

# NINTH YEAR MATHEMATICS—JUNE 1957 (1)

## Course 1—Algebra

### (Sample Examination)

#### Instructions

It is wise to divide your time so that you may complete the entire examination in *three hours*. Part I probably can be done within a period of one and one-half hours and parts II and III within the time remaining. Excess time may be used in reviewing your paper for errors.

#### Part I

*Directions (1-25):* Answer all questions in this part. Write the answer to each question in the space provided at the right. No work need be shown for this part. Each correct answer will receive 2 credits. [50]

1. Subtract  $2y^2 - 3y + 2$  from  $3y^2 - 2y + 3$ .
2. Multiply  $\frac{a^2 - b^2}{12a^3}$  by  $\frac{6a}{a - b}$  and reduce to lowest terms.
3. Represent the number of hours in  $x$  days and  $y$  hours.
4. The formula for the volume of a rectangular solid is  $V = lwh$ . Find the number of cubic inches in the volume of a rectangular solid 8 inches long,  $2\frac{1}{2}$  inches wide and  $3\frac{1}{4}$  inches high.
5. What is the perimeter of a rectangle whose width is represented by  $w$  and whose length is represented by  $6w - 4$ ?
6. Find the square root of 135 to the *nearest tenth*.
7. Solve for  $y$ :  $9y - 5 = 7 + 8y$
8. Solve for  $x$ :  $5 - 3x = 17$ .
9. Solve for  $m$ :  $8m - (6m - 3) = 9$
10. Solve for the positive value of  $x$ :  $3x^2 = 108$
11. In five years the enrollment of a certain junior high school increased from 800 to 1,400 pupils. What was the percent of increase in enrollment in this school during this period?
12. The scale on a map is 1 inch = 500 miles. If two cities are 1,125 miles apart, how many inches apart will they be on the map?

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13. Find the factors of  $x^2 - x - 42$ .

14. Solve for  $n$ :  $\frac{n}{3} + \frac{n}{2} = 40$

15. Solve for  $x$ :  $0.06x = 0.468$

16. Solve for  $a$ :  $3a - q = p$

17. Solve the following set of equations for  $x$ :

$$5x + 4y = 27$$

$$x - 2y = 11$$

18. If  $\sin A = .4343$ , find angle  $A$  to the nearest degree.

*Directions (19-23):* Indicate the correct completion to each question by writing on the line at the right the letter  $a$ ,  $b$  or  $c$ .

19. If  $x^2 - 5x - 8$  is divided by  $x - 2$ , the remainder is (a) 4  
(b) -2 (c) -14

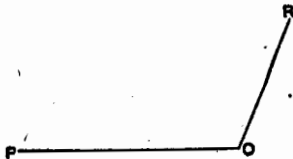
20. The sum of  $\sqrt{98}$  and  $\sqrt{50}$  is (a)  $\sqrt{148}$  (b)  $12\sqrt{2}$  (c) 24

21. The expression  $(x + 5)^2$  is equal to  
(a)  $x^2 + 25$  (b)  $x^2 + 5x + 25$  (c)  $x^2 + 10x + 25$

22. If the fractions  $\frac{5x - 3}{6x}$  and  $\frac{3x + 7}{10x}$  are added, the sum is  
(a)  $\frac{17x + 3}{15x}$  (b)  $\frac{3}{4}$  (c)  $\frac{28x + 7}{10x}$

23. On a sheet of graph paper, locate the points  $(8,3)$  and  $(-4,-6)$  and connect them with a straight line. This line will intersect the  $x$ -axis at the point (a)  $(0,4)$  (b)  $(-3,0)$  (c)  $(4,0)$

24. Bisect angle  $POR$ .



25. Using  $AB$  as a base, construct an equilateral triangle.



Part II

Answer three questions from this part. Only algebraic solutions will be accepted. Show all work.

26. A citrus-fruit grower has a 120-acre grove completely planted with three different kinds of trees as follows: 30 more acres with tangerine trees than with grapefruit trees and 3 times as many acres with orange trees as with grapefruit trees. Find the number of acres he has planted with *each* kind of tree. [6, 4]

27. One side of a square exceeds one side of an equilateral triangle by 6. The perimeter of the square exceeds the perimeter of the triangle by 34. Find the length of one side of the triangle *and* of one side of the square. Check. [6, 3, 1]

28. Mr. Dale asked his son to deposit \$495 in the bank for him. There were exactly 70 bills, consisting of 5-dollar and 10-dollar bills. Find the number of bills of *each* kind that he had to deposit.

29. The numerator of a fraction is 5 less than the denominator. If the numerator is doubled and the denominator is increased by 7, the value of the resulting fraction is  $\frac{2}{3}$ . Find the original fraction. Check. [6, 3, 1]

30. A freight train and a passenger train leave at the same time from the same station and travel in opposite directions. The average rate of the freight train is 20 miles per hour *less* than that of the passenger train. At the end of 5 hours the trains are 520 miles apart. Find the average rate of *each* train. Check. [6, 3, 1]

Part III

Answer two questions from this part. Show all work.

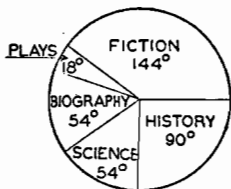
31. Solve *graphically* and check: [6, 2, 2]

$$\begin{aligned}x + 2y &= 7 \\4x - y &= 1\end{aligned}$$

32. A monument stands on level ground. The angle of elevation of the top of the monument taken at a point 325 feet from the foot of the monument is found to be  $27^\circ$ . Find the height of the monument to the *nearest foot*. [10]

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33. The circle graph below represents the distribution of 3,600 books in a certain school library.



- How many books of *each* kind are there in this library? [4]
- Using the answers found in part *a*, draw a bar graph to show the number of books of each kind. [6]

34.  $ABC$  is a right triangle whose legs are represented by  $2x - 1$  and  $2x + 2$ , and whose hypotenuse is  $3x$ . Find the *three* sides of the triangle. [3, 7]

