MATHEMATICS (Preliminary)

Wednesday, January 24, 1945 — 9.15 a. m. to 12.15 p. m., only

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Fill in the following lines:

Name of school...Name of pupil...

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 write the answer to each question on the line at the right; 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.

[1]

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Part I

Answer all questions in this part. Write the answer to each question on the dotted line at the right. Each question has 2 credits assigned to it; no partial credit will be allowed. Each answer must be reduced to its simplest form.

1 Add 406.3; 6.03; 80; 4.7; 3789

2 Multiply 784 by 69

3 How many times is $1\frac{1}{2}$ contained in $10\frac{1}{2}$?

4 $7\frac{3}{4} - 5\frac{7}{8}$

5 Divide 311.5 by 44.2 [Carry answer to *two* decimal places.]

6 Find the product of $4\frac{2}{3}$ and $4\frac{1}{2}$

7 Express $\frac{1}{6}$ as a per cent.

8 How many pecks of potatoes are there in 4 bushels of potatoes?

9 School supplies are listed in a catalog at $425 but are sold to the school with a discount of 25%. What is the net cost to the school?

10 A boy spends 45% of his allowance for lunches and 10% for carfare. What per cent of his allowance does he have left?

11 A square having sides 4 inches long is divided into squares with sides 2 inches long. How many of the smaller squares are there in the larger square?

12 Find the area of a triangle whose base is 12 feet and whose altitude is $8\frac{1}{2}$ feet.

13 Write in figures: forty-five thousandths

14 The scale of miles on a certain map is 1 inch = 200 miles. What is the distance in miles between two towns $8\frac{3}{4}$ inches apart on the map?

15 What is the cost of 1 lb. 10 oz. of meat at $.48 per lb.?

16 Find the value of x in the proportion $8:32 = x:16$

17 At the rate of 60 cents per $100, how much does it cost to insure a car against fire and theft for $950?

18 A boy sold $64 worth of merchandise on a $37\frac{1}{2}$% commission. How much did he earn?

19 A man rents a safety deposit box for $4 a year. If there is a tax of 20%, how much extra does he have to pay for the tax?

20 If Peter is x years older than his brother who is 12, express algebraically Peter's age.

21 Write the equation for the following: A certain number diminished by 3 equals 5

22 A special room to be constructed in a school is to have an area of 900 square feet. It can be made 25 feet wide. How long must it be?

23 What is the name given to an angle of less than 90 degrees?

24 The circumference of a circle is how many times as great as its diameter?

25 To the sum of 15 and 3 add the product of 3 and 4

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Write at top of first page of answer paper to part II (*a*) name of school where you have studied, (*b*) grade of work completed in mathematics.

The minimum requirement is the completion of the work of the eighth grade in mathematics.

Part II

Answer any five questions from this part. No credit will be allowed unless all necessary operations are given. Reduce each result to its simplest form and mark each answer *Ans.*

26 Last summer a girl picked wild raspberries and sold them for 50 cents a quart. She spent 6 hours a day for 14 days and, on the average, picked 1 quart an hour. She paid the owner of the berry patch 10 cents a quart for the berries and 10 cents a dozen for berry baskets.
    a How many quarts of berries did she pick? [2]
    b What were her total expenses? [4]
    c After deducting her expenses, how much net profit did she make on her berries? [4]

27 A man dug a circular cistern in which to store water. The cistern had a diameter of 14 feet and was 6 feet deep.
    a How many cubic feet of soil were removed? [6]
    b How many gallons of water can be stored in the cistern? [1 cu. ft = $7\frac{1}{2}$ gal.] [4]

28 A businessman had his building and its contents appraised and insured for the appraised value. The building was appraised at $5000 and was insured at the rate of 40 cents per $100 per year. The contents of the building were appraised at $9500 and were insured at the rate of 60 cents per $100 per year.
    a What is the total appraised value of the building and contents? [2]
    b If the contents were partially destroyed by fire and the owner received 35% of the appraised value, how much did he receive? [3]
    c What is the total annual insurance premium? [5]

29 The assessed valuation of a certain school district is $14,425,200. It is necessary to raise $230,803.20 by tax to pay the cost of operating the school system.
    a What will the school tax rate be? [6]
    b How much school tax will Mr Smith pay on his property if it is assessed for $4200? [4]

30 In a small house the dimensions of the rooms are as follows: kitchen 12 ft × 10 ft × 8 ft; living room 18 ft × 12 ft × 8 ft; 2 bedrooms each 13 ft × 10 ft × 8 ft. The total space in the other rooms is 800 cu. ft.
    a Find the total air space or volume of the rooms in the house. [6]
    b What is the weight of the air in the house? [Weight of air = .08 lb. per cu. ft] [4]

31 *a* Solve *each* of the following equations: [4]
    (1) $x - 8 = 12$
    (2) $\dfrac{x}{5} - 4 = 4$

    b Write the following in simplest form: [2]
       $3a + 4b - c + 3c - b + a$
    c Write the algebraic equation for *each* of the following: [4]
    (1) One number is $\frac{1}{4}$ of another number and their sum is 5.
    (2) If four times Mary's age is increased by 3, the result is 39.

[3]

32 A garden is five times as long as it is wide. The distance around the garden is 180 feet. Answer *each* of the following, letting x equal the width of the garden:

    a Express the length of the garden in terms of x. [1]

    b Express the distance around the garden in terms of x. [3]

    c Write an equation for the distance around the garden. [2]

    d Solve the equation to find the width of the garden. [2]

    e Find the length of the garden. [2]

33 The diagram below represents a rectangular solid.

    a Find the volume. [4]

    b Find the total surface area. [6]

[4]