ELEMENTARY ALGEBRA

Monday, January 19, 1931 — 9.15 a. m. to 12.15 p. m., only

Instructions

Do not open this sheet until the signal is given.

Answer all questions in part I and five questions from part II.

Part I is to be done first and the maximum time to be allowed for this part is one and one half hours. Merely place the answer to each question in the space provided; no work need be shown.

If you finish part I before the signal to stop is given you may begin part II. However, it is advisable to look your work over carefully before proceeding to part II, since *no credit will be given any answer in part I which is not correct and reduced to its simplest form.*

When the signal to stop is given at the close of the one and one half hour period, work on part I must cease and this sheet of the question paper must be detached. The sheets will then be collected and you should continue with the remainder of the examination.

ELEMENTARY ALGEBRA

Monday, January 19, 1931

Fill in the following lines:

Name of school.. Name of pupil..

Detach this sheet and hand it in at the close of the one and one half hour period.

Part I

Answer all questions in this part. Each question has 2½ credits assigned to it; no partial credit should be allowed. Each answer must be reduced to its simplest form.

1 Find the quotient if $2x^3 - 3x^2 - 5x + 6$ is divided by $x^2 - 3x + 2$ Ans..............

2 Factor $x^2 - .16$ Ans..............

3 Write a formula for finding the number of trees (n) in an orchard containing r rows of t trees each.   Ans..............

4 Find the numerical value of $2a^2(b - 1) - 3b$ when $a = 4$ and $b = 3$ Ans..............

5 A lady bought 3 dozen buttons at d cents a dozen and 4 yards of cloth at k cents a yard; what is the total cost of the merchandise?   Ans..............

6 Solve the following equation for x:
$$10x - 2(3x - 1) = 23 - 3x$$
Ans..............

7 Express $\dfrac{3x-4}{5} - \dfrac{x-2}{4}$ as a single fraction.   Ans..............

8 Find the square root of 53 to the *nearest tenth*.   Ans..............

9 If three boys weigh x, y and z pounds respectively, what is their average weight?   Ans..............

10 Solve the following equation for x: Ans..............
$$\frac{6}{x} - \frac{1}{x-2} = \frac{3}{x^2 - 2x}$$

11 Unite into a single term: $3\sqrt{8} - \sqrt{2}$ Ans..............

12 Solve the following set of equations for x:
$$x + 3y = 4$$
$$2x - y = 1$$
Ans..............

13 If $y = \dfrac{6}{x}$ and x is positive, does y increase or decrease as x increases?   Ans..............

14 The cosine of an angle is .8750. Find the angle to the *nearest degree*.   Ans..............

15 If three times the square of a certain number is diminished by 20, the result is equal to the number itself; write the equation that would be used in solving this problem.   Ans..............

16 The formula for the perimeter of a rectangle is $P = 2L + 2W$; solve for W in terms of P and L.   Ans..............

Write at top of first page of answer paper to part II (a) name of school where you have studied (b) number of weeks and recitations a week in elementary algebra.

The minimum time requirement is five recitations a week for a school year.

Part II

Answer five questions from this part. Full 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.

21 An airplane made a trip of 600 miles in 6 hours. During the first part of the trip it traveled 120 miles an hour. It then ran into a storm which reduced the rate to 80 miles an hour for the rest of the trip. Find the number of hours it traveled at each rate. [7, 3]

22 The distance from a point A to the foot (C) of a tree is 116.0 feet and the angle of elevation from A to the top (B) of the tree is 47°. Find the height of the tree to the *nearest tenth* of a foot. Check your result by dividing AC by BC and showing that the quotient is approximately the tangent of 43°, the angle at B. [8, 2]

23 In a schoolroom there are two kinds of seats, single and double. There are three times as many single seats as double seats. The room will seat 70 pupils. How many seats of each kind are there? [7, 3]

24 Indicate whether *each* of the following statements is *true* or *false*: [Write the letters a, b, c, d, e in a column and then write the word *true* or *false* after each letter.]

 a $\sqrt{x^2 - y^2} = x - y$ for all values of x and y. [2]

 b The sum of three consecutive numbers equals three times the middle number. [2]

 c $2^3 \times 2^4 = 4^7$ [2]

 d One root of the equation $x^2 - x - 6 = 0$ is -3. [2]

 e $\dfrac{x}{x - y} = \dfrac{-x}{y - x}$ when x and y are unequal. [2]

25 A child's bank contains $3.05 in nickels and dimes. There are 19 more nickels than dimes. How many coins are there of each kind? [7, 3]

26 The numerator and the denominator of a certain fraction are in the ratio 3:7. If 2 is added to both numerator and denominator, the ratio becomes 1:2. Find the fraction. [7, 3]

27 The table below shows the changes in temperature in a town on a certain day from 9 a. m. to 3 p. m.

Hour	9	10	11	12	1	2	3
Temperature	62°	66°	71°	74°	70°	69°	67°

 a Draw a graph to show these changes in temperature. [6]

 b On the graph made in answer to a, mark the points that indicate the approximate time when the temperature was 68°. [2]

 c Determine from the graph for how long a time during the day the temperature was above 68°. [2]

The following question is based on one of the optional topics in the syllabus and may be substituted for any other question in part II.

28 The hypotenuse of a right triangle is 25 inches and one of the legs is 5 inches longer than the other; what is the length of *each* of the two legs? [10]