This is a Class 1 exam

Lebanon Evangelical School
for Boys and Girls
Loueizeh - Baabda

Stage Exam 01

11NOV2022

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

Subject :	Maths
Class :	10B and 10C
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.-(4 pts)

In the following table, only one of the proposed answers is correct. Write the number of the question and its proposed answer. **Justify** your answer.

		A	B	C
1	$\sqrt[3]{4} \times \sqrt{2} =$	$\sqrt[3]{8}$	$2\sqrt[6]{2}$	$\sqrt[6]{4}$
2	$]-\infty; -2] \cup]-6; -1] =$	$]-\infty; -1]$	$[-6; -2[$	$]-6; -2]$
3	If x is a negative real number, then $x\sqrt{3} =$	$-\sqrt{3x^2}$	$\sqrt{3x^2}$	$\lvert x\rvert\sqrt{3}$
4	$]-\infty; 8[\cap [8; +\infty[=$	8	R	$\emptyset$

II.- (7.5 points)

Simplify. Show all the steps of calculation.

1) $\dfrac{\sqrt{27}\times\sqrt[5]{9}\times\sqrt[5]{\sqrt[3]{81}}}{\sqrt[6]{3}}$ 2) $\sqrt{(4\sqrt{3}-7)^2}$ 3) $\dfrac{15^{n+2}-15^n}{3^{n+2}-3^n}$

4) $\sqrt[6]{\left(\dfrac{64a^3}{27b^{-3}}\right)^{-2}}$ 5) $\left(\sqrt{3}-\dfrac{4}{\sqrt{3}}\right)^5$

III.- (5 pts)

Solve the following equations and give the answer as an integer or a simplified fraction:

1) $(x-5)^5 = -32$ 2) $x^6 = 10^{-12}$ 3) $(2x+7)^4 = 10^4$

IV.- (8.5 points)

1) Find the set of real numbers such that:

   a) $5|2-3x|+13 = 8$ b) $|2x-7| \leq 10$ c) $|3-5x| = 13$

2) Determine x so that E is defined: E= $\dfrac{x+3}{\sqrt{|x-1|-5}}$

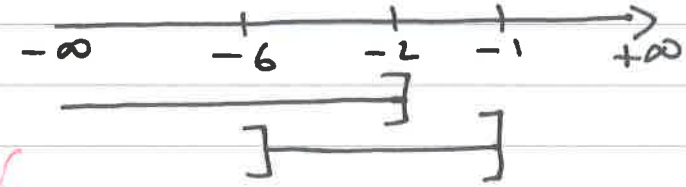
3) Write the following expression without the absolute value: $|2x-4|-2x+4$.

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I.- 1) b $\sqrt[3]{4} \times \sqrt{2} = 2^{\frac{2}{3}} \times 2^{\frac{1}{2}} = 2^{\frac{7}{6}} = \sqrt[6]{2^7}$ 0.5

$= 2\sqrt[6]{2}$ 0.5

2) a $]-\infty; -2] \cup]-6; -1] =]-\infty; -1]$ 0.5 0.5



3) a $-\sqrt{3x^2} = -|x|\sqrt{3} = -(-x)\sqrt{3} = x\sqrt{3}$ 0.5 0.5

4) c $]-\infty; 8[\cap [8; +\infty[= \phi$. 0.5 0.5

II.- 1) $\dfrac{\sqrt{27} \times \sqrt[5]{9} \times \sqrt[5]{\sqrt[3]{81}}}{\sqrt[6]{3}} = \dfrac{3^{\frac{3}{2}} \times 3^{\frac{2}{5}} \times \sqrt[15]{3^4}}{3^{\frac{1}{6}}}$ 1

$= 3^{\frac{3}{2} + \frac{2}{5} + \frac{4}{15} - \frac{1}{6}} = 3^2 = 9$ 1

2) $\sqrt{(4\sqrt{3} - 7)^2} = |4\sqrt{3} - 7| = 7 - 4\sqrt{3}$ $(4\sqrt{3} < 7)$ 0.75 0.25

3) $\dfrac{15^{n+2} - 15^n}{3^{n+2} - 3^n} = \dfrac{15^n(15^2 - 1)}{3^n(3^2 - 1)} = \dfrac{5^n(224)}{8}$ 0.5 0.5

$= 5^n \times 28$ 0.5

4) $\sqrt[6]{\left(\dfrac{64a^3}{27b^{-3}}\right)^{-2}} = \sqrt[6]{\left(\dfrac{2^6 a^3}{3^3 b^{-3}}\right)^{-2}}$ 0.5

$= \sqrt[6]{\dfrac{2^{-12} a^{-6}}{3^{-6} b^6}} = \dfrac{2^{-2} a^{-1}}{3^{-1} b}$ 0.5

$= \dfrac{3}{4ab}$ 0.5

II,- 5) $\left(\sqrt{3} - \frac{4}{\sqrt{3}}\right)^5 = \left(\frac{3-4}{\sqrt{3}}\right)^5 = \left(\frac{-1}{\sqrt{3}}\right)^5$ 0.5 0.5

$= \frac{-1}{9\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{-\sqrt{3}}{27}$ 0.5

III,- 1) $(x-5)^5 = -32$

$x - 5 = \sqrt[5]{-32}$

$x - 5 = -2 \quad x = 3$ 1

2) $x^6 = 10^{-12}$

$x = \pm 10^{-2}$ 2

3) $(2x+7)^4 = 10^4$

$2x+7 = 10 \qquad 2x+7 = -10$

$2x = 3 \qquad 2x = -17$ 1

$x = \frac{3}{2} \qquad x = -\frac{17}{2}$

IV,- 1) a) $5|2-3x|+13 = 8$

$5|2-3x| = -5$

$|2-3x| = -1$ 1.5

impossible

$S = \phi$

b) $|2x-7| \leq 10$

$-10 \leq 2x-7 \leq 10$

$-3 \leq 2x \leq 17$ 1.5

$-\frac{3}{2} \leq x \leq \frac{17}{2}$

$S = \left[-\frac{3}{2}; \frac{17}{2}\right]$ 0.5

c) $|3-5x| = 13$

$3-5x = 13$ 0.5 $\qquad 3-5x = -13$

$-5x = 10$ 1 $\qquad -5x = -16$

$x = -2 \qquad x = \frac{16}{5}$

$S = \left\{-2; \frac{16}{5}\right\}$ 0.5

2) $E = \frac{x+3}{\sqrt{|x-1|-5}}$

$|x-1|-5 > 0$ 0.5

$|x-1| > 5$

$x-1 > 5 \qquad x-1 < -5$ 1

$x > 6 \qquad x < -4$

$S =]-\infty; -4[\cup]6; +\infty[$. 0.5

3) $|2x-4|-2x+4 = 5$ 1

$2x-4-2x+4 = 0$ if $x \geq 2$

$4-2x-2x+4 = 8-4x$ if $x < 2$