your statements in QUESTIONS 8 and 9.

**QUESTION 8**

8.1 Complete the following statement:

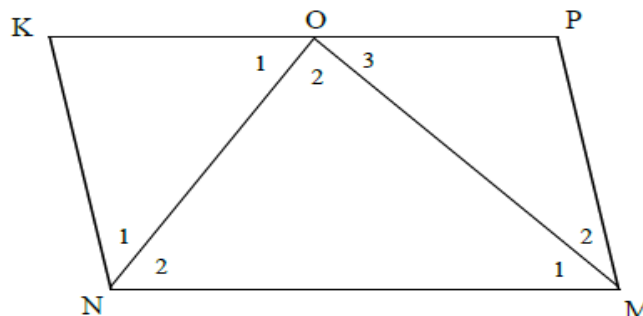
If the opposite angles of a quadrilateral are equal, then the quadrilateral ... (1)

8.2 Use the sketch below to prove that the opposite sides of a parallelogram are equal.



(6)

8.3 In the sketch below, KPMN is a parallelogram. ON bisects  $\hat{KNM}$  and OM bisects  $\hat{NMP}$ .



8.3.1 Show that  $\hat{NOM} = 90^\circ$ . (3)

8.3.2 Prove that O is the midpoint of KP. (6)

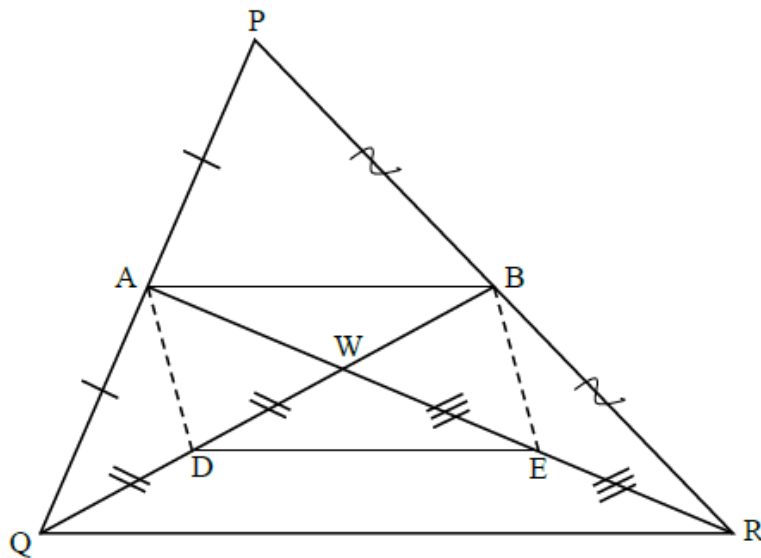
[16]

## QUESTION 9

9.1 Complete the following statement:

The line through the midpoint of two sides in a triangle is parallel to and ... the third side. (1)

9.2 In  $\triangle PQR$ ,  $A$  and  $B$  are the midpoints of sides  $PQ$  and  $PR$  respectively.  $AR$  and  $BQ$  intersect at  $W$ .  $D$  and  $E$  are points on  $WQ$  and  $WR$  respectively such that  $WD = DQ$  and  $WE = ER$ .



Prove that  $ADEB$  is a parallelogram.

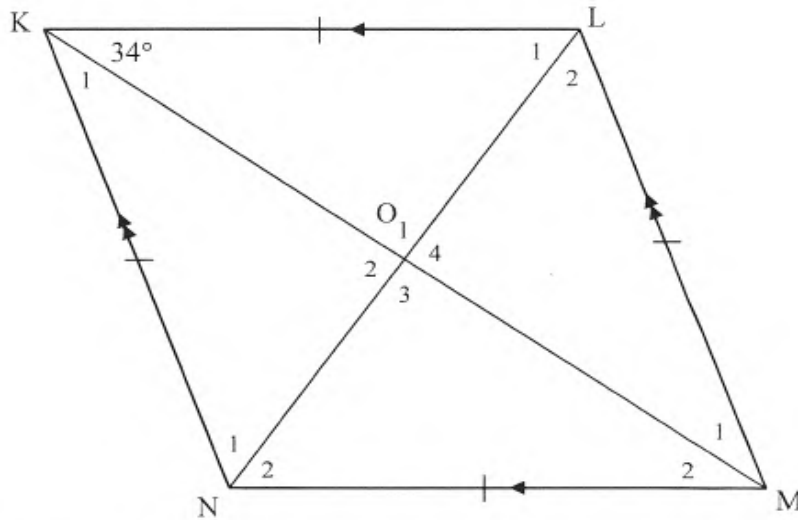
(5)  
[6]

**TUESDAY 18<sup>TH</sup> AUGUST**

DBE 2017

QUESTION 8

8.1 KLMN is a rhombus with diagonals intersecting at O.  $\hat{LKM} = 34^\circ$ .



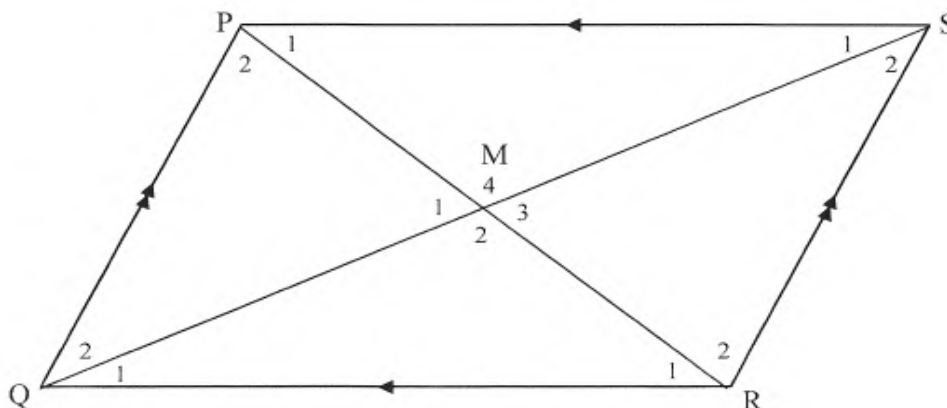
8.1.1 Write down the size of  $\hat{O}_1$ . (1)

8.1.2 Calculate the size of  $\hat{L}_1$ . (2)

8.1.3 Calculate the size of  $\hat{KNM}$ . (2)

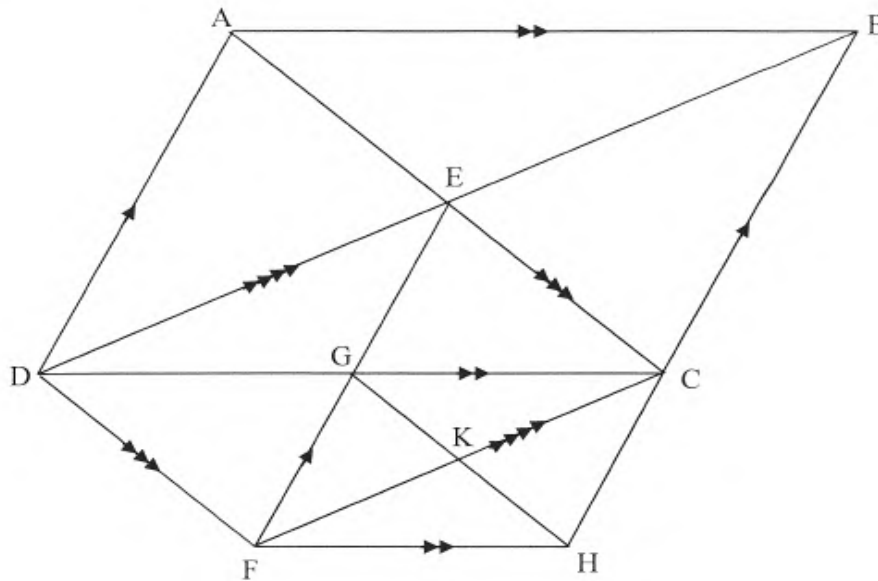
8.2 Given parallelogram PQRS with diagonals PR and QS intersecting at M.

8.2 Given parallelogram PQRS with diagonals PR and QS intersecting at M.



Prove that the diagonals bisect each other. (4)

8.3 In the diagram, ABCD is a parallelogram with diagonals intersecting at E. The diagonals of parallelogram DECF intersect at G. The diagonals of parallelogram FGCH intersect at K.

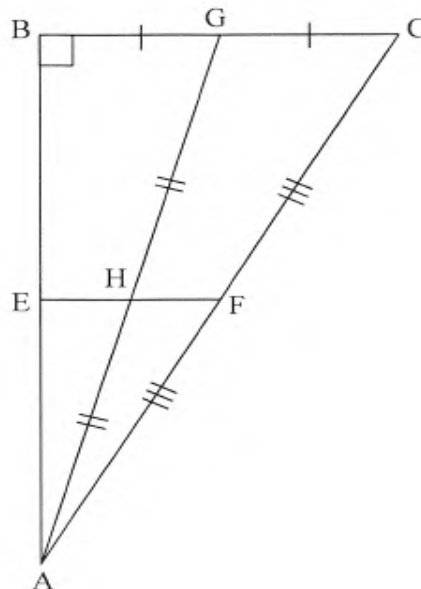


Prove that  $DB = 4KC$ .

(4)  
[13]

**QUESTION 9**

$\Delta ABC$  is right-angled at B. F and G are the midpoints of AC and BC respectively. H is the midpoint of AG. E lies on AB such that FHE is a straight line.



9.1 Prove that E is the midpoint of AB. (3)

9.2 If  $EH = 3,5 \text{ cm}$  and the area of  $\Delta AEH = 9,5 \text{ cm}^2$ , calculate the length of AB. (3)

9.3 Hence, calculate the area of  $\Delta ABC$ . (3)

[9]

**WEDNESDAY 19<sup>TH</sup> AUGUST**

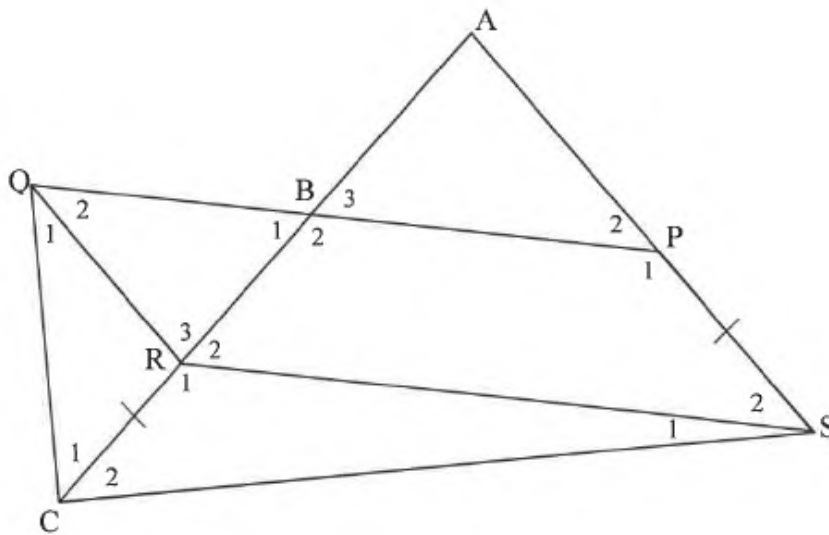
DBE 2018

**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.



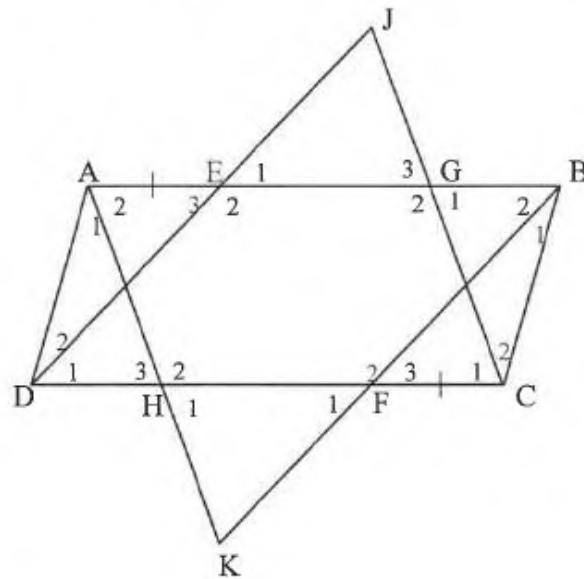
7.2.1 Calculate the size of  $\hat{A}$ . (5)

7.2.2 Determine the length of QP. (3)

[9]



- 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.

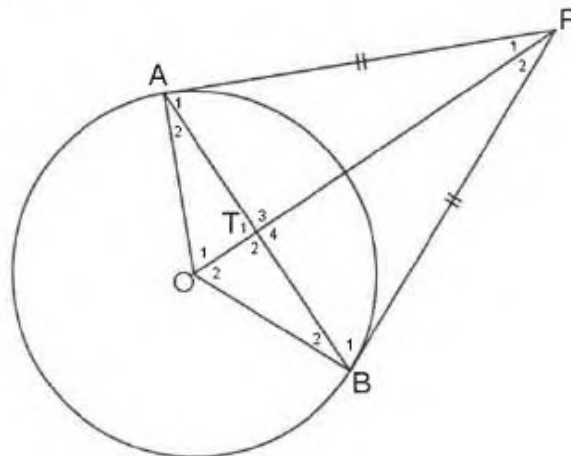


Prove that:

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)

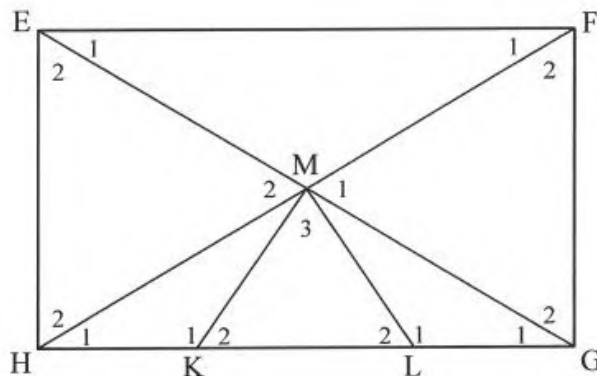
8.2.2  $\hat{O}TA = 90^\circ$  (1)  
[15]

**THURSDAY 20<sup>TH</sup> AUGUST**

DBE 2019

**QUESTION 7**

7.1 In the diagram, EFGH is a rectangle having diagonals intersecting at M.  $\hat{M}_2 = 60^\circ$  and  $\hat{L}_2 = 40^\circ$ .

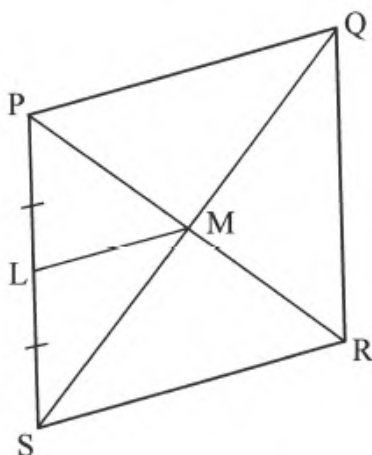


Calculate the size of:

7.1.1  $\hat{F}_1$  (2)

7.1.2  $\hat{GML}$  (3)

7.2 PQRS is a rhombus with diagonals PR and SQ intersecting at M. The perimeter of the rhombus is 12 cm. L is the midpoint of PS.



Calculate the length of LM.

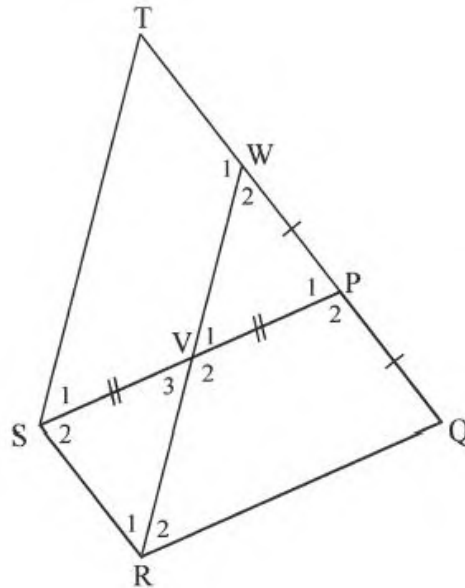
(4)  
[9]

**QUESTION 8**

8.1 Complete the statement so that it is TRUE:

The diagonals of a parallelogram ... each other. (1)

8.2 In the diagram below, P is the midpoint of side WQ of  $\triangle WQR$ . V is on WR such that  $VP \parallel RQ$ . PV is produced by its own length to S. PW is produced to T and ST drawn.



8.2.1 Give a reason why  $WV = VR$ . (1)

8.2.2 Prove that:

(a)  $\triangle VWP \cong \triangle VRS$  (3)

(b) SWPR is a parallelogram (2)

(c) PQRS is a parallelogram (3)

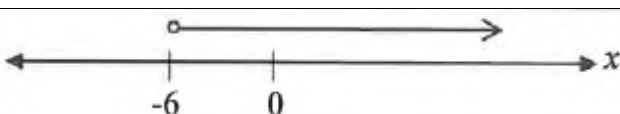
8.2.3 If it is further given that RSTW is a parallelogram, show that  $TQ = 3SR$ . (2) [12]

**FRIDAY 21<sup>ST</sup> AUGUST – REVISION & CONSOLIDATION OF WEEK’S WORK**


## ANSWERS TO QUESTIONS

## WEEK 1

MATHEMATICS PAPER 1 (DBE NATIONAL PAPER (2016))	
Algebra, Equations and Inequalities	
1.1.1	$x(x - 1)$
1.1.2	$(3x - 2m)(x + p)$
1.1.3	$2(p - 3)(p + 2)$
1.2.1	$x = \frac{3}{2}$
1.2.2	$\frac{1}{x}$
2.1.1	$x = 5$ or $x = -4$
2.1.2	$x = 4$
2.2.1	$-10 < m \leq 8$
2.2.2	$(-10; 8]$
2.3.1	$2x + y = 19$
2.3.2	$x = 7$ and $y = 5$

MATHEMATICS PAPER 1 (DBE NATIONAL PAPER (2017))	
Algebra, Equations and Inequalities	
1.1.1	$q = \sqrt{33}$
1.1.2	Irrational
1.1.3	5 and 6
1.2.1	$(r - s)(t + 1)(t - 1)$
1.2.2	$(x + 1)$
1.3.1	$14y^3 + 9y^2 - 34y - 24$
1.3.2	$\frac{5x - 3}{(x - 3)^2(x + 3)}$
2.1.1	$\frac{8}{9}$
2.1.2	
2.1.3	$x > -6$
2.2	$x = -4$ $y = -2$
2.3.1	$x = 6$ or $x = -1$
2.3.2	$x = \frac{c^2 - a}{2}$
2.4	$x = 12$

MATHEMATICS PAPER 1 (DBE NATIONAL PAPER (2018))	
Algebra, Equations and Inequalities	
1.1.1	$x(2-x)(2+x)$
1.1.2	$\frac{(x+18)(x-3)}{(y-1)(1-x)}$
1.1.3	$\frac{(y-1)(1-x)}{(y-1)(1-x)}$
1.2.1	$x^3 + x^2 + x + 6$
1.2.2	$\frac{8x-1}{(x+3)(x-2)}$
1.2.3	15
1.3	-6
2.1.1	$x = \frac{a}{p+q} ; p \neq -q$
2.1.2	$x = \frac{1}{2} \text{ or } x = 2$
2.1.3	$x = -2$
2.2.1	$-1 \leq m < 4$
2.2.2	5

MATHEMATICS PAPER 1 (DBE NATIONAL PAPER (2019))	
Algebra, Equations and Inequalities	
1.1.1	$y(3y+1)$
1.1.2	$(x-12)(x+2)$
1.1.3	$(3x+y-5)(3x-y+5)$
1.2.1	$8 - \frac{10}{x} - \frac{3}{x^2}$
1.2.2	$\frac{x-1}{x}$
1.2.3	$\frac{4}{9}$
2.1.1	$x = 0 \text{ or } x = 5$
2.1.2	$x = -1$
2.1.3	$x = -21$
2.2.1	$x > -9$
2.2.2	
2.3	$x = 3 \text{ or } y = x = 3$
2.4	$x = 100$

## WEEK 2

MATHEMATICS PAPER 2 (DBE NATIONAL PAPER (2016))	
Trigonometry	
4.1.1(a)	$\frac{b}{c}$
4.1.1 (b)	$\frac{a}{b}$
4.1.3(c)	$\frac{b}{c}$
4.1.2	b= 4.20
4.2	3.42
4.3	3
4.4	$\cot\alpha = \frac{4}{3}$

MATHEMATICS PAPER 2 (DBE NATIONAL PAPER (2017))	
4.1.1(a)	$\cos\theta = -\frac{3}{5}$
4.1.2(b)	$\sin^2\theta - 1 = -\cos^2\theta.$
4.2	3
4.3	$\theta = 36,8^\circ$

MATHEMATICS PAPER 2 (DBE NATIONAL PAPER (2018))	
3.1.1	$\frac{q}{r}$
3.1.2	sec Q
3.2.1	5
3.2.2	$\frac{-77}{75}$
3.3	$\frac{2}{\sqrt{6}}$

MATHEMATICS PAPER 2 (DBE NATIONAL PAPER (2019))	
3.1	1,80
3.2	$\frac{1}{3}$
3.3.1	$\cos D = \frac{CD}{AD}$
3.3.2	$\cos D = \frac{DE}{CD}$
3.3.3	ED=1,92

3.4.1	$\sin \theta = \frac{-12}{13}$
3.4.2	$\frac{234}{25}$

**WEEK 3****MATHEMATICS PAPER 2 (DBE NATIONAL PAPER (2016))**

8.1	Is parallel
8.2	Proof
8.3.1	Proof
8.3.2	Proof
9.1	Half the length
9.2	Proof

**MATHEMATICS PAPER 2 (DBE NATIONAL PAPER (2017))**

8.1.1	$\widehat{O}_1 = 90^\circ$
8.1.2	$\widehat{L}_1 = 56^\circ$
8.1.3	$\widehat{KMN} = 112^\circ$
8.2	Proof
8.3	Proof
9.1	Proof
9.2	10,86cm
9.3	76cm <sup>2</sup>

**MATHEMATICS PAPER 2 (DBE NATIONAL PAPER (2018))**

7.1	Bisects the third side
7.2.1	$\widehat{A} = 100^\circ$
7.2.2	QP = 120
8.1.1	Proof
8.1.2	Proof
8.2.1	Proof
8.2.2	$\widehat{OTA} = 90^\circ$

**MATHEMATICS PAPER 2 (DBE NATIONAL PAPER (2019))**

7.1.1	$\hat{F}_1 = 30^\circ$
7.1.2	$\widehat{GML} = 10^\circ$
7.2	LM=1,5cm
8.1	Bisect each other
8.2.1	The line drawn from the midpoint of one side of a triangle parallel to the other side bisects the third side.
8.2.2a	Proof
8.2.2b	Proof
8.2.2c	Proof
8.3	Proof

**ALL DBE November National Papers from 2016 – 2019 were utilized when compiling this document.**