

MATHEMATICS (PRELIMINARY)—JUNE 1955 (1)

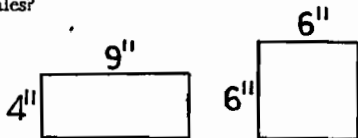
Part I

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.

- Add: \$13.95, \$20, \$8.02, \$6.79
- What is $12\frac{3}{8} - 5\frac{7}{16}$?
- Divide $4\frac{1}{2}$ by $\frac{2}{3}$
- Find the value of $2\frac{2}{3} \times 2\frac{1}{4} \times \frac{1}{2}$
- Divide 1.584 by .12
- Express 2.5% as a decimal
- Change $\frac{3}{4}$ to a decimal, correct to the nearest hundredth
- The price of canned corn is \$1.80 per dozen cans or \$.16 each if bought one at a time. How many cents would be saved on each can if a purchase of 12 cans is made by the dozen instead of one at a time?

9. How much does a girl earn for selling \$68 worth of writing paper if she is paid a commission of 40% on her sales?

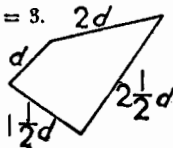
10. Are the rectangle and the square, in the diagram at the right, equal in area or similar?



- A team played 24 games of which it won 18. What per cent of the games played did it win?
- One man earns \$4050 per year. A second man earns \$315 per month. How much more does the first man earn in a year than the second man?
- A girl purchased a blouse for \$2.19. She returned the blouse the next day and selected a better one costing \$2.89. She gave the clerk a dollar bill to pay for the difference in price. How many cents in change should she receive?
- The daily almanac report for one day during the summer stated that the sun rose at 6:14 a.m. and set at 6:06 p.m. Find the number of hours and minutes in the time between the rising and setting of the sun on that day.

15. In the formula $A = 6s^2$, find the value of A when $s = 3$.

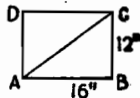
16. What is the perimeter of the figure in the diagram at the right?



MATHEMATICS (PRELIMINARY)—JUNE 1955 (2)

17. In a certain homeroom nine pupils took part in a school program. If this number represented 25% of the total homeroom enrollment, how many pupils were enrolled in the homeroom?

18. In the diagram at the right AC is a diagonal in rectangle $ABCD$. Find the number of square inches in the area of triangle ABC .



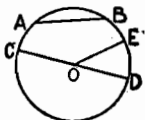
19. Find the simple interest on \$4500 for 6 months at a yearly rate of 4%.

20. Find the value of n in the following equation: $3n + 5 = 17$.

21. The yearly income from an investment of \$1200 is \$60. What yearly rate of interest does this investment pay?

22. On a certain map 1 inch represents 300 miles. How many miles are represented by a line $2\frac{1}{2}$ inches long on this map?

23. If the circumference of the circle whose center is O is found by multiplying $3\frac{1}{2}$ by the length of one of the lines in the figure at the right, which one of the lines, AB , OE or CD , must be used to find the circumference of this circle?



24. What is the length in feet of one side of a square having an area of 100 square feet?

25. During the first 6 weeks of a summer vacation a boy earned \$15 per week, and during the next 4 weeks he earned \$20 per week. What average pay per week did he earn during that 10-week period?

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 purchased twelve United States Savings Bonds through the pay-roll savings plan at his place of employment.

a. If he paid \$75 for each bond, what did the 12 bonds cost him? [2]

b. Each of the bonds will be worth \$100 if kept for a period of 10 years. If the man keeps each bond for its full 10-year period, what will be the final total value of these bonds? [2]

c. What is the difference between the original total cost and the final total value of these bonds? [2]

d. What will be the per cent of increase in the value of these bonds for the 10-year period? [4]

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27. A girl planned to make corn meal crisps to serve with the dinner she was giving for the girls in her club. She knew that the following recipe would make 20 crisps:

- | | |
|------------------------|---------------------------------|
| 1 cup yellow corn meal | ½ teaspoon baking powder |
| ½ cup sifted flour | 2 tablespoons melted shortening |
| ½ teaspoon salt | ½ cup milk |

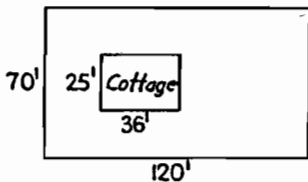
- a. There are to be fifteen girls, including herself, at dinner. If she wishes to make 4 crisps for each girl, by what amount should each ingredient in the above recipe be multiplied to make the required number of crisps? [4]
- b. Using the answer found in part a, rewrite the recipe above to show the total amount of each ingredient that will be needed. [6]

28. John Doe wishes to insure his house against loss by fire for \$6500. An insurance salesman told him that the cost of a 3-year policy is $2\frac{1}{2}$ times the cost of a 1-year policy. The rate on a 1-year policy is \$.46 per \$100 of insurance.

- a. Find the premium John Doe would pay for a 1-year policy. [3]
- b. Find the premium he would pay for a 3-year policy. [5]
- c. How much will he save over a 3-year period if he buys a 3-year policy rather than a 1-year policy each year? [2]

29. The diagram at the right below represents the position of a summer cottage on a rectangular plot of land. The outside dimensions of the cottage are 36 feet by 25 feet; the dimensions of the plot are 120 feet by 70 feet. It is planned to seed the ground surrounding the cottage, making no allowances for paths or driveway.

- a. Find the total area of the lot. [2]
- b. Find the area of the space occupied by the cottage. [2]
- c. How many square feet of ground will be seeded? [2]
- d. Grass seed was bought at \$5 for each 5-pound carton. If it is estimated that 1 pound of seed will be needed for every 300 square feet of lawn, how much will the grass seed cost? [4]



30. A man paid \$2150 for a new automobile and drove it 18,000 miles the first year. At the end of the first year, the man figured his total cost of owning and operating the car for the year.

- a. If the car averaged 18 miles per gallon of gasoline at \$.29 per gallon, what was the cost of gasoline for the year? [3]

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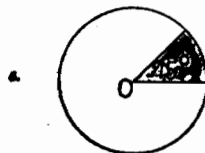
- b. A change of oil every 1000 miles required 6 quarts of oil at \$.40 per quart. What was the total cost of oil for the year? [3]
- a. A depreciation of 25% of the original cost of the car was figured as an additional expense for the year. Find the amount of depreciation. [2]
- d. If other expenses for the year, including interest charges, license fee, insurance, and service and repairs, amounted to \$359.70, find the total cost of owning and operating the car for the year. [2]

81. Two boys went on a fishing trip and caught 40 fish. Because the first boy furnished all the equipment, it was agreed that he should take three times as many fish as the second boy. If x represents the number of fish taken by the second boy, then

- a. represent in terms of x the number of fish taken by the first boy. [2]
- b. write an equation that would be used to find the value of x . [4]
- c. using the equation found in b, solve for x . [2]
- d. how many fish did the first boy take? [2]

82. In each of the following statements select the expression within the parentheses which correctly completes the statement: [10]

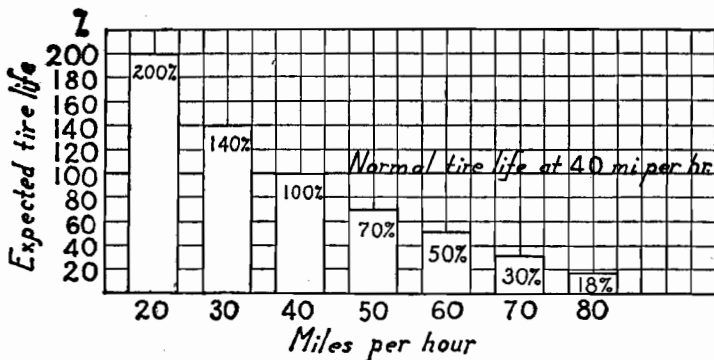
- a. A right angle always contains (60° , 90° , 180°).
- b. An octagon is a polygon of (5, 6, 8) sides.
- c. If a point lies within a circle, its distance from the center is (less than, equal to, greater than) the radius of the circle.
- d. If two straight lines are perpendicular to each other, they form (acute, right, straight) angles.



The shaded part in the diagram is (10%, $12\frac{1}{2}\%$, 25%) of the circle.

MATHEMATICS (PRELIMINARY)—JUNE 1955 (5)

RELATION BETWEEN CAR SPEED AND TIRE WEAR



99. The graph above appeared in a magazine advertisement. Use the graph to answer the following: [10]

- At what speed is the normal life of a tire determined?
- The life of a tire on a car driven at 20 miles per hour is how many times greater than the life of a tire on a car driven at 40 miles per hour?
- What car speed will result in tires lasting only half of their normal tire life?
- If a car is driven at 30 miles per hour, what per cent *more* than normal tire life may be expected?
- If a car is driven at 70 miles per hour, what per cent *less* than normal tire life may be expected?