This is a Class 1 exam

Lebanon Evangelical School for Boys and Girls

Lebanon Evangelical School
for Boys and Girls Loueizeh - Baabda

Stage Exam 04

20-25JUN2025

Do NOT write in this box. Your MARK will be placed here.

Subject :	Maths
Class :	9B, 9C and 9E
Teacher :	Mr. George Mouhayar
Duration :	1 hour

1. Calculators are allowed.
2. Show all of your work.
3. Graph paper needed.

You are to answer the questions to this exam on : Squared paper

Your name :		*Time taken to complete exam*
Your Class :		
Exam Room :		
How many sheets, including cover sheet :		

- Do not open this paper until the teacher in charge instructs you to do so.
- The most important thing to remember in taking an exam is NEVER PANIC.
- If you are caught cheating in this exam, you will be awarded zero for ALL exams that are taken on this day.

I. (7.5 points)

Solve each of the following system of inequalities and represent the solution on a number line and as an interval notation.

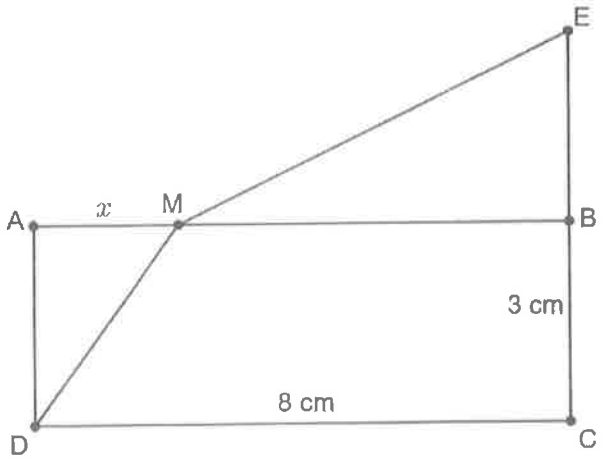
a. $\begin{cases} 4(x-2)+3 \leq 7x-5 \\ 5x+12 > 3(x+1) \end{cases}$

b. $\begin{cases} 5(x-3) \leq 2(x+1)-2 \\ \frac{x+1}{4} - \frac{1}{2} \leq \frac{4x-1}{8} \end{cases}$

II. (8 points)

In the figure below, $ABCD$ is a rectangle in which $AB = 8\ cm$ and $BC = 3\ cm$. B is the midpoint of $[EC]$. Let M be a variable point on $[AB]$ with $AM = x$.

a. In terms of x, express the areas of triangles AMD and BEM.
b. In terms of x, express the area of trapezoid $MBCD$.
c. The area of triangle AMD is greater than or equal to the area of triangle BEM and less than that of trapezoid $MBCD$.
   i. Write a system of two inequalities to describe the above information and solve it by showing the solution on a number line and interval form.
   ii. If x is a natural number, what are the possible values of x?



III. (8 points)

In an orthonormal system of axes $(x'Ox, y'Oy)$, consider the points A (-1, -2), B (2, 2), and C (6, 1).

a. Plot the points A, B, and C.

b. Calculate the components (coordinates) of vectors $\overrightarrow{AB}$ and $\overrightarrow{CB}$.

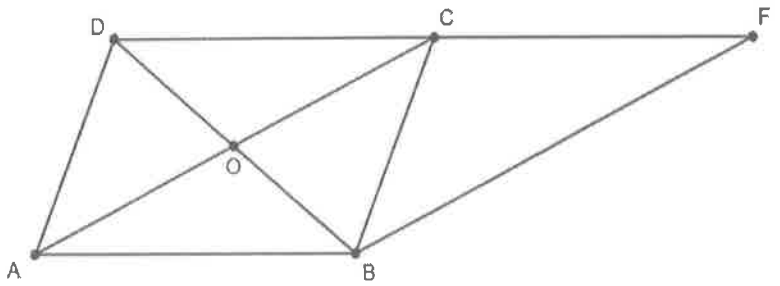
c. Calculate the coordinates of point D so that ABCD is a parallelogram.

d. Consider the point E (-1, 2). Designate by F the translate of E by the translation vector $\overrightarrow{AO} + \overrightarrow{OB}$. Find the coordinates of point F.

e. What is the nature of quadrilateral CDEF? Justify your answer.

IV. (6.5 points)

ABCD is a parallelogram of center O. F is the translate of C by the translation vector $\overrightarrow{AB}$.



1. Copy and complete the following (Mention the rule used):
   a. $\overrightarrow{FB} + \overrightarrow{CF} =$ _____
   b. $\overrightarrow{BA} + \overrightarrow{BC} =$ _____
   c. $\overrightarrow{DA} + \overrightarrow{BC} =$ _____
   d. $\overrightarrow{FC} + \overrightarrow{DA} =$ _____
   e. $\overrightarrow{CO} + \overrightarrow{AB} =$ _____
   f. $\overrightarrow{CF} + \overrightarrow{CA} =$ _____
2. Answer by true or false. Correct if false.
   a. $\overrightarrow{DB} + \overrightarrow{CA} = \overrightarrow{DA} + \overrightarrow{CB}$
   b. F is the translate (image) of B by the translation vector $\overrightarrow{CA}$

Solution for SE04 — Class 1

9BCE Maths - 2024 2025

I. a) $\begin{cases} 4(x-2)+3 \leq 7x-5 \\ 5x+12 > 3(x+1) \end{cases}$

1st inequality :

$4(x-2)+3 \leq 7x-5$

$4x-8+3 \leq 7x-5$

$4x-7x \leq 8-3-5$

$-3x \leq 0$

$\boxed{x \geq 0}$ (0.75)

2nd inequality :

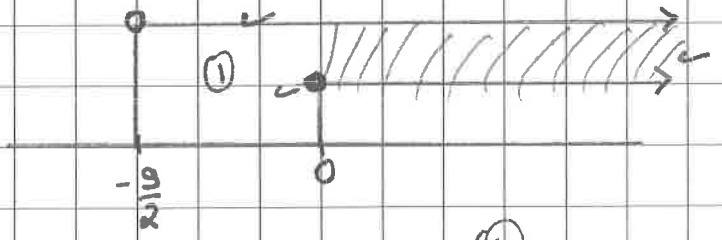
$5x+12 > 3(x+1)$

$5x+12 > 3x+3$

$5x-3x > 3-12$

$2x > -9$

$\boxed{x > -\frac{9}{2}}$ (0.5)



(0.25) (1)

Solution: $x \in [0; +\infty[$ or $x \geq 0$

b) $\begin{cases} 5(x-3) \leq 2(x+1)-2 \\ \frac{x+1}{4} - \frac{1}{2} \leq \frac{4x-1}{8} \end{cases}$

1st inequality :

$5x-15 \leq 2x+2-2$

$5x-2x \leq 15$

$3x \leq 15$

$\boxed{x \leq 5}$ (0.5)

2nd inequality :

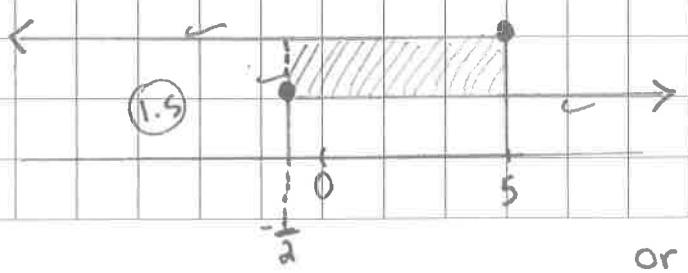
$\frac{2(x+1)}{4\times 2} - \frac{1\times 4}{2\times 4} \leq \frac{4x-1}{8}$

$2x+2-4 \leq 4x-1$

$2x-4x \leq 4-2-1$

$\frac{-2x}{-2} \leq \frac{1}{-2}$ (1)

$\boxed{x \geq -\frac{1}{2}}$



Solution: $x \in [-\frac{1}{2}; 5]$ (1)

or $-\frac{1}{2} \leq x \leq 5$

II.

a) $A_{\Delta AMD} = \frac{B \times H}{2}$

$A_{\Delta AMD} = \frac{3x}{2}$ (0.5)

$A_{\Delta BEM} = \frac{B \times H}{2}$

$= \frac{3(8-x)}{2}$

$A_{\Delta BEM} = \frac{24-3x}{2}$ (1)

b) $A_{MBCD} = \frac{(a+b)H}{2}$

$= \frac{(8+8-x)(3)}{2}$

$= \frac{3(16-x)}{2}$ (1.5)

$A_{MBCD} = \frac{48-3x}{2}$

OR $A_{MBCD} = 24 - A_{AMD}$

$= 24 - \frac{3x}{2}$

$= \frac{48-3x}{2}$

c) i) $\begin{cases} \frac{3x}{2} \geq \frac{24-3x}{2} & (0.5) \\ \frac{3x}{2} < \frac{48-3x}{2} & (0.5) \end{cases}$

1st inequality:

$\frac{3x}{2} \geq \frac{24-3x}{2}$

$3x \geq 24 - 3x$

$6x \geq 24$ (0.5)

$x \geq 4$

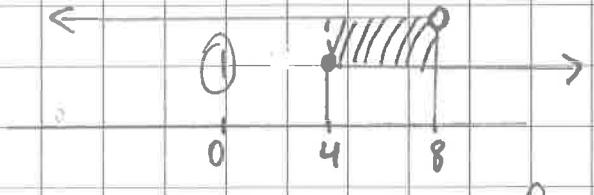
2nd inequality:

$\frac{3x}{2} < \frac{48-3x}{2}$

$3x < 48 - 3x$

$6x < 48$

$x < 8$ (0.5)



(1)

$x \in [4; 8[$

ii) If x is a natural number, the possible values of x (1) are 4, 5, 6, and 7

III a) on the graph paper (1)

b) $\vec{AB}\ (x_{\vec{AB}}\ ;\ y_{\vec{AB}})$

$x_{\vec{AB}} = x_B - x_A$ $\quad$ $y_{\vec{AB}} = y_B - y_A$

$= 2 - (-1)$ $\quad$ $= 2 - (-2)$

$= 3$ $\quad$ $= 4$

$\vec{AB}(3;4)$ (1)

$\vec{CB}\ (x_{\vec{CB}}, y_{\vec{CB}})$

$x_{\vec{CB}} = x_B - x_C$ $\quad$ $y_{\vec{CB}} = y_B - y_C$

$= 2 - 6$ $\quad$ $= 2 - 1$

$= -4$ (1) $\quad$ $= 1$

$\vec{CB}(-4;1)$

c) ABCD is a parallelogram

$\Rightarrow \vec{AB} = \vec{DC}$ (opposite sides of a parallelogram are equal and parallel)

$x_{\vec{AB}} = x_{\vec{DC}}$

$3 = x_C - x_D$

$x_D = 6 - 3$

$x_D = 3$

$y_{\vec{AB}} = y_{\vec{DC}}$

$4 = y_C - y_D$

$y_D = 1 - 4$ (2)

$y_D = -3$

$\Rightarrow D(3;-3)$

d) $\vec{AO} + \vec{OB} = \vec{AB}$ (Chasles' Rule)

$\vec{EF} = \vec{AB}$ (by translation)

$x_{\vec{EF}} = x_{\vec{AB}}$	$y_{\vec{EF}} = y_{\vec{AB}}$
$x_F - x_E = 3$	$y_F - y_E = 4$
$x_F - (-1) = 3$	$y_F - 2 = 4$
$x_F + 1 = 3$ (2)	$y_F = 6$
$x_F = 2$	

$F(2; 6)$

e) $\vec{AB} = \vec{DC}$ (ABCD is a parallelogram)

$\vec{AB} = \vec{EF}$ (by translation)

$\Rightarrow \vec{DC} = \vec{EF}$ (by comparison) (1)

Therefore CDEF is a parallelogram (having a pair of opposite sides equal and parallel)

IV

1.

a) $\vec{FB} + \vec{CF} = \vec{CF} + \vec{FB} = \vec{CB}$ (Chasles' Rule)

b) $\vec{BA} + \vec{BC} = \vec{BD}$ (parallelogram Rule)

c) $\vec{DA} + \vec{BC} = \vec{0}$ (opposite vectors) 0.75 each

d) $\vec{FC} + \vec{DA} = \vec{CD} + \vec{DA} = \vec{CA}$ (Chasles' Rule) or $\vec{FB}$

e) $\vec{CO} + \vec{AB} = \vec{OA} + \vec{AB} = \vec{OB}$ (Chasles' Rule) or $\vec{DO}$

f) $\vec{CF} + \vec{CA} = \vec{CB}$ (parallelogram Rule) or $\vec{DA}$

2.

a. $\vec{DB} + \vec{CA} = \vec{DA} + \vec{CB}$

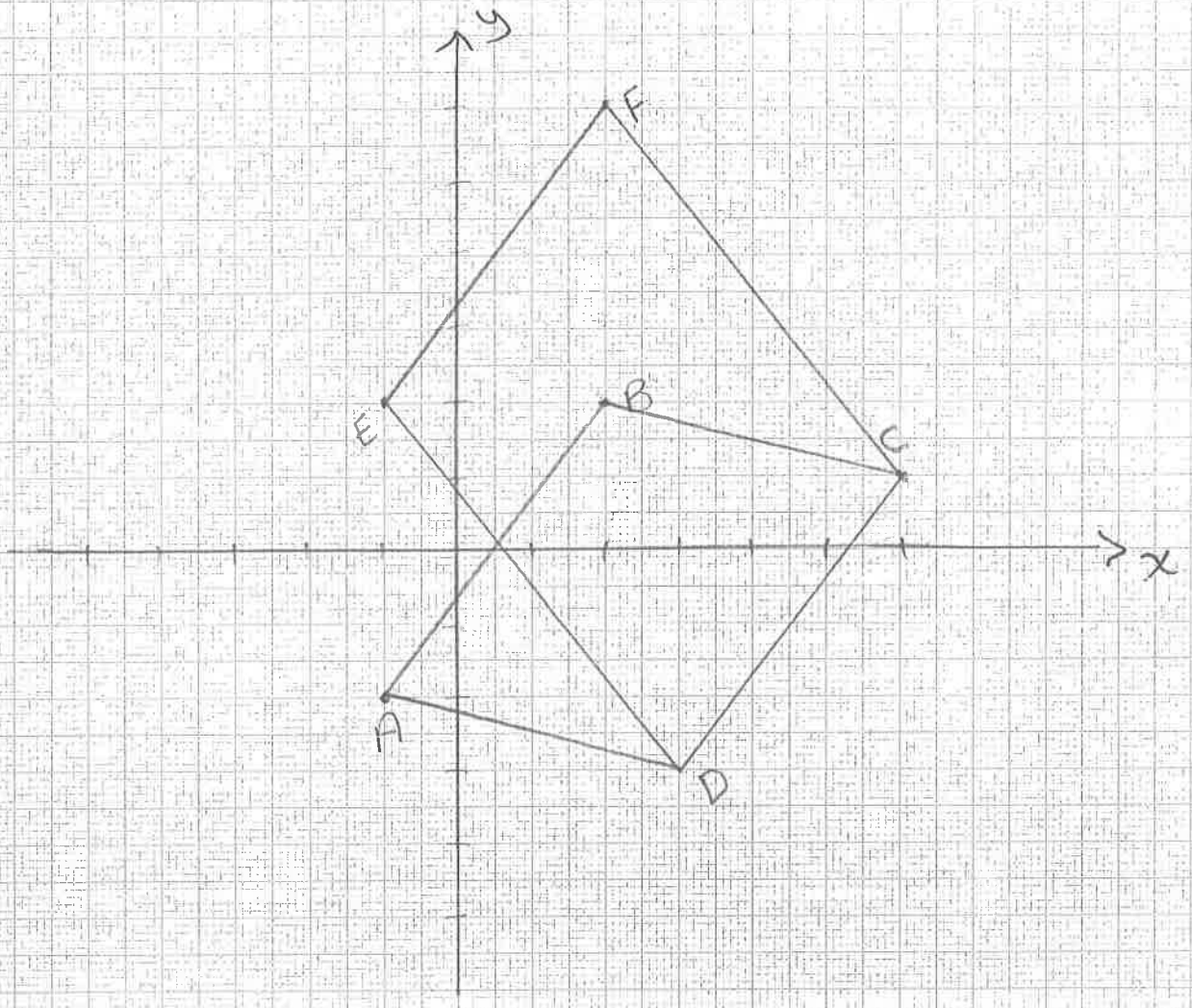
$\vec{DA} + \vec{AB} + \vec{CA} = \vec{DA} + \vec{CB}$ (1)

$\vec{DA} + \vec{CB} = \vec{DA} + \vec{CB}$ True

b. False

B is the translate of F by the translation vector $\vec{CA}$

(1)


y
x
F
E
B
C
A
D