ALGEBRA

Tuesday, September 26, 1905 — 9.15 a. m. to 12.15 p. m., only

Answer the first four questions and four of the others but no more. Give all operations (except mental ones) necessary to find results. Reduce each result to its simplest form and mark it Ans. Each complete answer will receive $12\frac{1}{2}$ credits. Papers entitled to 75 or more credits will be accepted.

1 Add $\dfrac{a+2}{a^2-5a+6} + \dfrac{a+2}{a^2-7a+12} + \dfrac{1}{a^2-6a+8}$

2 Factor *five* of the following: a^8-b^8, $15a^2-26ab-24b^2$, x^6+8y^6, $a^4+4a^2b^2+16b^4$, a^5+b^5, $6a^2-3ab-2ac+bc$, $a^{3x}-27$

3 Solve $\dfrac{x-4}{2} - \dfrac{x-6}{6} = \dfrac{1}{x-3}$

4 A man lacks 3 cents of having money enough to give each boy in a group 10 cents, but has 11 cents more than enough to give each one 8 cents; how many boys are there in the group and how much money has the man?

5 Find the highest common factor (greatest common divisor) of $2a^3-11a^2-20a-7$ and $2a^3-a^2+5a+2$

6 Solve $\begin{cases} 2x+3y+5z=3 \\ x-y+z=1\frac{1}{2} \\ 2x-2y-3z=-1\frac{4}{5} \end{cases}$

7 Expand to *four* terms by the binomial theorem $(2a^2b-c)^5$, giving all the work for finding the coefficients.

8 Find two numbers such that their difference equals $\frac{1}{2}$ and their squares are equal.

9 Solve $2\sqrt{x+1} = \sqrt{x-4} + \sqrt{x+8}$

10 Solve $\begin{cases} 4x^2-4xy-3y^2=36 \\ 2x+y=18 \end{cases}$

11 Simplify $(\sqrt{3}\times\sqrt[3]{2})\div\sqrt[6]{6}$; $(\sqrt{3}-\sqrt{12})(\sqrt{8}+\sqrt{2})$;
$\sqrt{(a-b)^3}+b\sqrt{\dfrac{a^2-b^2}{a+b}}-(a-b)\sqrt{\dfrac{a^2}{a-b}}$

12 The digit in the units place of a certain number of two figures is 7 less than the digit in the tens place; if the order of the digits is reversed, the resulting number will be $\frac{3}{8}$ the original number. Find the number.