## Precalculus Summer Packet

## Instructions:

Each answer must be accompanied by a complete solution on loose leaf. Make sure all sheets used for your solutions are stapled to this packet.
$>$ Packets are to be submitted on the first day of school of the 2023-2024 academic year.
> Have an enjoyable and safe summer vacation!!!
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$\qquad$
Date submitted: $\qquad$

## International Leadership Charter High School

1) Nancy Ocampo thinks that any number to the 0 power is 1 , and 0 to any power is 0 . She wants to know whether $0^{0}$ equals 1 or 0 . Justify your answer.
I. Simplify the expressions.
2) $\left(\frac{x^{7}}{y^{4}}\right)^{8}\left(\frac{y^{10}}{x^{10}}\right)^{3}$
3) $\left(\frac{10 p^{12} n^{7}}{5 p^{3} n^{5}}\right)^{6}$
4) $\frac{\left(9^{54}\right)^{10}}{\left(9^{49}\right)^{11}}$
II. Use the properties of exponentiation to simplify the expression. Write the answers as products of powers, with no variables in denominators.
5) $\left(1001 x^{-4} y^{-3}\right) \div\left(77 x^{6} y^{-7}\right)$
6) $\frac{3^{4} a^{-7} b^{3} d^{-4}}{43^{0} a^{-4} b^{-5} c^{6}}$
7) $\left(4 x^{-\frac{1}{2}}\right)^{3} \div\left(9 x^{\frac{1}{3}}\right)^{-\frac{3}{2}}$
III. Simplify. Write the answer in exact form, as a fraction if necessary.
8) $\sqrt[6]{256} \div \sqrt[4]{64}$
9) $(-64)^{\frac{2}{3}}$
10) $-64^{\frac{2}{3}}$
11) $\left(-\frac{125}{27}\right)^{-\frac{4}{3}}$
12) $\sqrt[3]{128} \cdot \sqrt{32}$
IV. Transform the given expression to simple radical form. You can check your answer by evaluating it and the original expression by calculator.
13) $3 \sqrt{125}-2 \sqrt{80}+\sqrt{405}$
14) $\sqrt[3]{108}+10 \sqrt[3]{32}+\sqrt[3]{500}$
15) $\frac{2}{\sqrt[3]{9}}$
16) $\frac{7}{\sqrt[4]{49}}$
17) $\frac{1+\frac{1}{\sqrt{3}}}{1-\frac{1}{\sqrt{3}}}$
V. Factor the polynomial completely.
18) $x^{6}-y^{6}$
19) $9 x^{2}-56 x+12$
20) $5 x^{3}+6 x^{2}-45 x-54$
VI. Convert the quadratic trinomial to completed square form.
21) $2 x^{2}+9 x-20$
VII. Solve:
22) $x^{2}-x-6=0$ by factoring.
23) $(x+3)^{2}=16$ by extracting square roots.
24) $x^{2}+6 x=5$ by completing the square.
25) $2 x^{2}+3 x-1=0$ by quadratic formula.
