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 :	10B, 10C and 10E
Teacher :	Taline Hawatian
Duration :	1 hour
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.- (8 points)

1) Solve the following system of inequalities. Write the solution set in the form of an interval.

$$\begin{cases} |2x-5| > |7-4x| \\ \frac{9-2x}{2x-3} \geq -2 \end{cases}$$

2) Solve the following inequality and write the solution in the form of an interval.

$$\frac{(x+5)^2(9-2x)(4x+11)}{(x-3)(5-2x)} \leq 0$$

II.- (4 points)

Given two vectors $\vec{u}(-2;1)$ and $\vec{v}(-4;3)$. Let $\vec{w}$ be a non-zero vector defined by

$\vec{w} = (t+1)\vec{\imath} + (t-1)\vec{\jmath}$.

1) Calculate $\|\vec{u}\|$ and $\|\vec{v}\|$.Calculate $\cos(\vec{u};\ \vec{v})$.
2) Evaluate t, in each of the following cases:
   a) $\vec{u}$ and $\vec{w}$ are perpendicular.
   b) The angle $(\vec{v};\ \vec{w})$ is acute.

III.- (3 points)

Given a triangle MNP such that MN=8cm, NP= 9cm, and $\widehat{MNP} = 80°$. Calculate MP and the angles $\widehat{MPN}$ and $\widehat{PMN}$.

IV.- (3 points)

Solve the following system of equations:

$$\begin{cases} 4\sqrt{x+2} - 3\sqrt{y} = -7 \\ 3\sqrt{x+2} + 2\sqrt{y} = 16 \end{cases}$$

V.- (2 points)

At an ice cream stand, customers can buy either a small cone for $3 or a large cone for $4.50. Yesterday, the owner reported he had sold 720 cones, and his daily revenue for the day was $2340. How many small cones did he sell?

SE04/2024 2025/Maths/10BCE

I.- 1) $\begin{cases} |2x-5| > |7-4x| \quad \ldots (1) \\ \frac{9-2x}{2x-3} \geq -3 \quad \ldots (2) \end{cases}$

(1): $|2x-5| > |7-4x|$

$(2x-5)^2 > (7-4x)^2$ ✓0.5

$(2x-5)^2 - (7-4x)^2 > 0$

$(2x-5-7+4x)(2x-5+7-4x) > 0$ ✓0.5

$(6x-12)(2-2x) > 0$

x	$-\infty$		1		2		$+\infty$
$(6x-12)(2-2x)$		$-$	ϕ odd	$+$	ϕ odd	$-$	

✓1 ✓0.5

$S_1 =]1;2[$

(2): $\frac{9-2x}{2x-3} \geq -2$

$\frac{9-2x}{2x-3} + 2 \geq 0$

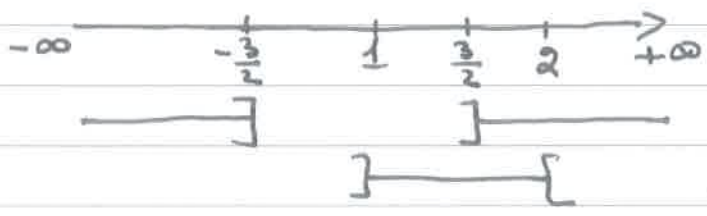
$\frac{9-2x+4x-6}{2x-3} \geq 0$ ✓0.5

$\frac{2x+3}{2x-3} \geq 0$ $\quad x = -\frac{3}{2}$ $\quad x \neq \frac{3}{2}$

x	$-\infty$		$-3/2$		$3/2$		$+\infty$
$\frac{2x+3}{2x-3}$		$+$	0 odd	$-$	$\nexists$ odd	$+$	

✓1

$S_2 =]-\infty; -\frac{3}{2}] \cup]\frac{3}{2}; +\infty[$ ✓0.5



✓0.5 $S =]\frac{3}{2}; 2[$

1

2) $E = \dfrac{(x+5)^2(9-2x)(4x+11)}{(x-3)(5-2x)}$

$x+5=0 \quad x=-5 \qquad 9-2x=0 \quad x=\frac{9}{2} \qquad 4x+11=0 \quad x=-\frac{11}{4}$

0.5

$x-3\neq 0 \quad x\neq 3 \qquad 5-2x\neq 0 \quad x\neq \frac{5}{2}$

1.5

x	$-\infty$		-5		$-11/4$		0		$5/2$		3		$9/2$		$+\infty$
		$+$	ϕ	$+$	ϕ	$-$		$+$		$-$	ϕ	$+$			
			even		odd				odd		odd		odd		

$S = \left[-\frac{11}{4}; \frac{5}{2}\right[\cup \left]3; \frac{9}{2}\right]$ 1

II.- $\vec{u}(-2;1) \quad \vec{v}(-4;3) \quad \vec{w}(t+1;t-1)$

1) $\|\vec{u}\| = \sqrt{4+1} = \sqrt{5} \qquad \|\vec{v}\| = \sqrt{16+9} = 5$ 1

$\cos(\vec{u};\vec{v}) = \dfrac{\vec{u}\cdot\vec{v}}{\|\vec{u}\|\cdot\|\vec{v}\|} = \dfrac{(-2)(-4)+(1)(3)}{(\sqrt{5})(5)} = \dfrac{11\sqrt{5}}{25}$ 1

2) a) $\vec{u}$ and $\vec{w}$ are perpendicular.

$\vec{u}\cdot\vec{w} = 0$ 1

$-2(t+1)+(t-1)=0 \quad -2t-2+t-1=0 \quad t=-3$

b) $(\vec{v},\vec{w})$ is an acute angle.

$\Rightarrow \quad \vec{v}\cdot\vec{w} > 0$

$-4(t+1)+3(t-1)>0$

$-4t-4+3t-3>0$

$-t-7>0$ 1

$-t>7$

$t<-7$

III.- $MN = 8\,cm \quad NP = 9\,cm \quad \hat{MNP} = 80°$

$MP^2 = MN^2 + NP^2 - 2 MN \times NP \times \cos \hat{MNP}$ 1

$= 64 + 81 - 2(8)(9)\cos 80° = 119.99$

$MP = 10.95\,cm$ 0.5

$MN^2 = MP^2 + NP^2 - 2 MP \times NP \times \cos \hat{MPN}$

$2 MP \times NP \times \cos \hat{MPN} = MP^2 + NP^2 - MN^2$

$\cos \hat{MPN} = \dfrac{(10.95)^2 + 81 - 64}{2 \times 10.95 \times 9} = 0.695$ 0.5

$\hat{MPN} = 46°$ 0.5

$P\hat{M}N = 180° - (80° + 46°) = 54°$ 0.5

IV.- $\begin{cases} 4\sqrt{x+2} - 3\sqrt{y} = -7 \\ 3\sqrt{x+2} + 2\sqrt{y} = 16 \end{cases}$ Let $a = \sqrt{x+2}$ $a \geq 0$ $x \geq -2$

$b = \sqrt{y}$ 0.5 $b \geq 0$ $y \geq 0$

$\begin{cases} (4a - 3b = -7) \ (2) \\ (3a + 2b = 16) \ (3) \end{cases}$ 0.5

$+ \begin{cases} 8a - 6b = -14 \\ 9a + 6b = 48 \end{cases}$

$17a = 34$ 0.5

$a = 2$ accepted 0.5

$3(2) + 2b = 16 \quad 2b = 10 \quad b = 5$ accepted

$a = 2 \quad \sqrt{x+2} = 2 \quad x + 2 = 4 \quad x = 2$ 0.5

$b = 5 \quad \sqrt{y} = 5 \quad y = 25$ acc. 0.5 $(2; 25)$

V.- Let x be the number of small cones and y the large cones.

$\begin{cases} (x + y = 720) \ (-3) \\ 3x + 4.5y = 2340 \end{cases}$ 1

$+ \begin{cases} -3x - 3y = -2160 \\ 3x + 4.5y = 2340 \end{cases}$

$1.5y = 180$ 0.5

$y = 120$ 0.5 $\quad x = 720 - 120 = 600$

The owner sold 600 small cones and 120 large cones.