BERGVLIET HIGH SCHOOL

MATHEMATICS DEPARTMENT

NOVEMBER EXAMINATION

GRADE 9

MATHEMATICS PAPER 2

21 November 2024

MARKS: 75

TIME: 90 MINUTES

SET BY: T Herbert

MODERATOR: D Viljoen

Name: _____

Teacher	Eb	Jo	Le	Si	Sm	Vi	Wh	Ws	(circle your teacher)
Class	B	E	R	G	V	L	I	T	(circle your class)

Question	1	2	3	4	5	Total
Mark obtained						
	/15	**/26**	**/8**	**/16**	**/10**	**/75**

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 5 questions and 11 pages.
2. Answer ALL questions in this QUESTION PAPER provided.
3. Clearly show ALL calculations, diagrams, graphs, etc 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.

Useful formulas.

$C = 2\pi r$	$V = s^3$
$P = 2(l + b)$	$V = lbh$
$P = a + b + c$	$V = \pi r^2 h$
$A = s^2$	$V = \frac{1}{2}bhd$
$A = \frac{1}{2}bh$	$TSA = 2lb + 2lh + 2bh$
$A = lb$	$TSA = 2(\frac{1}{2}bh) + ad + bd + cd$
$A = bh$	$TSA = 2\pi r^2 + 2\pi rh$
$A = \pi r^2$	

Question 1: Data handling and Probability

1.1 Given below are the marks, out of 50, for a Mathematics test written by a Grade 9 class at a particular school.

3	12	38	43
15	39	47	29
8	38	37	42
22	36	28	31
11	19	25	12

1.1.1 Complete the table using the data above. (3)

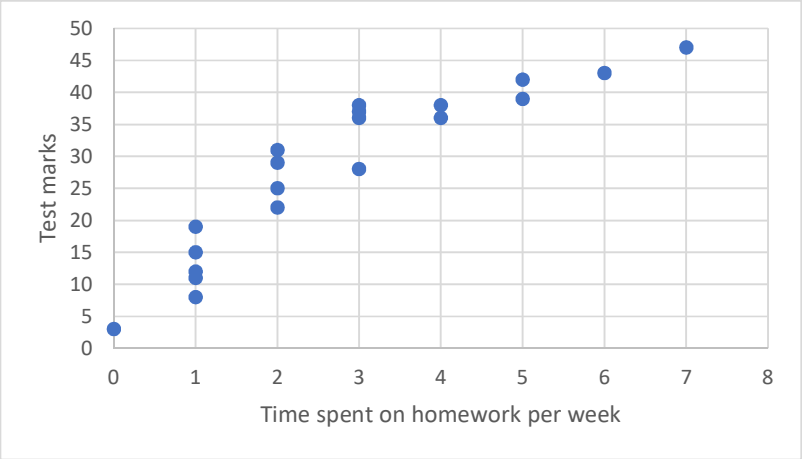
Marks	Tally	Frequency	Midpoint	Freq. x midpt.
$0 \leq x < 10$				
$10 \leq x < 20$				
$20 \leq x < 30$				
$30 \leq x < 40$				
$40 \leq x < 50$				
TOTAL				

1.1.2 Calculate the estimated mean of the grouped data set. (2)

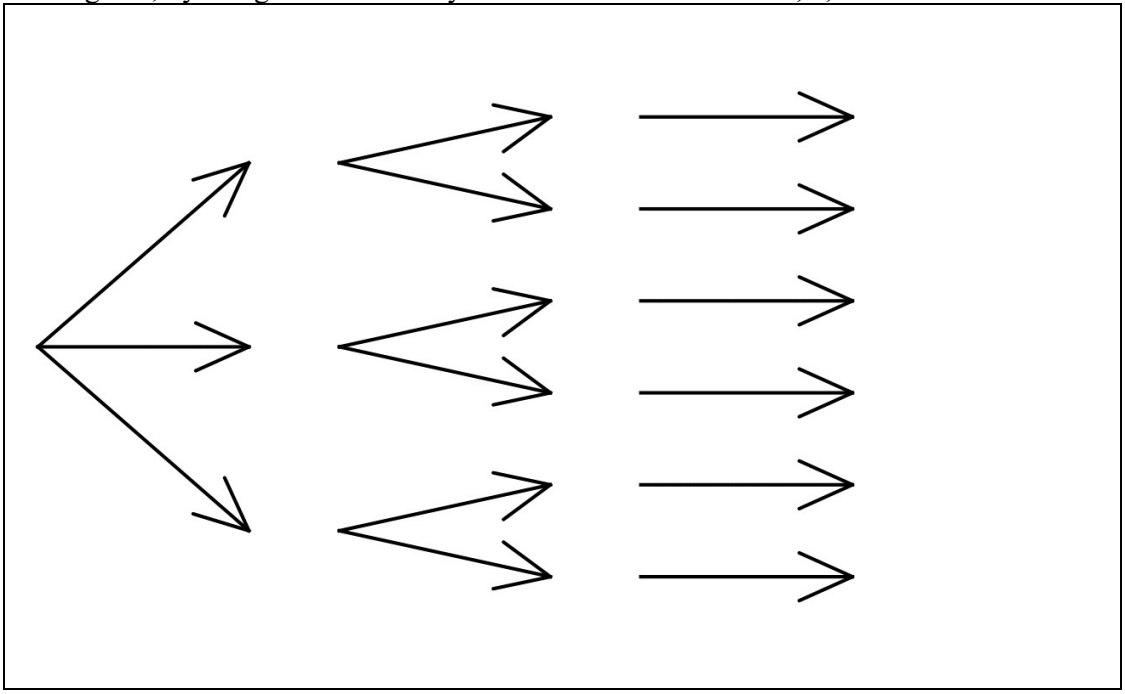
1.1.3 Determine the median interval of the grouped data set. (2)

1.1.4 What is the modal class of the data set? (1)

1.2 Given below is the correlation between the time the learners spent doing their homework each week (in hours), and the marks they obtained in the test. Describe the correlation. (2)



1.3 Complete the tree diagram to show all three-letter combinations that can be made from the letters given, by using each letter only once in the combination: **T,A,B** (3)



1.3.1 Write down the sample space. (1)

S = {_____ ; _____ ; _____ ; _____ ; _____ ; _____ }

1.3.2 What is the probability of selecting a combination that is a word in the English language? (1)

[15]

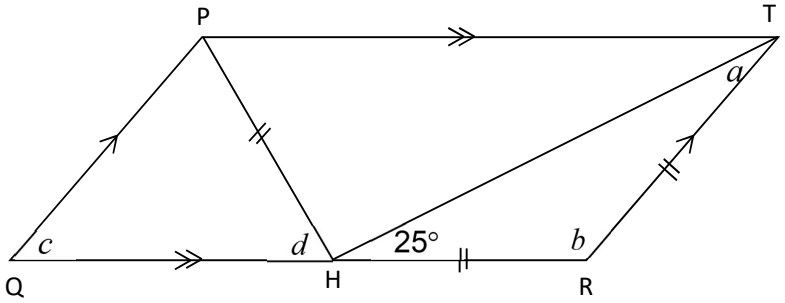
Question 2: 2D geometry

2.1 Match the following coumns. The first row is completed as an example. (5)

			Answer
1	Supplementary	A quadrilateral with two pairs of adjacent sides that are equal in length	5
2	The sum of the opposite interior angles	Lines that never intersect or cross one another on a plane and remain the same distance apart	
3	Parallel lines	Triangles are congruent	
4	90°	The exterior angle of a triangle is equal to…	
5	Kite	Sum to 180°	
6	AAA	The diagonals of a kite bisect at	
7	AAS		

Give reasons for all your answers.

2.2 Consider the shape below



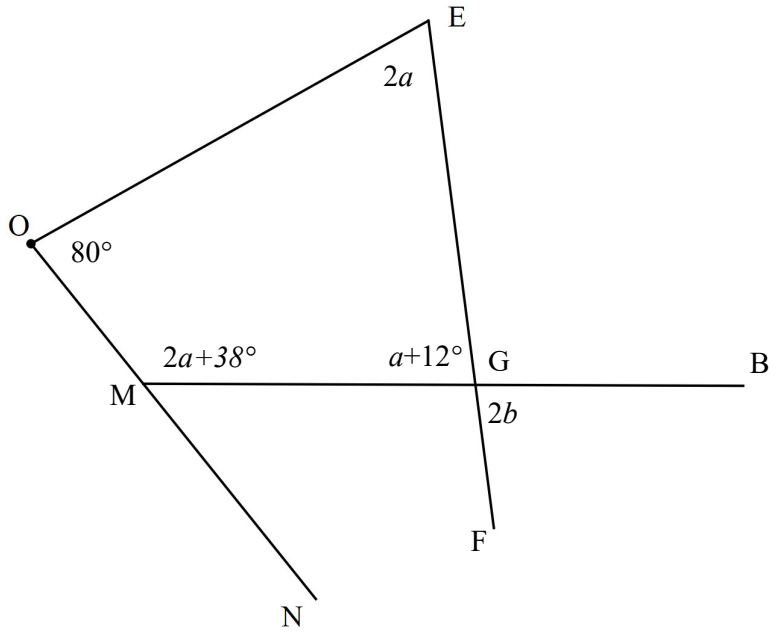
2.2.1 What type of quadrilateral is PQRT? (2)

Statement	Reason

2.2.2 Calculate the sizes of *a, b, c,* and *d.* (9)

Statement	Reason

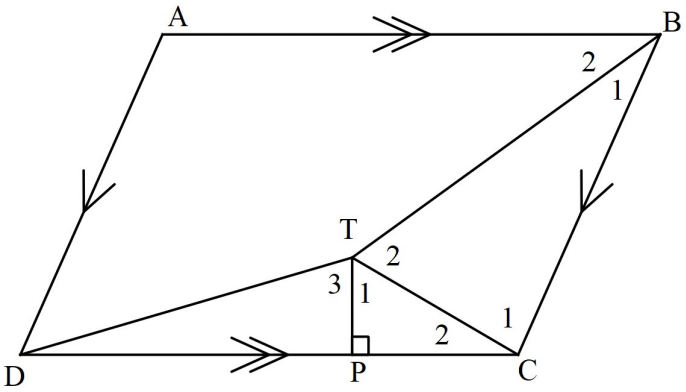
2.3 Calculate a and b in the figure below



Statement	Reason

(5)

2.4



The angle bisectors of $\hat{B}$ and $\hat{C}$ of parallelogram ABCD intersect at T.

Points B, T and D do not lie on a straight line. P is a point on DC such that $T\hat{P}C = 90°$.

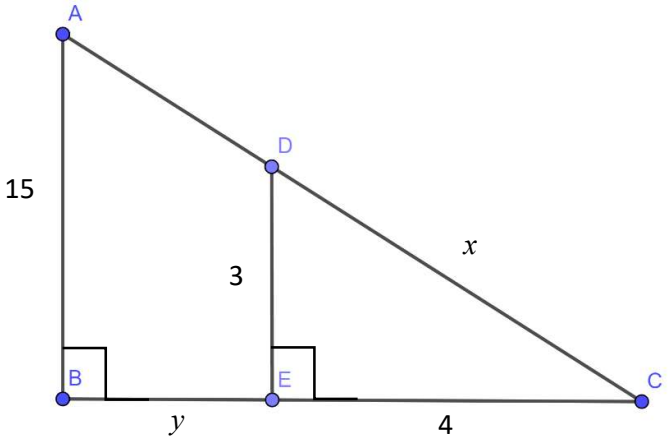
Prove that $\hat{T}_2 = 90°$

Statement	Reason

(5)

[26]

Question 3: Similarity and Proportion



3.1 Prove that ΔABC and ΔDEC are similar. (4)

Statement	Reason

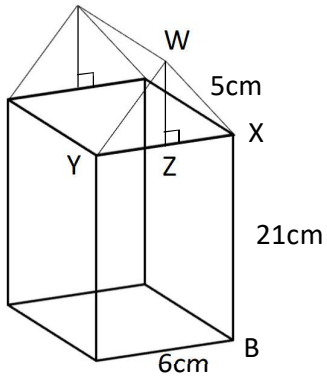
3.2 Hence, or otherwise, calculate the values of x and y. (4)

Statement	Reason

[8]

Question 4: Measurement

4.1 Consider the volume of the milk carton pictured. The base is a square with sides 6cm. Side XB is 21cm. The front facing triangle WYX is isosceles with hypotenuse 5cm.



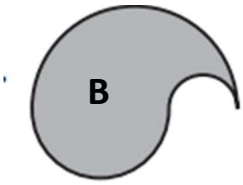
4.1.1 Calculate the height WZ, in triangle WYX. (3)

4.1.2 What is the total height of the carton? (1)

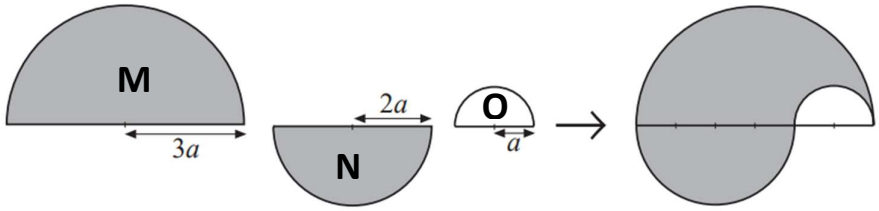
4.1.3 Calculate the total volume of the milk carton. (4)

4.1.4 Twelve milk cartons are packed into a crate 25cm tall, 18cm wide, and 24cm deep. How much empty space is in the crate when fully packed? (3)

4.2 This shape, labelled B, is designed using three semi-circles M,N, and O respectively.



The radii of the circles M,N and O, are 3a, 2a, and a respectively.

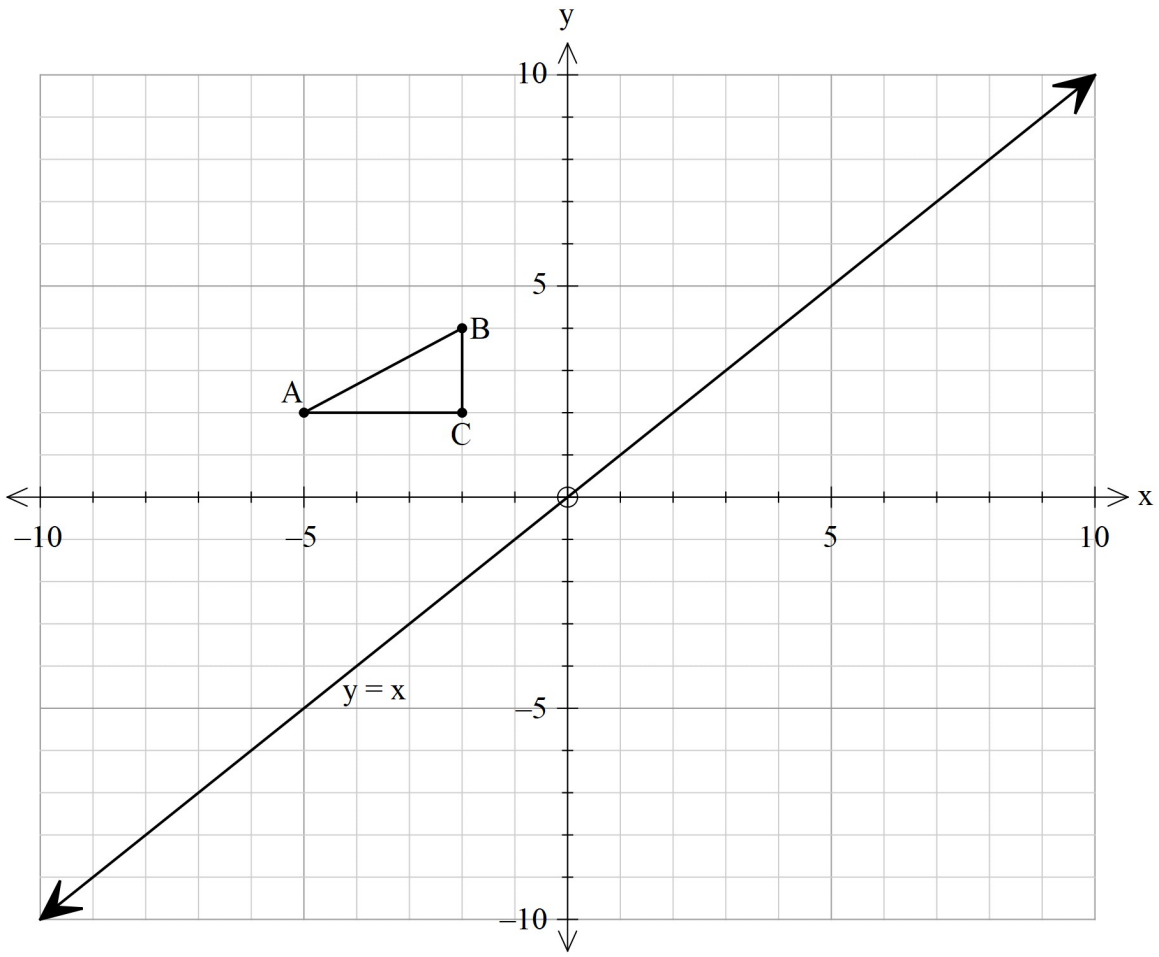


4.2.1 Calculate the area of each of the semi-circles M, N, O respectively in terms of a, and π. (3)

4.2.2 Determine the total area of the shape B in terms of a and π. (2)

[16]

Question 5: Transformation geometry



5.1 On the given set of axes is triangle ABC. The coordinates are A(-5,2); B(-2,4); C(-2,2).

5.1.1 Triangle ABC is reflected about the line y=x to form its image A'B'C'. Draw and label this image on the given set of axes. (3)

5.1.2 Triangle ABC is translated using the following rule $(x, y) \rightarrow (x + 2; y - 2)$. (3)
Complete the algebraic rule below.

A (-5, 2) →	P(_____;_____)
B (-2, 4) →	Q(_____;_____)
C (-2, 2) →	R(_____;_____)

5.1.3 Following the translation of 5.1.2, the triangle PQR is then enlarged by a factor of 3 to form its new image P'Q'R'. Draw and label the image on the given set of axes above. (3)

5.1.4 Calculate the following ratio (1)
Area ΔABC : Area ΔA'B'C : Area ΔP'Q'R'

[10]

Additional working space. Make sure to number the questions answered here.

