High School Department

182D EXAMINATION

ALGEBRA

Monday, June 13, 1904 — 9.15 a. m. to 12.15 p. m., only

Answer the first four questions and four of the others but **no more.** *If more than four of the others are answered only the first four answers will be considered. 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* 12½ *credits. Papers entitled to 75 or more credits will be accepted.*

1 Simplify $\left(\dfrac{2x-v}{x-2y}-\dfrac{2x+y}{x+2y}\right)\div\left(2x+y-\dfrac{2(x^2-v^2)}{x-2y}\right)$

2 Factor *five* of the following: $2a^2+5ab-12b^2$, $2a^3-54$, $a^2-b^2-a^2b+ab^2$, $x^4-6x^2y^2+y^4$, $x^{3a}+1$, $4a^2-4ab+b^2-a^2b^2$, x^6+1

3 Solve $\sqrt{3x}-\sqrt{x-3}=3$

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

5 Reduce $\dfrac{2a^4+a^3-8a^2-a+6}{4a^4+12a^3-a^2-27a-18}$ to its lowest terms.

6 Write the *sixth* term of the expansion of $\left(2x+\dfrac{y}{2}\right)^{13}$ by the binomial theorem. Do not combine factors.

7 The sum of the three digits of a number is 15; the second digit is half the sum of the first and third digits; if 198 is subtracted from the number the order of the digits is reversed. Find the number.

8 Solve $\begin{cases}\dfrac{1}{x}+\dfrac{1}{2y}=3\frac{1}{2}\\[2mm]\dfrac{3}{x}+\dfrac{1}{y}=9\end{cases}$

9 Reduce $\sqrt[18]{5}$, $\sqrt[12]{3}$, $\sqrt[9]{2}$ to radicals having the same index.

Simplify $\sqrt{(x-y)^3}+(x^2-y^2)\sqrt{\dfrac{1}{x-y}}-2\sqrt{x^3-x^2y}$;

$$\dfrac{\sqrt{5}+\sqrt{2}}{\sqrt{5}-\sqrt{2}}\times(7-2\sqrt{10})$$

10 If the length and width of a rectangle are increased 3 feet and 2 feet respectively, the area of the rectangle is increased 87 square feet; if the length and width are decreased 5 feet and 4 feet respectively, the area of the rectangle is decreased 127 square feet. Find the dimensions of the first rectangle.

11 Solve $\begin{cases}2x^2+xy-6y^2=3\frac{3}{4}\\x+2y=2\frac{1}{2}\end{cases}$

12 Define coefficient, binomial, literal equation, surd, pure quadratic.