Monday, September 9, 1912 — 9.15 a. m. to 12.15 p. m., only

Answer the first four questions and four of the others. Credit will not be granted unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient. Each answer should be reduced to its simplest form. Each complete answer will receive 12½ credits. Papers entitled to less than 75 credits will not be accepted.

1 Solve $4(x-6) - 2\{3x - (x-8)\} = 5(13 - 3x)$ [Credit will not be granted unless all work is correct.]

2 Solve $\dfrac{3}{x-5} + \dfrac{2x}{x-3} = 5$

3 Answer both *a* and *b*:

a How much must be added to *m* to make 10?

b A man buys *c* pounds of tea at *d* cents a pound and gives in payment a *y* dollar bill; how much change should he receive?

4 If the numerator and denominator of a fraction are each increased by 3 the fraction equals $\frac{1}{2}$; if 1 is subtracted from each term of the fraction the value of the fraction becomes $\frac{3}{10}$. Find the fraction.

5 Factor each numerator and denominator in the following expression, perform the operations indicated and reduce the result to its lowest terms:

$$\frac{8a^2 - 28a + 12}{2a^3 - 11a^2 + 12a} \times \frac{a^2 - 8a + 16}{4a^2 + 6a - 4} \div \frac{27a^3 - 12a}{6a^2 - 5a - 6}$$

6 Simplify $8\sqrt{\frac{3}{4}} - \frac{1}{2}\sqrt{12} + 4\sqrt{27} - 2\sqrt{\frac{3}{16}}$; $\dfrac{\sqrt{48}}{\sqrt{12}}$; $\dfrac{\sqrt{a} + \sqrt{b}}{\sqrt{a} - \sqrt{b}}$; $\frac{1}{3}\sqrt{\frac{2}{3}}$

7 A is $\frac{1}{2}$ as old as B; 4 years ago he was $\frac{2}{5}$ as old as B. Find the present age of each.

8 The diagonal of a rectangle is to the length of the rectangle as 5 is to 4; the area of the figure is 96 sq. ft. Find the sides of the rectangle.

9 If a train had traveled 10 miles an hour faster it would have required 2 hours less to travel 120 miles; find the rate of the train per hour.

10 Solve $\begin{cases} 2x^2 - 3xy + 2y^2 = 8 \\ x - y = 1 \end{cases}$