ALGEBRA

Monday, June 12, 1899—9.15 a. m. to 12.15 p. m., only

Answer the first five questions and five of the others but no more. If more than five of the others are answered only the first five answers will be considered. Give each step of solution. Reduce fractions to lowest terms. Express final result in its simplest form and mark it Ans. Each complete answer will receive 10 credits. Papers entitled to 75 or more credits will be accepted.

1 Simplify $\dfrac{\frac{ab-b^2}{a^2-ab}+\frac{a^3-b^3}{ab}}{\frac{a(a+b)}{b(a-b)}} \div \dfrac{1}{\frac{(a+b)^3}{a^2-b^2}}$

2 Simplify $x+y-\{-2y+3x+(3y-\overline{x+y})-x\}$

3 Factor x^4-y^4, a^3-3a^2-10a, $x^2-2x+1-y^2$, a^6+b^6, x^3+x^2+1

4 Solve $\dfrac{8}{x}+\dfrac{15}{y}=-1,\ \dfrac{10}{x}-\dfrac{9}{y}=8$

5 Solve $3x^2-5ax=112a^2$

6 Multiply $2a^2-a+1-3a^4+a^2$ by $a^3+3a^2-2a^3$

7 A number is composed of two digits whose sum is equal to four times the tens digit; if the digits are interchanged the resulting number exceeds the original number by 36. Find the number.

8 Find the greatest common divisor (highest common factor) of $5a^3-21a^2+5a-4$ and $5a^3-19a^2-5a+4$

9 Expand $(a^2-b^3)^6$ to *four* terms by the binomial theorem.

10 Simplify $\sqrt[2n]{a^{2n}b^{8n}},\ \sqrt[n]{m^2n^6},\ \dfrac{a}{b^2}\sqrt{\dfrac{\delta^{4n}}{a^3}},\ \dfrac{a}{x}\sqrt[n]{\dfrac{x^n}{a^{2n}}}$

11 Solve $\sqrt{\dfrac{x}{c}+\dfrac{a}{b}}+\sqrt{\dfrac{x}{c}-\dfrac{a}{b}}=\sqrt{\dfrac{4x}{c}-\dfrac{2a}{b}}$

12 Find the square root of $\dfrac{x^4}{4}+x^3+\dfrac{2x^2}{3}-\dfrac{2x}{3}+\dfrac{1}{9}$

13 Solve $\begin{cases}(a-b)x=(a+b)y\\ x+y=ab\end{cases}$

14 Solve $\begin{cases}x^2-xy+y^2=37\\ x+y=10\end{cases}$

15 The distance between two opposite corners of a rectangular field is 17 rods, and its perimeter is 46 rods; find the length and breadth of the field.