This is a Class 1 exam

Lebanon Evangelical School for Boys and Girls

Lebanon Evangelical School

for Boys and Girls — Loueizeh - Baabda

Stage Exam 01

17FEB2025

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. (4 points)

In the table below, only one of the proposed answers to each question is correct. Write down the number of the question and give, **with justification**, its corresponding answer.

Number	Questions	Proposed answers		
		a	b	c
1	$\frac{3}{4} - \frac{3}{4} \times \frac{8}{9} =$	0	$\frac{1}{12}$	$\frac{17}{12}$
2	$(4 + \sqrt{3})^2 - 19 =$	$16 + \sqrt{3}$	0	$8\sqrt{3}$
3	In an orthonormal system, the two lines with equations: $(d_1): y = 3x + 3$ and $(d_2): 2y = 3(2x - 4)$	Perpendicular	Parallel	Confounded
4	The line whose slope is 2 and is passing through the point (1; 0) has an equation:	$y = 2x + 1$	$y = 2x - 2$	$y = x + 2$

II. (4.5 points)

Consider the three numbers A, B, C:

$$A = 3\sqrt{80} - 2\sqrt{20} + \sqrt{144} - 7$$

$$B = \frac{6 \times 10^3 \times 2.4 \times 10^5}{12 \times 10^3}$$

$$C = \frac{2}{3 - \sqrt{3}} - \frac{\sqrt{3}}{3}$$

1) Write A in the form of $a\sqrt{5} + b$ where a and b are integers.
2) Calculate B and write the answer in scientific notation.
3) Rationalize the denominator of $\frac{2}{3 - \sqrt{3}}$ and deduce that C is an integer.

III. (5.5 points)

Given: $A(x) = (2x - 3)(4x + 7)$ and $B(x) = x^2 - 4 - (2 - x)(3x + 5)$

1) Solve the equation $A(x) = 0$.
2) Prove that $B(x) = (x - 2)(4x + 7)$
3) Given the expression $F(x) = \frac{(2x - 3)(4x + 7)}{(x - 2)(4x + 7)}$
   a) For what values of x, is $F(x)$ defined?
   b) Simplify $F(x)$.
   c) Does the equation $F(x) = 2$ have a solution? Justify.

IV. (6 points)

In an orthonormal system of axes $x'Ox, y'Oy$, consider the points A (1; -2), B (2; 1) and C (5; 0). Let (d) be the line of equation $y = 3x - 5$

1) Plot the points A, B, and C.
2) Verify that A and B are points on line (d) then plot (d).
3) Let M be the midpoint of [AC]. Calculate the coordinates of point M.
4) Given that (d) is perpendicular to line (BC). Determine the equation of line (BC).
5) Knowing that $AB = \sqrt{10}$, calculate the length of segment BC. Deduce the nature of triangle ABC.

Solution For SE01 Class 1

9BCE Maths - 2024 2025

I.

(1) $\frac{3}{4} - \frac{2}{4} \times \frac{8}{9}$

$= \frac{3}{4 \times 3} - \frac{2}{3 \times 4}$

$= \frac{9}{12} - \frac{8}{12}$

$= \frac{1}{12}$ (b)

OR $\frac{3}{4} - \frac{3}{4} \times \frac{8}{9}$

$= \frac{3}{4}\left(1 - \frac{8}{9}\right)$ (1)

$= \frac{3}{4}\left(\frac{1}{9}\right)$

$= \frac{1}{12}$ (b)

(2) $(4+\sqrt{3})^2 - 19$

$= 4^2 + 2(4)(\sqrt{3}) + (\sqrt{3})^2 - 19$

$= 16 + 8\sqrt{3} + 3 - 19$

$= 8\sqrt{3}$ (1)

(c)

(3) $(d_1): y = 3x + 3$

$(d_2): 2y = 3(2x - 4)$

$2y = 6x - 12$

$y = 3x - 6$

$a_{(d_1)} = a_{(d_2)}$

$\Rightarrow (d_1) // (d_2)$ (1)

(b)

(4) $a = 2$ through

line passing (1; 0)

$y = ax + b$

$y = 2x + b$ (1)

$0 = 2(1) + b$

$b = -2$

$\Rightarrow y = 2x - 2$ (b)

II

1) $A = 3\sqrt{80} - 2\sqrt{20} + \sqrt{144} - 7$

$= 3\sqrt{2^2 \times 2^2 \times 5} - 2\sqrt{2^2 \times 5} + 12 - 7$

$= 12\sqrt{5} - 4\sqrt{5} + 5$

$= 8\sqrt{5} + 5$

0.25 each check mark

2) $B = \dfrac{6 \times 10^2 \times 2.4 \times 10^5}{12 \times 10^3}$ ✓ 0.25

$= \dfrac{6 \times 24 \times 10^{-1} \times 10^5}{12}$ ✓ 0.25

$= 12 \times 10^4$ ✓ 0.5

$= 1.2 \times 10 \times 10^4$

$= 1.2 \times 10^5$ ✓ 0.5

3) $C = \dfrac{2}{3 - \sqrt{3}} - \dfrac{\sqrt{3}}{3}$

$\dfrac{2}{3-\sqrt{3}} \times \dfrac{3+\sqrt{3}}{3+\sqrt{3}}$ ✓ 0.5

$= \dfrac{2(3+\sqrt{3})}{9-3}$

$= \dfrac{2(3+\sqrt{3})}{6}$ ✓ 0.5

$= \dfrac{3+\sqrt{3}}{3}$

$\dfrac{3+\sqrt{3}}{3} - \dfrac{\sqrt{3}}{3}$

$= \dfrac{3+\sqrt{3}-\sqrt{3}}{3}$

$= \dfrac{3}{3}$ ✓ 0.5

$= 1$ 1 is an integer

III

$A(x) = (2x-3)(4x+7)$

$B(x) = x^2 - 4 - (2-x)(3x+5)$

① $A(x) = 0$

$(2x-3)(4x+7) = 0$

$2x-3 = 0$ OR $4x+7 = 0$

$2x = 3$ $\quad 4x = -7$

$x = \frac{3}{2}$ 0.5 $\quad x = \frac{-7}{4}$ 0.5

② $B(x) = x^2 - 4 - (2-x)(3x+5)$

$= (x-2)(x+2) - (2-x)(3x+5)$ 0.5

$= (x-2)(x+2) + (x-2)(3x+5)$ 0.5

$= (x-2)(x+2+3x+5)$

$B(x) = (x-2)(4x+7)$ 0.5

verified

③ $F(x) = \frac{(2x-3)(4x+7)}{(x-2)(4x+7)}$

a) $(x-2)(4x+7) \neq 0$

$x-2 \neq 0$ AND $4x+7 \neq 0$

$x \neq 2$ $\quad 4x \neq -7$

$x \neq \frac{-7}{4}$

$D_F: x \in \mathbb{R} - \{-\frac{7}{4}; 2\}$ ①

b) $F(x) = \frac{(2x-3)(4x+7)}{(x-2)(4x+7)}$

$F(x) = \frac{2x-3}{x-2}$ ⑤

c) $F(x) = 2$

$\frac{2x-3}{x-2} \times \frac{2}{1}$

$2x-3 = 2(x-2)$ (0.5)

$2x-3 = 2x-4$

$2x-2x = -4+3$

$0x = -1$ (0.5)

Impossible no solution (0.5)

IV 1) on the graph paper (0.5)

2) (d): $y = 3x-5$

$y_A \stackrel{?}{=} 3x_A - 5$

$-2 \stackrel{?}{=} 3(1) - 5$

$-2 = -2$

$\Rightarrow$ A belongs to (d) (0.5)

$y_B \stackrel{?}{=} 3x_B - 5$

$1 \stackrel{?}{=} 3(2) - 5$

$1 \stackrel{?}{=} 6 - 5$

$1 = 1$

$\Rightarrow$ B belongs to (d) (0.5)

plotting the line (0.5)

3) $x_M = \frac{x_A + x_C}{2}$

$= \frac{1+5}{2}$

$= \frac{6}{2}$

$x_M = 3$ (0.5)

$y_M = \frac{y_A + y_C}{2}$

$= \frac{-2+0}{2}$

$= \frac{-2}{2}$

$y_M = -1$ (0.5)

$M(3; -1)$

4) (d) $\perp$ (BC)

$a_{(d)} \times a_{(BC)} = -1$

$3\, a_{(BC)} = -1$

$a_{(BC)} = -\frac{1}{3}$ (0.5)

(BC): $y = ax + b$

$y = -\frac{1}{3}x + b$

(BC) passes through B and C: $y_C = -\frac{1}{3}x_C + b$ (0.5)

$0 = -\frac{1}{3}(5) + b$

$b = \frac{5}{3}$

(BC): $y = -\frac{1}{3}x + \frac{5}{3}$ (0.5)

5) $BC = \sqrt{(x_B - x_C)^2 + (y_B - y_C)^2}$ (0.5)

$= \sqrt{(2-5)^2 + (1-0)^2}$

$= \sqrt{(-3)^2 + 1^2}$

$= \sqrt{9+1}$

$= \sqrt{10}$ (0.5)

$AB = BC = \sqrt{10}$

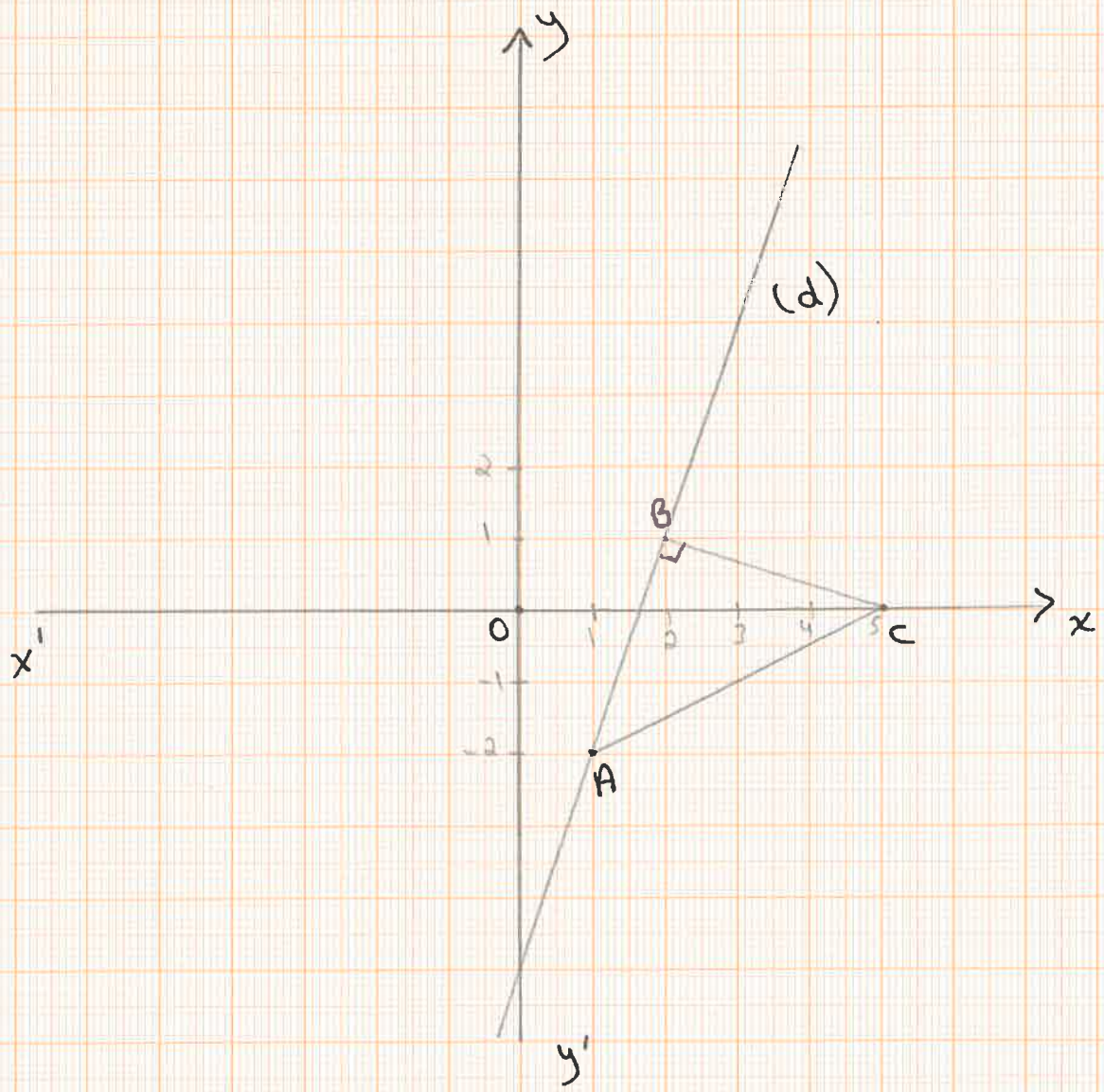
(d) $\perp$ (BC)

A and B belong to (d) (0.5)

$\Rightarrow$ (AB) $\perp$ (BC)

$\Rightarrow A\hat{B}C = 90°$ (angle formed between 2 $\perp$ lines)

Therefore ABC is an isosceles triangle right-angled at B.


y
x
x'
y'
O
(d)
B
A
C
1
2
3
4
5
-1
-2