Answer eight questions. 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 complete answer will receive 12½ credits. Papers entitled to less than 75 credits will not be accepted.

1 How is the value of a *proper* fraction affected by (*a*) canceling any factor in either term, (*b*) multiplying either term by any integer, (*c*) dividing both terms by the same factor, (*d*) adding the same number to both terms?

2 Find the common difference of a series of 6 terms, the extremes being 1 and 81.

3 A teamster drew on one load 4 stones, each 1.5 meters long, 65 centimeters wide and 22 centimeters thick; one cubic decimeter of each stone weighed 2440 grams. Find in kilograms the total weight of the load.

4 The pressure of the atmosphere at sea level is 15 pounds per square inch; what is the total pressure on a sphere 3 feet in diameter?

5 Lead weighs 709.375 pounds to the cubic foot; what is the diameter of a ball of lead that weighs 50 pounds?

6 On a mortgage for $600, dated Albany, N. Y., July 10, 1880, payments were indorsed as follows: Jan. 25, 1882, $100; May 20, 1884, $50; Oct. 2, 1884, $200. How much was due March 20, 1889?

7 If 18 men in 12 days of 8 hours each can build 480 cubic feet of masonry, how many cubic feet can 6 men build in 24 days of 10 hours each? [Solve by cancelation.]

8 What decimal bears the same ratio to .004 that $1\frac{3}{8}$ bears to $5\frac{1}{4}$?

9 Find the dimensions of the largest square piece of timber that can be cut from a round log 2 feet 9 inches in diameter and 10 feet long.

10 A berry basket is $5\frac{1}{4}$ inches square at the top, $4\frac{1}{4}$ inches square at the bottom and $2\frac{3}{4}$ inches deep; if level full will it contain a quart of berries? Explain your answer.

11 The entire surface of a cylinder 48 centimeters in diameter is 14.76 square meters; find its length.

12 If a horse is sold for $175 and the gain is $16\frac{2}{3}\%$ how much is the gain? How much did the horse cost? What per cent of the selling price is the gain?