

Monday, September 14, 1908—9.15 a. m. to 12.15 p. m., only

Answer eight questions, selecting at least two from each group. 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% credits. Papers entitled to 75 or more credits will be accepted.

Group I 1 Factor $2a^2 - 5ab - 12b^2$, $x^4 + 2x^2y^2 + 9y^4$, $5m^2 - 1$, $2ac - ad + 4bc - 2bd$, $2x^2y - 64xy^2$

2 Simplify $a - [2a - b - \{-3a + (b - 2b + a) + b\} - 4a]$

3 Simplify $3 - \frac{1}{m - \frac{m^2}{1+m}}$

4 B is one half as old as A; seven years ago he was two fifths as old as A. Find the age of each.

Group II 5 Arrange in order of magnitude $\sqrt[3]{3}$, $\sqrt[4]{6}$, $\sqrt[5]{10}$. Show all work.

6 Simplify $\sqrt{72} + \sqrt{108} - \sqrt{32} + \sqrt{243}$; $(2 + \sqrt{3})(4 - 2\sqrt{3})$;
 $\frac{\sqrt{a} - \sqrt{b}}{\sqrt{a} + \sqrt{b}}$

7 Solve $\frac{2ax - 3}{ax - 1} = 5 - \frac{3ax + 2}{3ax - 1}$

8 Find the square root of $\frac{x^4}{9} + \frac{4x^2}{3} + 2a^2 - 12a + 9$

Group III 9 The difference of two numbers is $5\frac{1}{2}$ and the difference of their squares is $2\frac{1}{2}$; find the numbers.

10 Solve $\sqrt{x+7} + \sqrt{5(x-2)} = 3$

11 If 3 is subtracted from the greater of two numbers and two is added to the smaller, the results are in the ratio 2:3; but if 1 is added to the greater number and 2 is subtracted from the smaller, the results are in the ratio 3:2. Find the numbers.

12 Expand by the binomial formula $(2x - y^2)^4$, giving all of the work for finding the coefficients.