This is a Class 1 exam

Lebanon Evangelical School for Boys and Girls

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 :	7A, 7B and 7C
Teacher :	Mrs. Nancy Abdul Khalek
Duration :	1 hour

1. Write your solutions neatly on a separate grid paper unless stated otherwise.
2. Show all of your work.
3. Calculators are not allowed.

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.

Write all of your solutions neatly on a separate paper unless stated otherwise.

Show all your work. **Calculators** are **not allowed.**

I. Evaluate the following expression following the order of operations. [3 marks]

$$(9 - 2 \times 4)^5 + 7 \times 2^2 - 6$$

II. Find the value of x in each of the following equalities. [3 marks]

a. $3^3 \times (3^7)^x = 3^{17}$

b. $5^{-3} \times 5^x \times 5^6 = 5^{13}$

c. $(2 \times 5)^x = 100^4$

III. Simplify. Your answer should contain **positive** exponents only. [7 marks]

a. $(3a^3b)(4a^{-6}b^5)$

b. $(6xy^4)^2$

c. $\frac{15x^7y^3}{3x^4y^5}$

d. $\frac{p^6q^0}{4p^7}$

IV. Write the following expression in the form of a product of **prime** numbers. [3 marks]

$$A = 2^4 \times 49 \times (2^3 \times 7)^2 \times 14$$

V. Write the following numbers in scientific notation. [3 marks]

a. 189000

b. 275×10^4

c. 2135.7

VI. Find the GCD and LCM of 450 and 360 by using the prime factorization method. [3 marks]

VII. Solve the following problem. Show your work. [3 marks]

Karen baked 30 oatmeal cookies and 48 chocolate chip cookies to pack in plastic containers for her friends at school. She wants to divide the cookies into identical containers so that each container has the same number of each kind of cookie.

a. If she wants each container to have the greatest number of cookies possible, how many plastic containers does she need?

b. Find the number of oatmeal cookies and chocolate chip cookies in each container.

VIII. Let PAL be an isosceles triangle of main vertex A such that $P\hat{A}L = 72^0$. The perpendicular to (PL) at P cuts (AL) at I. [12 marks]

a. Show that $A\hat{P}L$ and $A\hat{P}I$ are complementary. (1mark)

b. Find the measure of the angles $A\hat{P}L$ *and* $A\hat{L}P$ of triangle PAL. (2 marks)

c. Find the measure of the three angles of triangle IPA. (5.5 marks)

d. Deduce the nature of triangle IPA. Justify. (1mark)

e. Show that $AL = AI$, then deduce that A is the midpoint of [LI]. (2.5 marks)

Note: Don't redraw the figure on the answer sheet

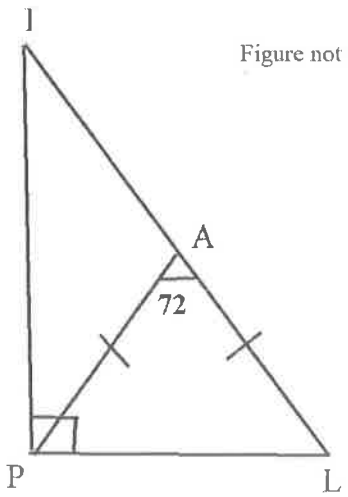


Figure not accurately drawn

Solution of SE03
Maths 7ABC – 2023 2024

class 1

I. $(9-2\times4)^5 + 7\times2^2 - 6$

$= (9-8)^5 + 7\times4 - 6$

$= 1^5 + 28 - 6$ (3)

$= 1 + 28 - 6$

$= 29 - 6$

$= 23$

II. a. $3^3 \times (3^7)^x = 3^{17}$

$3^{3+7x} = 3^{17}$

$3+7x = 17$

$7x = 17-3$

$7x = 14$

$x = 2$ (1)

b. $5^{-3} \times 5^x \times 5^6 = 5^{13}$

$5^{-3+x+6} = 5^{13}$

$-3+x+6 = 13$

$x+3 = 13$

$x = 10$ (1)

c. $(2\times5)^x = 100^4$

$10^x = (10^2)^4$

$10^x = 10^8$

$x = 8$ (1)

III. a. $(3a^3b)(4a^{-6}b^5) = 12a^{-3}b^6 = \frac{12b^6}{a^3}$ (2)

b. $(6xy^4)^2 = 6^2x^2y^8 = 36x^2y^8$ (2)

c. $\frac{15x^7y^3}{3x^4y^5} = 5x^3y^{-2} = \frac{5x^3}{y^2}$ (2)

d. $\frac{p^6q^6}{4p^7} = \frac{1}{4p}$ (1)

1/4

IV. $A = 2^4 \times 49 \times (2^3 \times 7)^2 \times 14$

$= 2^4 \times 7^2 \times 2^6 \times 7^2 \times 2 \times 7$ (3)

$= 2^{11} \times 7^5$

V. a. $189000 = 1.89 \times 10^5$ (1)

b. $275 \times 10^4 = 2.75 \times 10^2 \times 10^4 = 2.75 \times 10^6$ (1)

c. $2135.7 = 2.1357 \times 10^3$ (1)

VI.

450	360	2
225	180	3
75	60	3
25	20	5
5	4	5
1	4	2
1	2	2
(1)	(1)	

(1)

$GCD(450, 360) = 2 \times 3^2 \times 5$

$= 2 \times 9 \times 5$ (1)

$= 90$

$LCM(450, 360) = 2^3 \times 3^2 \times 5^2$

$= 8 \times 9 \times 25$ (1)

$= 1800$

VII. a.

30	48	2
15	24	3
5	8	5
1	8	2
1	4	2
1	2	2
(1)	(1)	

(1)

$GCD(30, 48) = 2 \times 3 = 6$ (1/2)

She needs 6 plastic containers. (1/2)

(1/2)

b. The number of oatmeal cookies $= \frac{30}{6} = 5$ cookies (1/2)

The number of chocolate chip cookies $= \frac{48}{6} = 8$ cookies

VIII. Given
$P\hat{A}L = 72°$
$(IP) \perp (PL)$

a. $A\hat{P}L + A\hat{P}I = I\hat{P}L$ ✓
$A\hat{P}L + A\hat{P}I = 90°$ ($(IP) \perp (PL)$) ✓ (1)
then $A\hat{P}L$ and $A\hat{P}I$ are complementary.

b. APL is an isosceles triangle of main vertex A

$\Rightarrow A\hat{P}L = A\hat{L}P = \frac{180° - P\hat{A}L}{2}$ ✓ (base angles of isosceles triangle PAL)

$= \frac{180° - 72°}{2}$ ✓ (2)

$= \frac{108°}{2} = 54°$ ✓

c. In triangle IPA:

* $I\hat{P}A = I\hat{P}L - A\hat{P}L$ ✓ (adjacent complement angle) ✓
$= 90° - 54° = 36°$ ✓ (1.5)

* $P\hat{A}I = L\hat{A}I - P\hat{A}L$ ✓ ($L\hat{A}I$ is a straight angle) ✓
$= 180° - 72°$ ✓
$= 108°$ ✓ (2)

* $P\hat{I}A = 180° - (I\hat{P}A + P\hat{A}I)$ ✓ (sum of angles in a triangle) ✓
$= 180° - (36° + 108°)$ ✓
$= 180° - 144°$
$= 36°$ ✓ (2)

d. Since $I\hat{P}A = P\hat{I}A = 36^\circ$ (proven) (1)
then IPA is an obtuse isosceles triangle of main vertex A.

e. $AL = AP$ (sides of isosceles triangle APL) (1)
$AI = AP$ (sides of isosceles triangle IPA) (1)
then $AL = AI$ (by comparison)

Since $AL = AI$ and I, A and L are collinear, then A is the midpoint of $[LI]$. $\frac{1}{2}$

4/4