This is a Class 1 exam

Lebanon Evangelical School
for Boys and Girls
Loueizeh - Baabda

Stage Exam 02

26MAR2025

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	The price of an item in a store is \$50. What will its price be after an increase of 8%?	\$54	\$46	\$58
2	After a discount of 12%, Charbel paid \$528 for a laptop. What was its original price?	\$600	\$465	\$592
3	Given A (1; 3) and B (5; -5). The slope of line (AB) is:	$\frac{1}{2}$	2	- 2
4	$\sqrt{5}+3$ | x $\frac{2}{3}$ | $3-\sqrt{5}$ Determine x so that the above table is a table of proportion.	2	6	8

II. (3.5 points)

A sports academy has students distributed as follows:

- 45% of the students are in the beginner level.
- $\frac{1}{4}$ of the students are in the intermediate level.
- 60 students are in the advanced level.

a. Find the percentage of students who are in the intermediate level and deduce the percentage of students who are in the advanced level.
b. Find the total number of students in the sports academy and verify that the number of students who are in the beginner level is 90.
c. Among the students that are in the beginner level, 60% of them are boys. What is the number of girls who are in the beginner level?

III. (10.5 points)

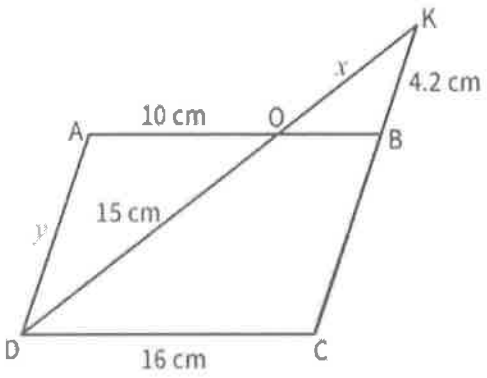
In an orthonormal system of axes $x'Ox, y'Oy$, consider the points A (-2; 5), B (3; 0) and C (1; -4). Let (d) be the line with equation $y = -\frac{1}{2}x + 4$.

a. Plot the points A, B, and C.
b. Verify that point A is on line (d), then draw (d).
c. Write the equation of straight line (AC)
d. (L) is the straight line passing through B and perpendicular to (d). Prove that the equation of (L) is $y = 2x - 6$. Verify that C belongs to (L).
e. (d) and (L) intersect at F. Determine the coordinates of F, the point of intersection of (d) and (L).
f. Knowing that AF = $3\sqrt{5}$, calculate FC and deduce that AFC is a right-angled isosceles triangle.
g. Determine the coordinates of the center I of circle (C) circumscribed about triangle AFC and calculate its radius.

IV. (2 points)

In the adjacent figure, ABCD is a parallelogram. O is a point on [AB]. (DO) cuts (BC) at K.

Calculate x and y.



Solution for SEO2 — Class 1
9BCE Maths - 2024 2025

I.

1. let x be the original price.
let y be the new price.

$$y = \left(1 + \frac{P}{100}\right) x$$

$$y = \left(1 + \frac{8}{100}\right)(50)$$

$$y = (1.08)(50)$$

$$y = \$54$$ (a) (1)

2. let x be the original price.
let y be the new price.

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

$$y = \left(1 - \frac{12}{100}\right) x$$ (1)

$$528 = 0.88x$$

$$x = \$600$$ (a)

3.

$$a_{(AB)} = \frac{y_A - y_B}{x_A - x_B}$$

$$a_{(AB)} = \frac{3 - (-5)}{1 - 5}$$ (1)

$$a_{(AB)} = \frac{8}{-4} = -2$$ (c)

4. $\frac{\frac{2}{3}}{\sqrt{5}+3} \times \frac{3-\sqrt{5}}{x}$

$\frac{2}{3}x = (3+\sqrt{5})(3-\sqrt{5})$

$\frac{2}{3}x = 9-5$ (1)

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

$x = 6$ (b)

II. a. $\frac{1}{4} \times 100 = 25\%$ in the intermediate level (0.5)

$100 - (45+25) = 100 - 70 = 30\%$ in the advanced level

b. 60 students $\longrightarrow$ 30% (0.5)

x students $\longrightarrow$ 100%

$30x = 6000$

$x = 200$ students (1)

$\frac{45}{100} \times 200 = 90$ students in the beginner level. (0.5)

c. 60% boys

40% girls (1)

$\frac{40}{100} \times 90 = 36$ girls in the beginner level.

III a. on the graph paper (0.5)

b. (d): $y = -\frac{1}{2}x + 4$

x	y	(x;y)
0	4	(0;4)

(0.5)

$y_A \stackrel{?}{=} -\frac{1}{2}x_A + 4$

$5 \stackrel{?}{=} -\frac{1}{2}(-2) + 4$

$5 \stackrel{?}{=} 1 + 4$ (0.5)

$5 = 5 \Rightarrow$ A is on line (d)

c. $a_{(AC)} = \frac{y_A - y_C}{x_A - x_C}$

$= \frac{5 - (-4)}{-2 - 1}$

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

$a_{(AC)} = -3$ (0.75)

(AC): $y = -3x + b$

$y_A = -3x_A + b$

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

$5 = 6 + b$

$b = -1$ (0.75)

(AC): $y = -3x - 1$

or

$y - y_A = a(x - x_A)$

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

$y - 5 = -3x - 6$

$y = -3x - 6 + 5$

$y = -3x - 1$

d. $(L): y = ax + b$

$(L) \perp (d)$

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

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

$\Rightarrow a_{(L)} = 2$ (0.5)

$(L): y = 2x + b$

$y_B = 2x_B + b$

$0 = 2(3) + b$

$b = -6$ (0.5) $\Rightarrow (L): y = 2x - 6$

OR $y_B = 2x_B - 6$

$0 = 2(3) - 6$

$0 \stackrel{?}{=} 0$ verified

$y_C \stackrel{?}{=} 2x_C - 6$

$-4 \stackrel{?}{=} 2(1) - 6$

$-4 \stackrel{!}{=} 2 - 6$ (0.5)

$-4 = -4 \Rightarrow C$ belongs to (L)

e. $(d): y = -\frac{1}{2}x + 4$

$(L): y = 2x - 6$

$y = y$

$-\frac{1}{2}x + 4 = 2x - 6$

$-\frac{1}{2}x - 2x = -6 - 4$

$-\frac{5}{2}x = -10$

$x = 4$ (1)

$y = 2x - 6$

$y = 2(4) - 6$

$y = 8 - 6$ (1)

$y = 2$

$F(4; 2)$

f. $FC = \sqrt{(x_F - x_C)^2 + (y_F - y_C)^2}$

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

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

$= \sqrt{9+36}$ (1)

$= \sqrt{45}$

$FC = 3\sqrt{5}$

$AF = FC = 3\sqrt{5}$

(L) $\perp$ (d) and intersect at F

A belongs to (d)

C belongs to (L) (0.5)

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

Therefore AFC is an isosceles triangle right-angled at F.

g. In any right-angled triangle, the hypotenuse is the diameter of the circle circumscribed about it. (0.5)

$\Rightarrow$ I midpoint of [AC] the hypotenuse

$x_I = \frac{x_A + x_C}{2}$ $\quad y_I = \frac{y_A + y_C}{2}$

$= \frac{-2+1}{2}$ $\quad = \frac{5+(-4)}{2}$

$x_I = -\frac{1}{2}$ (1) $\quad y_I = \frac{1}{2}$

$I\left(-\frac{1}{2}; \frac{1}{2}\right)$

Radius $= \frac{AC}{2}$

$AC = \sqrt{(x_A - x_C)^2 + (y_A - y_C)^2}$

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

$= \sqrt{(-3)^2 + 9^2}$ (1)

$= \sqrt{9+81}$

$= \sqrt{90}$

$AC = 3\sqrt{10}$

Radius $= \frac{3\sqrt{10}}{2}$

IV. (AD) // (BC) (opposite sides of a parallelogram)

Using thales theorem:

$$\frac{OB}{OA} = \frac{OK}{OD}$$

$$\frac{6}{10} = \frac{x}{15}$$

$10x = 90$ (1)

$\boxed{x = 9 \text{ cm}}$

$$\frac{OB}{OA} = \frac{BK}{AD}$$

$$\frac{6}{10} = \frac{4.2}{y}$$

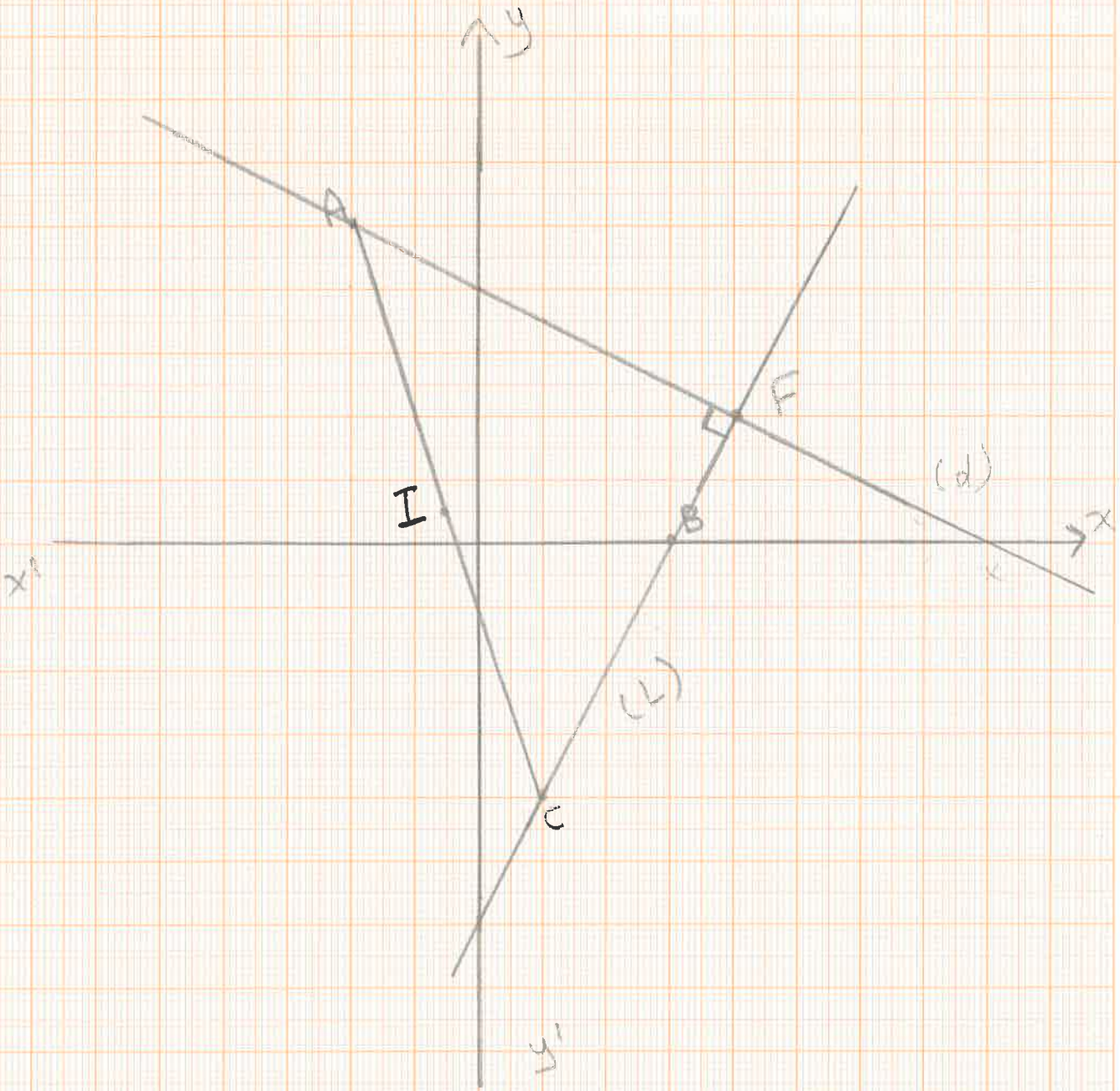
$6y = 42$ (1)

$\boxed{y = 7 \text{ cm}}$

$AB = DC$

$\Rightarrow OB = 16 - 10$

$= 6 \text{ cm}$


y
x
x'
y'
I
B
C
F
(d)
(L)