This is a Class 1 exam

Lebanon Evangelical School
for Boys and Girls
Loueizeh - Baabda

Stage Exam 03

26JAN2024

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

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

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	$\frac{1}{3}-\frac{1}{3}\times\frac{6}{7}=$	0	$\frac{1}{21}$	$\frac{6}{7}$
2	$(3+\sqrt{5})^2-14=$	$9+\sqrt{5}$	0	$6\sqrt{5}$
3	x | $\sqrt{2}$ $\sqrt{2}$ | 4 The table above is a table of proportionality for x =	4	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$
4	The original price of an article is 5,200 L.L. After a discount of 15%, the new price will be:	5,980 L.L.	780 L.L.	4,420 L.L.

II. (6 points)

Consider the three numbers A, B, and C:

$A=\frac{9}{2}-\frac{9}{2}\times\frac{1}{3}$; $B=\frac{10^{14}\times2^{10}}{5\times4\times10^{12}\times2^{9}}$; $C=(2+\sqrt{5})^2+(1-2\sqrt{5})^2$

1) Write A in its simplest form.
2) Verify that B is a natural number.
3) Verify that C is a natural number.

III. (5 points)

In an orthonormal system of axes x'Ox, y'Oy, consider the points A (3 ; 3), B (0; -3) and C (-6 ; 0).

1) Plot the points A, B, and C
2) Verify that $y = 2x - 3$ is the equation of the line (AB) and draw line the line.
3) The equation of line (BC) is $y = -\frac{1}{2}x - 3$. Deduce that (AB) and (BC) are perpendicular.
4) Show that ABC is a right-angled isosceles triangle at B.

IV. (5 points)

In an orthonormal system of axes x'Ox and y'Oy, consider points A (-1 ; 0) and B (1 ; 4). Let (d) be the line with equation $y = 2x + 2$.

1) a. Verify that A and B are points on line (d).
   b. Plot the points A and B and draw line (d).

2) Let I be the point of intersection of line (d) with the y-axis.
   a. Calculate the coordinates of point I
   b. Verify that I is the midpoint of [AB].

3) Let (d') be the perpendicular bisector of [AB].
   Verify that the equation of (d') is $y = -\frac{1}{2}x + 2$.

Solution For SE03 — class 1

9CE Maths – 2023 2024

I.

1. $\frac{1}{3} - \frac{1}{8} \times \frac{6}{7}$

$= \frac{1}{3} - \frac{2}{7}$

$= \frac{7}{21} - \frac{6}{21} = \frac{1}{21}$ (b) 1

2. $(3+\sqrt{5})^2 - 14$

$= 9 + 2(3)(\sqrt{5}) + (\sqrt{5})^2 - 14$

$= 9 + 6\sqrt{5} + 5 - 14$

$= 14 + 6\sqrt{5} - 14$

$= 6\sqrt{5}$ (c) 1

3. $\frac{\sqrt{2}}{x} = \frac{4}{\sqrt{2}}$

$4x = (\sqrt{2})(\sqrt{2})$

$\frac{4x}{4} = \frac{2}{4}$

$x = \frac{1}{2}$ (b) 1

4. x: original price

y: new price

$P = 15\%$

$y = (1 - \frac{P}{100})x$

$= (1 - \frac{15}{100})x$

$= (0.85)(5200)$

$= 4,420$ L.L. (c) 1

II

1. $A = \frac{9}{2} - \frac{\cancel{8}^{3}}{2} \times \frac{1}{\cancel{3}_{1}}$

$= \frac{9}{2} - \frac{3}{2}$

$= \frac{6}{2} = \boxed{3}$ (1)

2. $B = \frac{10^{14} \times 2^{10}}{5 \times 4 \times 10^{12} \times 2^{9}}$

$= \frac{10^{2} \times 2^{10}}{5 \times 2^{2} \times 2^{9}} = \frac{10^{2} \times 2^{10}}{5 \times 2^{11}} = \frac{10^{2} \times 2^{-1}}{5}$

$= \frac{10^{2}}{2 \times 5} = \boxed{10}$ (2)

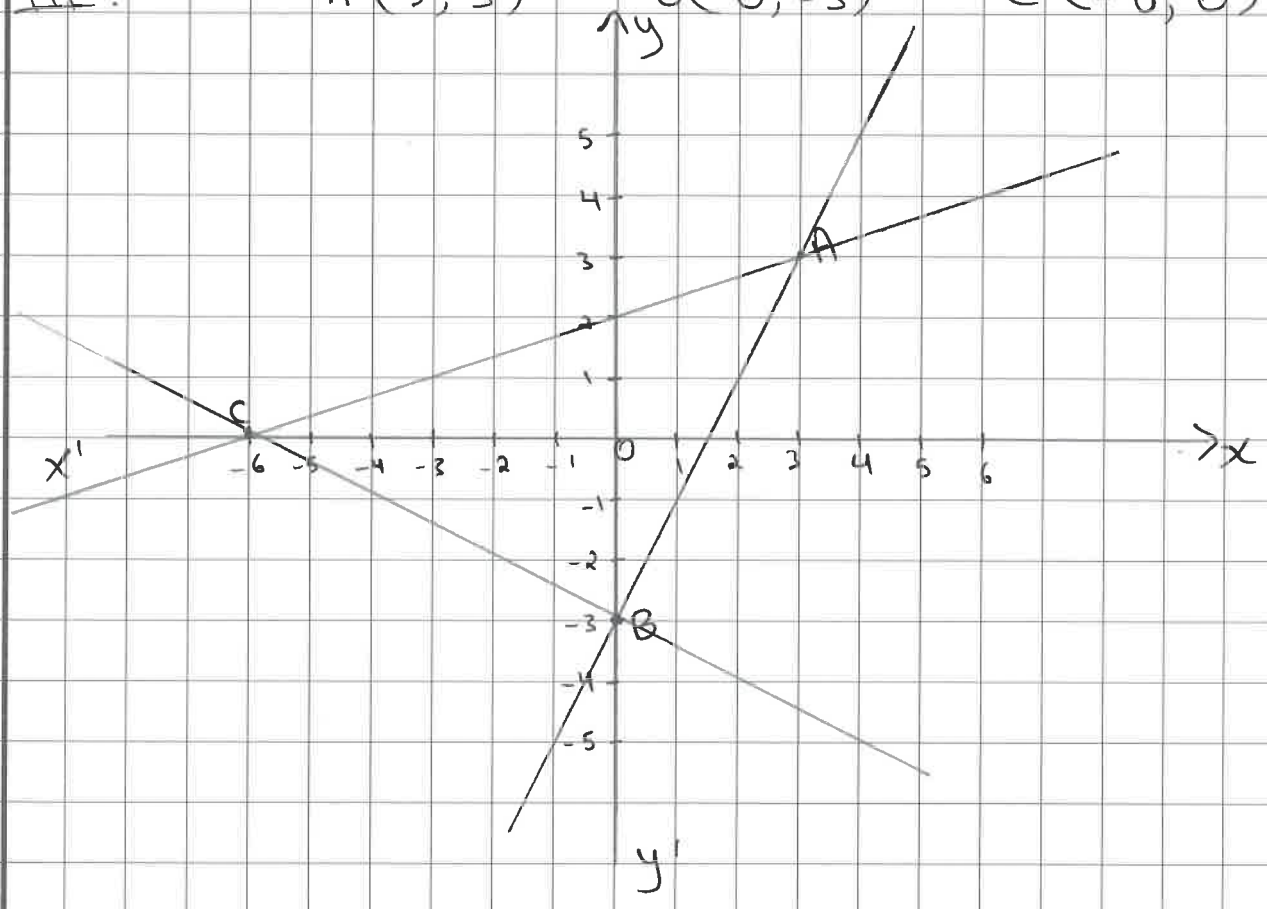
3. $C = (2+\sqrt{5})^{2} + (1-2\sqrt{5})^{2}$

$= 4 + 2(2)(\sqrt{5}) + 5 + 1 - 2(1)(2\sqrt{5}) + (2\sqrt{5})^{2}$

$= 4 + \cancel{4\sqrt{5}} + 5 + 1 - \cancel{4\sqrt{5}} + 20$

$= \boxed{30}$ (2)

III. A(3, 3) B(0, -3) C(-6, 0)



1. on the Figure (1)

2. $y_A = 2x_A - 3$

$3 = 2(3) - 3$

$3 = 6 - 3$

$3 = 3$

$y_B = 2x_B - 3$

$-3 = 2(0) - 3$

$-3 = -3$ (2)

$\Rightarrow$ (AB) has an equation of $y = 2x - 3$

3. $a_{(AB)} \times a_{(BC)} \stackrel{?}{=} -1$

$2 \times \left(-\frac{1}{2}\right) = -1$ (1)

$-1 = -1 \Rightarrow (AB) \perp (BC)$

4. $AB = \sqrt{(x_A - x_B)^2 + (y_A - y_B)^2}$

$= \sqrt{(3-0)^2 + (3-(-3))^2}$

$= \sqrt{(3)^2 + (6)^2}$

$= \sqrt{9+36}$

$= \sqrt{45} = 3\sqrt{5}$ (1.5)

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

$= \sqrt{(0-(-6))^2 + (-3-0)^2}$

$= \sqrt{(6)^2 + (-3)^2}$

$= \sqrt{36+9}$

$= \sqrt{45} = 3\sqrt{5}$

$\Rightarrow AB = BC = 3\sqrt{5}$

$(AB) \perp (BC)$ (Proved) ($\frac{1}{2}$)

Therefore ABC is a right angled isosceles triangle

IV.

1. a) $y = 2x + 2$

$y_A = 2x_A + 2$

$0 = 2(-1) + 2$

$0 = -2 + 2$

$0 = 0$

$\Rightarrow$ A belongs to (d)

$y = 2x + 2$

$y_B = 2x_B + 2$

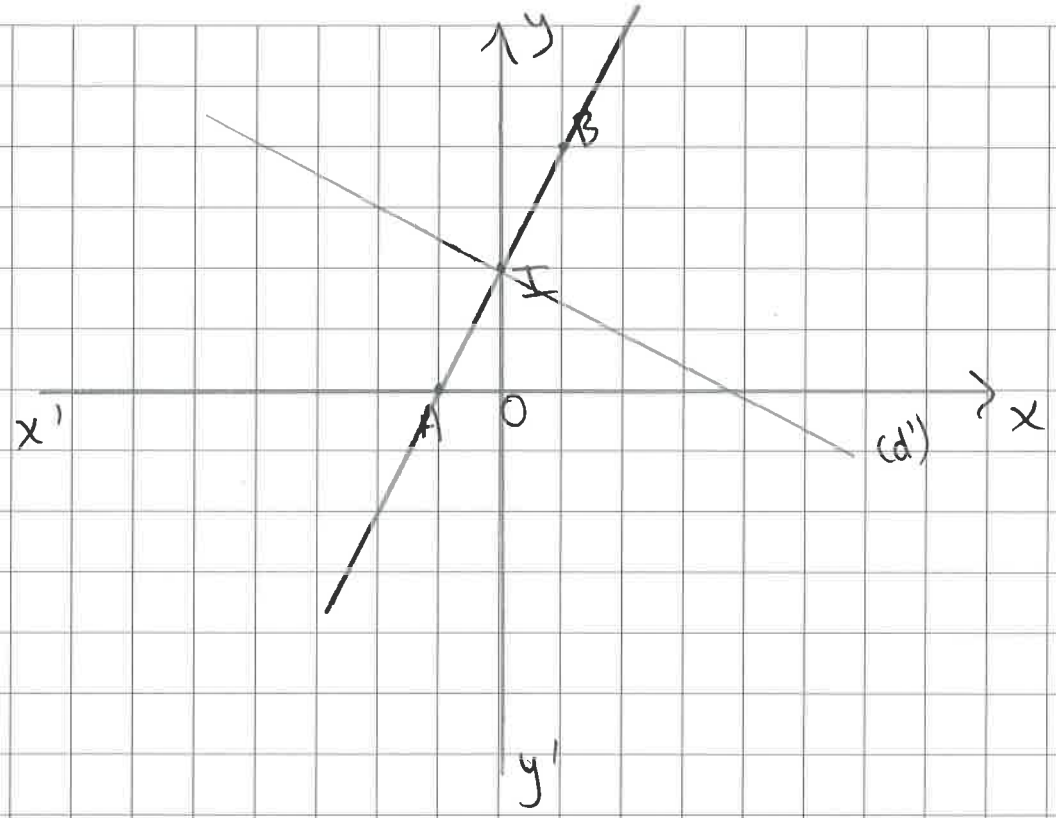
$4 = 2(1) + 2$

$4 = 2 + 2$

$4 = 4$

$\Rightarrow$ B belongs to (d) (1)

b) on the Figure (1)



2. a) cuts the y-axis $\Rightarrow$ y-intercept $(0, b)$ or $x = 0$

$y = 2x + 2$

$y = 2(0) + 2$

$y = 2$ $\Rightarrow$ $I(0, 2)$ (1)

b) $x_I \overset{?}{=} \frac{x_A + x_B}{2}$ $\quad$ $y_I \overset{?}{=} \frac{y_A + y_B}{2}$

$0 = \frac{-1+1}{2}$ $\quad$ $2 = \frac{0+4}{2}$ (1)

$0 = 0$ $\quad$ $2 = 2$

$\Rightarrow$ I midpoint of [AB]

3. $(d') \perp (AB)$

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

$\frac{2\, a_{(d')}}{2} = \frac{-1}{2}$ $\left(\frac{1}{2}\right)$

$a_{(d')} = -\frac{1}{2}$

$y = ax + b$

$y = -\frac{1}{2}x + b$

(d') passes by $I(0, 2)$ $\left(\frac{1}{2}\right)$

$2 = -\frac{1}{2}(0) + b$

$b = 2$

$\Rightarrow \boxed{y = -\frac{1}{2}x + 2}$