

EXAMINATION—JANUARY 1954 (1)

Board of Education

Buffalo, New York

Part I—Answer all questions in part I.

1. Find the sum of $2b + 3$, $5b - 6$, and $b + 4$
2. From $4m - 3n$ subtract $3m + 2n$
3. Divide $12x^2y^2$ by $3xy^2$
4. Multiply: $(4a + 1)(a + 4)$
5. Solve for r : $5r = 30$
6. Solve for x : $3x + 7 = 19$
7. Solve for a : $5a - 4 = 3a + 6$
8. Solve for y : $6(y + 3) = 2y - 2$
9. Solve for m : $m : 7 = 6 : 3$
10. Solve for x : $\frac{x}{3} + \frac{x}{4} = \frac{7}{12}$
11. Solve for x and y : $5x + 3y = 13$
 $x + 3y = 5$
12. The formula for the area of an equilateral triangle is $A = \frac{b^2\sqrt{3}}{4}$ where b is one side of the triangle. Find the area of an equilateral triangle whose side is 20. [Use $\sqrt{3} = 1.73$]
13. Factor: $a^2 - 36$
14. Factor: $5x^2y^2 + 15x^2y^2$
15. Solve for the *positive* root of the equation:
 $x^2 - 2x - 15 = 0$
16. A man has d dollars and spends s dollars. How many dollars has he left?
17. A rectangular playground is 120 feet wide and 160 feet long. What is the distance from one corner of the playground to a diagonally opposite corner?
18. After January 1, a taxpayer finds that the deduction from his paycheck for income tax is 10% less than formerly. If the former deduction had been \$4.50, what is the new deduction?
19. A certain type dress requires $2\frac{3}{4}$ yards of material. How many dresses of this type can a manufacturer make up from 120 yards of material?
20. Write the linear equation expressing the relationship between x and y shown in the following table:

x	-1	0	1	2	3
y	-6	-3	0	3	6

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Directions: (21-23). Indicate the correct completion to each question by writing on the line at the right the letter *a*, *b*, or *c*.

21. If the gas company charges 78 cents per 1000 cubic feet of gas, the approximate cost of 49,286 cubic feet is (a) \$38. (b) \$16. (c) \$3.80

22. On a sheet of graph paper locate the points (1,1), (3,1) and (3,5) and join them with three straight lines. The triangle formed will be (a) equilateral (b) isosceles (c) right

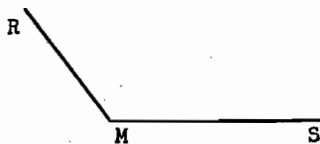
23. If the radical $5\sqrt{18}$ is simplified, the result is (a) $15\sqrt{2}$ (b) $8\sqrt{2}$ (c) $9\sqrt{2}$

Directions: (24-25). Leave all construction lines on the paper.

24. Construct the perpendicular bisector of *AB*.



25. Bisect angle *RMS*.



Part II

Answer three questions from Part II.

26. Jack, Bob and Dan earned a total of \$22 shoveling snow. If Bob earned \$3 more than Jack, while Dan earned \$5 less than twice as much as Jack, how much did each earn? Check. [6, 3, 1]

27. If 5 pencils and 2 tablets cost 45¢, and 3 pencils and one tablet cost 25¢, what is the cost of a pencil? Check. [6, 3, 1]

28. The perimeter of a skating rink is 370 feet. If the length is 5 feet more than three times the width, what are the dimensions? Check. [6, 3, 1]

29. Write the equations that may be used in solving any *two* of the following problems. In each case state what the letter or letters represent. [Solution of the equations is *not* required.]

a. A boy saved nickels and dimes until he had \$1.45. If he had 8 more nickels than dimes, how many dimes did he have? [5]

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- b. Two trains started towards each other at the same time from cities which were 360 miles apart. If one train traveled at the rate of 45 miles an hour while the other traveled 35 miles an hour, in how many hours would they meet? [5]
- c. Mr. Baldwin invests a certain amount of money in bonds at 3% a year and twice as much in stocks which pay 5% a year. If his total annual income from the two investments is \$104, how much is invested in bonds? [5]

Part III

Answer two questions from Part III.

30. Solve graphically, and check:

$$2x - y = 5$$

$$x + 2y = 5 \quad [8, 1, 1]$$

31. A tall building casts a shadow 120 feet long at a time when the angle of elevation of the sun is 53° . Find the height of the building to the nearest foot. [10]

32. a. Construct a rectangle whose length is 3 inches and whose width is 2 inches. [6]

- b. Bisect one of the angles of the rectangle, and extend this bisector to intersect a side of the rectangle, thus forming an isosceles triangle. [3]

- c. What is the length of the *smaller* of the two segments into which the side of the rectangle is divided? [1]

33. Each of the five parts of this question is a statement that may be correctly completed by *one and only one* of the given choices. Write on your answer paper the numbers (1) to (5) and after *each* indicate the correct answer to the corresponding question by writing *one and only one* of the letters *a*, *b*, or *c*. [10]

- (1) If $x^3 - 4x^2 + 3x + 32$ is divided by $x + 2$, the remainder is (a) 2 (b) 18 (c) 62
- (2) $2\sqrt{50} + 5\sqrt{8}$ will simplify to (a) $7\sqrt{58}$ (b) $15\sqrt{2}$ (c) $20\sqrt{2}$
- (3) A man buys a collection of 993 old books for which he pays \$250. The approximate average cost of each book is (a) $2\frac{1}{2}$ cents (b) 25 cents (c) \$2.50
- (4) A root of the equation $7x - x^2 = 12$ is (a) 2 (b) -4 (c) 4
- (5) A dealer mixes coffee worth 80¢ a pound with coffee worth \$1.10 a pound to make a mixture to sell for 98¢ a pound. How many pounds of each does he use? Do *not* solve this problem, but simply state whether there is given
 (a) not enough information to solve the problem.
 (b) just enough information to solve the problem.
 (c) more information than necessary to solve the problem.