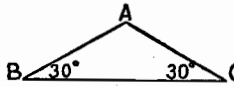
MATHEMATICS (Preliminary)—JANUARY 1955 (1)

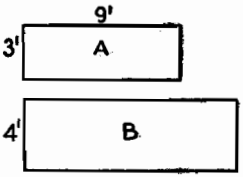
Part I

Answer all questions in this part. Write the answer to each question on the line at the right. Each question counts 2 credits; no partial credit is allowed. Reduce each answer to its simplest form.

1. Add $6\frac{1}{2}$, $8\frac{3}{4}$, $5\frac{1}{8}$
2. Subtract $14\frac{2}{3}$ from 56
3. Add \$124.00, \$48.25, \$.98, \$8.09 and \$9.67
4. Find $3\frac{1}{3} \div \frac{2}{3}$
5. Divide 2.064 by .24
6. Multiply \$1.04 by $8\frac{1}{4}$
7. A train scheduled to arrive in Albany at 11:42 a.m. was 45 minutes late. At what time in the afternoon did it reach Albany?
8. How many square yards of linoleum are needed to cover a floor 18 feet long and 15 feet wide?
9. If a scale of $\frac{1}{4}$ inch = 1 foot is used in a house plan, what is the actual number of feet represented by a line $4\frac{1}{2}$ inches long on the plan?
10. Find the number of degrees in angle A of the triangle ABC.



11. The price of eggs increased from 50 cents to 60 cents a dozen. What was the per cent of increase in price?
12. Using the dimensions given on the similar rectangles A and B at the right, find the number of feet in the length of rectangle B.



13. By purchasing a coat at a clearance sale, a girl saved \$12, which was a saving of 25% on the original price. What was the original price of the coat?
14. The formula for the area of a triangle is $A = \frac{1}{2}bh$. Find A if $b = 12$ and $h = 10$.
15. Write the equation showing that if twice the number n is increased by 3, the result is 15.
16. What is the simple interest on a loan of \$1600 for 6 months at a yearly rate of 5%?

17. Solve for x: $4x - 8 = 16$

18. A dry cleaner offers a 20% discount on all dry cleaning done during the month of January. If the regular cost of dry cleaning a rug is \$2.25, what is the saving if a rug is cleaned in January at this dry cleaner's?

19. How many packages of candy containing $\frac{3}{4}$ of a pound each can be filled from 15 pounds of candy?

20. Tom spent 2 hours and 30 minutes studying for three classes. What was the average time in *minutes* that he spent in studying for each class?

21. Find the number of feet in the circumference of a circle if the diameter is 84 feet.

22. Find the hypotenuse of a right triangle if the legs are 6 and 8.

23. Each edge of a cube is 4 inches long. Find the number of cubic inches in the volume of the cube.

24. Which of the following has the same value as .5%: $\frac{1}{2}$, .005, $\frac{1}{500}$?

25. Of the following real estate tax rates, which is larger, a or b?
(a) \$31.25 per \$1000 (b) \$3.45 per \$100

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. A man wishes to buy a set of tools for his workshop. Dealer X lists the tools at \$154 with a 25% discount. Dealer Y lists the same make of tools for \$140, subject to successive discounts of 10% and 5%.

   a. Find the cost of the tools if they are purchased from dealer *X*. [3]

   b. Find the cost of the tools if they are purchased from dealer Y. [5]

   c. How much is saved by taking advantage of the better offer? [2]

27. In a certain community the real estate tax rate during a recent year was \$24.40 per \$1000 of the assessed valuation of the property.

   a. If a man's property was assessed for \$4500, find the amount of his tax bill for that year. [6]

b. As this man was a month late in paying his tax, a penalty of 1% of the amount of the tax bill was charged. What was the total amount paid in settling his tax bill? [4]

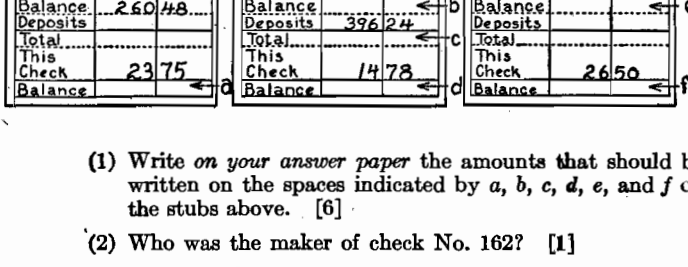
28. A man bought a house for $9000. He made some electrical repairs which cost him $400. He then paid a painter $20 a day for 15 days for painting the house. He also hired a carpenter who received $20 a day for 8 days. Additional expenses, including materials, interest, taxes, etc., amounted to $640. When the repairs were finished, he sold the house for $12,000.

a. How much did he pay for labor, repairs, and additional expenses? [5]

b. What was his profit? [2]

c. What was his per cent of profit based on the selling price of the house? [3]

29. The check stubs shown below are from the personal check book of John Doe. On your answer paper, answer the questions by referring to the stubs.



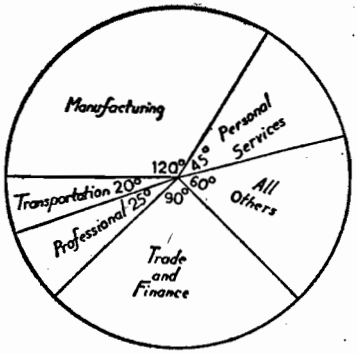
(1) Write *on your answer paper* the amounts that should be written on the spaces indicated by *a*, *b*, *c*, *d*, *e*, and *f* on the stubs above. [6]

(2) Who was the maker of check No. 162? [1]

(3) Who was the payee of check No. 162 which was detached from the stub above? [1]

(4) Write *on your answer paper* the two ways in which the amount to be paid on check No. 162 was written on the check. [2]

30. The circle graph below shows how the wage earners in a certain city earned their living in a recent year. The number of degrees required for each angle is given on the graph. Using the number of degrees shown on this graph,

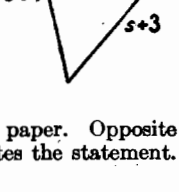


a. Find the fractional part of the graph that represents the number of wage earners earning their living in *each* of the following: [3]
(1) Trade and finance
(2) Personal services
(3) Manufacturing

b. How many times as many persons worked in the area of trade and finance as in the area of personal services? [2]

c. If there were 180,000 wage earners in the city that year, how many persons were engaged in transportation? [5]

31. The sides of the figure in the diagram are expressed algebraically in inches.



a. Express algebraically the perimeter of the figure in the diagram. [2]

b. If the perimeter of the figure is 45 inches, write an equation that may be used to solve for s. [2]

c. Solve your equation to find the length of s. [3]

d. Find the length of each of the remaining three sides of the figure. [3]

32. List the numbers 1 through 5 on your answer paper. Opposite *each* number write the answer that correctly completes the statement. [10]

(1) $a + a + a = \ldots$.

(2) If $\frac{a}{2} = 4$, then $a = \ldots$.

(3) The formula for the circumference C of a circle whose radius is r is: $C = \ldots$.

(4) A hexagon is a polygon that has . . . sides.

(5) If a bicyclist travels 20 miles at the rate of 10 miles per hour and then 36 miles at the rate of 6 miles per hour, his *average rate* for the entire distance is . . . miles per hour.

33. Answer the following questions concerning the first-floor plan of the house shown below: [The ruler is marked according to the *inch* unit of measure.]

a. What would it cost to cover the dining room floor completely with carpet that costs $9.50 per square yard? [5]

b. According to the scale used in the drawing, 1 inch represents *approximately* how many feet? [2]

c. What is the number of feet in the perimeter of the floor of the living room? [3]