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 :	9B
Teacher :	Taline Hawatian
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.- (5 pts)

Only one of the proposed answers to each question is correct. Write down the number of the each question and give with justification the answer.

1) The straight lines $(L_1): 3y - 4x - 6 = 0$ and $(L_2): 2y = -\frac{3}{2}x + 7$ are:

   a) parallel b) intersecting at A(0; 2) c) perpendicular

2) If the price of a car is decreased by 15% each year, then at the end of two years the price is reduced by:

   a) 30% b) 27.75% c) 22.5%

3) The straight lines $(D): y = -\frac{1}{5}x + 6$ and $(D'): 2y = 5x + 12$ are:

   a) parallel b) intersecting at $B(0; 6)$ c) perpendicular

4) The price of an article after a raise of 12% is \$70. The original price of this article is:

   a) \$62.5 b) \$78.4 c) \$61.6

5) Given $E = \frac{(5^2 \times 10^{-4})^3}{5^4 \times 8 \times 10^{-8}}$. The scientific notation of E is:

   a) 3.125×10^{-4} b) 31.25×10^{-5} c) 3.125×10^{4}

II.- (2.5 pts)

Determine the real number x so that the following table represents a proportion table.

$2 - 3\sqrt{2}$	$\frac{7}{2}$
x	$3\sqrt{2} + 2$

III.- (3.5 points)

The students of class 9 practice one sport and are distributed in the following way: **35%** of students practice football, $\frac{2}{5}$ of students practice basketball, **30** students practice volleyball.

1) What is the percentage of students that practice basketball and the percentage that practice volleyball?

2) Calculate the total number of students in class 9 and verify that the number of students that practice football is 42.

3) During the year 2023, 50% of the students that practice football and 30% of students that practice volleyball were injured. How many students were injured and what is the percentage of injured students?

IV.- (9 points)

In an orthonormal system of axes, $x'Ox, y'Oy$, consider the points $E(1;-2), F(3;4)$ and the straight lines $(L): y = 3x - 5$.

1) a) Plot the points E and F.
   b) Verify, by calculation, that E and F belong to (L).
2) Draw the straight lines (L).
3) (D) is a straight line perpendicular to (L) and passing through F.
   a) Write the equation of the straight line (D).
   b) Verify that the point $B(0;5)$ belongs to (D).
4) Calculate EF and FB. What is the nature of triangle EFB? Justify your answer.
5) Calculate the area of triangle EFB.
6) Determine the coordinates of the center I of the circle (C) circumscribed about triangle EFB. Calculate the radius of the circle (C).

SE03/20232024/Maths/9B

I- 1) c ✓0.5 $(L_1): y = \frac{4}{3}x + 2$ $(L_2): y = -\frac{3}{4}x + \frac{7}{2}$

slope (L_1) x slope $(L_2) = (\frac{4}{3})(-\frac{3}{4}) = -1$ ✓0.5

2) b ✓0.5

$y = (1-0.15)(1-0.15)x = 0.85(0.85)x = 0.7225x$

$1 - 0.7225 = 0.2775 = 27.75\ \%$ ✓0.5

3) b ✓0.5

$(D): y = -\frac{1}{5}x + 6$ $(D'): y = \frac{5}{2}x + 6$ ✓0.5

$6 \stackrel{?}{=} -\frac{1}{5}(0) + 6$ $6 \stackrel{?}{=} \frac{5}{2}(0) + 6$

$6 = 6$ verified $6 = 6$ verified

4) a ✓0.5

$E = \frac{(5^2 \times 10^{-4})^3}{5^4 \times 8 \times 10^{-8}} = \frac{5^6 \times 10^{-12}}{5^4 \times 8 \times 10^{-8}} = \frac{5^2 \times 10^{-4}}{8}$ ✓0.5

$= 3.125 \times 10^{-4}$

II- $\frac{7}{2}x = (2 - 3\sqrt{2})(3\sqrt{2} + 2)$ ✓0.5

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

$\frac{7}{2}x = 4 - 18$ ✓1

$\frac{7}{2}x = -14$

$x = \frac{(-14)(2)}{7} = -4$ ✓1

III- 35% football, $\frac{2}{5}$ basketball, 30 volleyball

1) $\frac{2}{5} = 0.4 = 40\%$ 40% practice basketball ✓0.5

• % volleyball = 100 − (35 + 40) = 25
25% practice volleyball ✓0.5

2) $\frac{25}{100} = \frac{30}{\text{total}}$ total $= \frac{30 \times 100}{25} = 120$ ✓1

The total number of students is 120. ✓0.5

$120 \times \frac{35}{100} = 42$. 42 student play football.

3) $\frac{50}{100} \times 42 = 21$ $\frac{30}{100} \times 30 = 9$ ✓0.5

$21 + 9 = 30$ 30 student were injured. ✓0.5

$\frac{30}{120} = 0.25$ 25% of the student were injured.

IV. E(1; −2) F(3; 4) (L): $y = 3x - 5$

1) a) Figure

b) $y_E \stackrel{?}{=} 3x_E - 5$ ✓0.5
$-2 \stackrel{?}{=} 3(1) - 5$
$-2 = -2$ verified
E belongs to (L)

$y_F \stackrel{?}{=} 3x_F - 5$ ✓0.5
$4 \stackrel{?}{=} 3(3) - 5$
$4 = 4$ verified
F belongs to (L).

2) Figure

3) a) (D) is perpendicular to (L) ✓0.5
slope (D) × slope (L) = −1
slope (D) × 3 = −1 slope (D) $= \frac{-1}{3}$ ✓0.5

(D): $y = \frac{-1}{3}x + b$
$y_F = \frac{-1}{3}x_F + b$ $4 = \frac{-1}{3}(3) + b$
$4 = -1 + b$ $b = 5$ ✓0.5

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

3) b) $y_B \stackrel{?}{=} -\frac{1}{3}x_B + 5$ 0.5

$5 \stackrel{?}{=} -\frac{1}{3}(0) + 5$ $5 = 5$ verified B belongs to (D).

4) $EF = \sqrt{(x_F - x_E)^2 + (y_F - y_E)^2}$ 1

$= \sqrt{(3-1)^2 + (4+2)^2} = \sqrt{4+36} = \sqrt{40} = 2\sqrt{10}$ u

$FB = \sqrt{(0-3)^2 + (5-4)^2} = \sqrt{9+1} = \sqrt{10}$ u 0.5

(D) is perpendicular to (L) (given)

$\hat{EFB} = 90°$. $\Rightarrow$ $\triangle EFB$ is a right triangle, right angled at F. 0.5

5) $A_{\triangle EFB} = \frac{\text{base} \times \text{height}}{2}$

$= \frac{EF \times BF}{2} = \frac{(2\sqrt{10})(\sqrt{10})}{2} = 10\,u^2$ 1

6) $\hat{EFB} = 90°$ I is the midpoint of [EB].

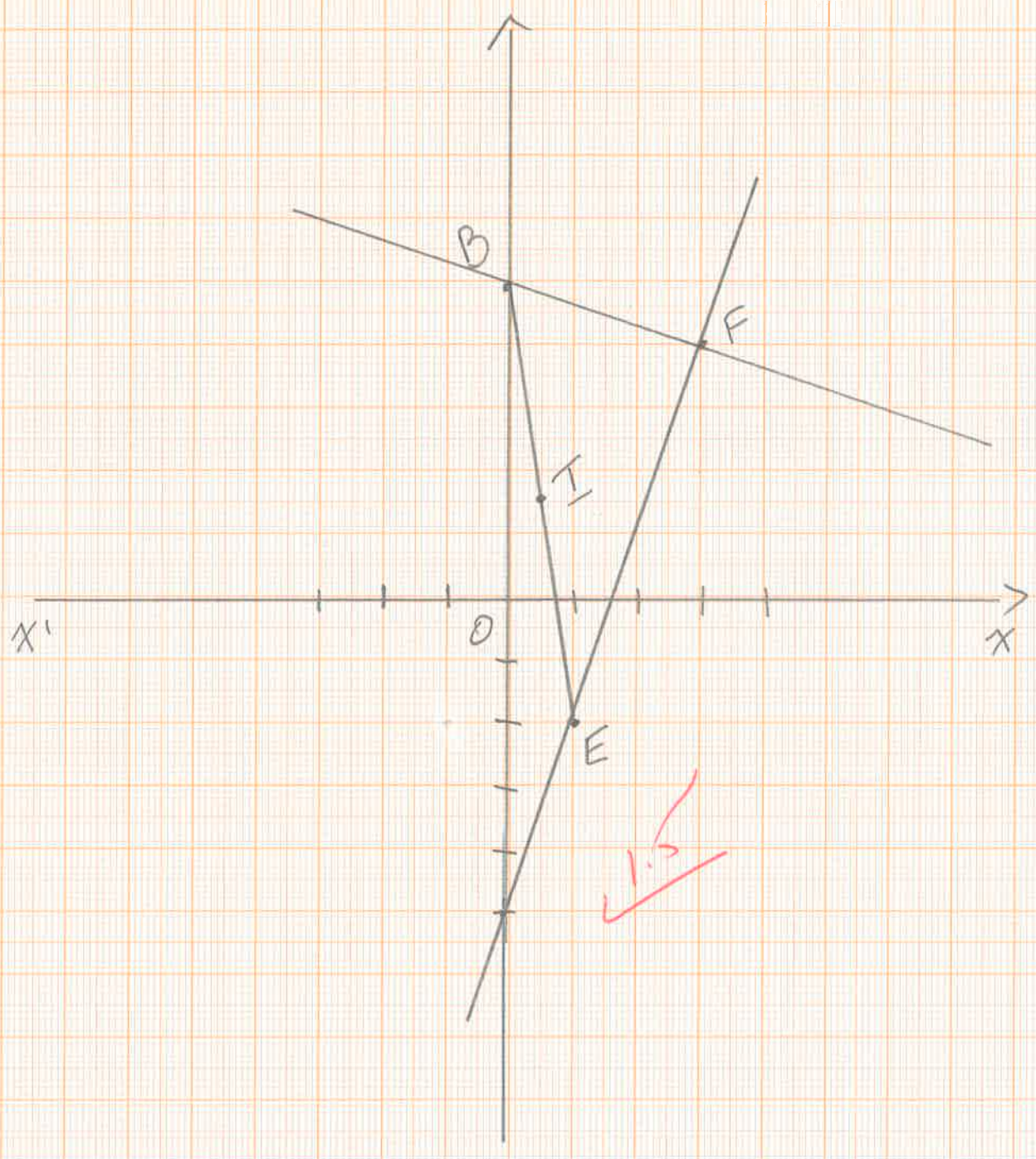
(The center of the circle circumscribed about a right $\triangle$ is the midpoint of the hypotenuse.)

$x_I = \frac{x_E + x_B}{2} = \frac{1+0}{2} = \frac{1}{2}$ 1

$y_I = \frac{y_E + y_B}{2} = \frac{-2+5}{2} = \frac{3}{2}$ $I\left(\frac{1}{2}; \frac{3}{2}\right)$

radius $= \frac{\text{diameter}}{2} = \frac{EB}{2} = \frac{\sqrt{(0-1)^2 + (5+2)^2}}{2}$ 0.5

$= \frac{\sqrt{50}}{2} = \frac{5\sqrt{2}}{2}$ u



1,5

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