195TH HIGH SCHOOL EXAMINATION

ELEMENTARY ALGEBRA

Monday, June 15, 1908—9.15 a. m. to 12.15 p. m., only

Answer eight questions, selecting at least two from each group.

Group I 1 Reduce the following fraction to lowest terms:

$$\frac{4a^3+4}{6a^3+12a^2+12a+6}$$

2 Answer either *a* or *b*:

a Give a rule for writing the square of any polynomial.

b Collect into parentheses the coefficients of x, y and z in the following:

$$2ax-3by-7cz-2bx+2cx+8cz-2cx-cy-cz$$

3 Factor *four* of the following: $x^4+x^3+x^2+x$; x^3-8; $x^8+2x+1-y^8-2y-1$; $49m^4+110m^2n^2+81n^4$; x^6+y^6

4 A man having 10 hours at his disposal made an excursion, riding out at the rate of 10 miles an hour and returning on foot at the rate of 3 miles an hour; find the distance he rode.

Group II 5 Extract the square roots of the following polynomials:

$$4x^6-20x^4-4x^3+25x^2+10x+1$$

$$1+10x+25x^2-4x^3-20x^4+4x^6$$

Compare the roots and explain why the signs appear as they do. [3 credits for the explanation.]

6 Simplify $2\frac{3}{4}\sqrt{40}+3\frac{1}{2}\sqrt{108}+\frac{1}{5}\sqrt{500}-\frac{1}{3}\sqrt{320}-2\frac{3}{7}\sqrt{1372}$

7 Solve $\sqrt{x+4}+\sqrt{2x-1}=6$

8 Prove that if four quantities are in proportion the product of the extremes is equal to the product of the means.

Group III 9 If the square root of $\frac{4}{5}$ of a number is subtracted from the number the remainder will be 140; find the number.

10 Solve $\begin{cases} x+y=5 \\ x^3+y^3=35 \end{cases}$

11 For building 108 rods of stone wall, 6 days fewer would have been required if 3 rods more a day had been built; find the number of rods built per day.

12 A man invests $\frac{3}{5}$ of his capital at 4% and the rest at $3\frac{1}{2}$%; his annual income is $76. Find his capital.