

NINTH YEAR MATHEMATICS—JUNE 1960 (1)

Course 1—Elementary Algebra (Sample Examination)

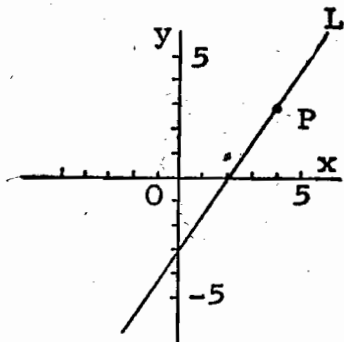
Part I

Directions (1-30): 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. [60]

1. If $a = 5$ and $b = -3$, what is the value of $2ab^2$?
2. Using the formula $K = \frac{1}{2}h(b + b')$, find h if $K = 39$, $b = 4$ and $b' = 9$.
3. Find the factors of $x^2 + 2x - 15$.
4. Reduce the fraction $\frac{y^2 - 1}{4y + 4}$ to its lowest terms.
5. On his last birthday Ted's weekly allowance was raised from \$2.50 to \$3.00. What percent of increase was this?
6. Represent the number of inches in p feet and q inches.
7. Subtract $x^2 + x - 1$ from $3x^2 - 5x$.
8. If the perimeter of an equilateral triangle is represented by $15x - 12$, find one side of the triangle.
9. Solve for y : $9y - 5(y - 2) = 12$
10. Solve for n : $\frac{2}{3}n - 2 = 8$
11. Solve for x : $2x + 5.7 = 26.3$
12. If $\cos A = .9000$, find angle A to the *nearest degree*.
13. Solve for the *positive* value of x : $4x^2 = 25$
14. Find to the *nearest tenth* the value of $\sqrt{67}$.
15. A certain airliner carries emergency food rations in the amount of $1\frac{1}{2}$ pounds per meal per person. What is the weight, in pounds, of three emergency meals for 20 persons?
16. If the point $(3, k)$ lies on the graph of $2x + y = 1$, what is the value of k ?
17. Solve for x : $x - a = a + b - 3x$
18. Solve the following proportion for p : $\frac{p + 1}{16} = \frac{3}{4}$
19. If the hypotenuse of a right triangle is 10 and one leg is 8, find the other leg.

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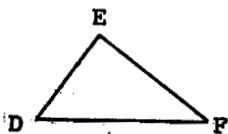
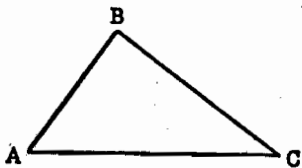
Directions (20-21): Refer to the graph shown in the figure.



20. What is the ordinate of point P?

21. What is the abscissa of the point where line L crosses the y-axis?

22. In the figure below, triangle ABC is similar to triangle DEF. If $AC = 72$, $AB = 45$ and $DF = 32$, find DE.



Directions (23-29): Indicate the correct completion for each of the following by writing on the line at the right the number 1, 2, 3 or 4.

23. The product of two binomials is $3x^2 - x - 4$. One of them is $x + 1$. The other is (1) $x - 4$ (2) $3x - 1$ (3) $3x - 4$ (4) $x + 4$

24. The sum of $\frac{a+3}{a-1}$ and $\frac{2}{1-a}$ is

(1) 1 (2) $\frac{a+1}{a-1}$ (3) $\frac{a+5}{a-1}$ (4) $\frac{a+5}{a^2-1}$

25. The expression $3\sqrt{5}$ is equivalent to (1) $-3\sqrt{5}$ (2) $\sqrt{15}$ (3) $\sqrt{45}$ (4) $\sqrt{75}$

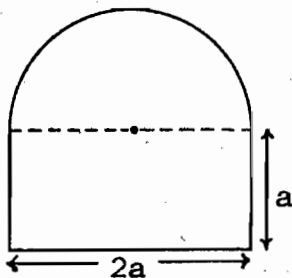
26. If $x = 8$, the value of $x - 5(x + 2)$ is (1) -42 (2) -22 (3) 30 (4) 42

27. The expression $(2x^2)^3$ is equivalent to (1) $6x^5$ (2) $6x^6$ (3) $8x^5$ (4) $8x^6$

28. The product of two consecutive even integers is 168. If n represents the smaller even integer, then an equation that can be used to find the integers is (1) $n + n + 2 = 168$ (2) $n + n + 1 = 168$
 (3) $n(n + 1) = 168$ (4) $n(n + 2) = 168$

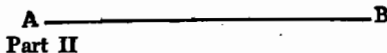
29. A semicircle surmounts a rectangle whose length is $2a$ and whose width is a , as shown in the diagram. A formula for finding the area of the whole figure is

- (1) $2a^2 + \frac{\pi a^2}{2}$ (2) $2\pi a^2$ (3) $3\pi a^2$ (4) $2a^2 + \pi a^2$



.P

30. Construct a line through point P perpendicular to line AB .



Answer four questions from this part. Show all work unless otherwise directed.

31. Answer both a and b :

a. Solve for n and check: [5, 1]

$$\frac{2n + 13}{3} - \frac{6 - n}{4} = 1$$

b. Solve for x : [4]

$$x - \frac{1}{c} = \frac{x}{c}$$

32. The athletic manager for a small school ordered 4 pairs of football shoes and 4 helmets for new members of the squad. Later in the season he had to order 9 more pairs of shoes and 6 more helmets to replace worn ones. The first order amounted to \$71 and the second to \$147. If there was no change in prices during the season, find the price of a pair of football shoes and the price of a helmet. [5, 5]

33. The width of a rectangle is 2 inches more than $\frac{1}{3}$ of its length. If the perimeter is 52 inches, find the length and the width of the rectangle. Check. [5, 4, 1]

34. Solve graphically and check: [8, 2]

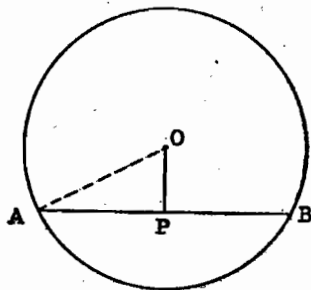
$$\begin{aligned} 3x - y &= 5 \\ x + 2y &= 4 \end{aligned}$$

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35. Write the equation or equations that may be used in solving the following problems. In each case, state what the letter or letters represent. (Solution of equations is *not* required.)

- a. A man has \$2,400 invested at 5%. How much additional money must he invest at 2% in order that his total annual income may equal 3% of the entire investment? [5]
- b. Tom's father drove from home to his summer camp in 4 hours. Returning over the same route, he took one hour longer because heavy traffic forced him to drive an average of 8 miles per hour slower. What was his average rate going to camp? [5]

36. In the figure, AB is a chord in circle O . Line OP is perpendicular to AB at its midpoint P (that is, $AP \cong PB$) and OA is drawn.



If the radius of the circle is 10 and if angle $OAP = 23^\circ$, find

- a. the length of OP to the nearest tenth [5]
- b. the length of AB to the nearest tenth [5]

37. List the letters a - e on your answer paper. Indicate, by writing the number 1, 2, or 3 after *each* letter, whether the correct completion is (1) less than (2) equal to (3) greater than.

In each of the following, let $x = 3$ and $y = 4$.

- a. The value of $\frac{x}{y-1}$ is the value of $\frac{x}{y}$. [2]
- b. The value of $\frac{x-2}{y-2}$ is the value of $\frac{x}{y}$. [2]
- c. The value of $\frac{5x}{5y}$ is the value of $\frac{x}{y}$. [2]
- d. The value of $\frac{x^2-1}{2y}$ is the value of $\frac{x}{y}$. [2]
- e. The value of $\frac{x^2}{y^2}$ is the value of $\frac{x}{y}$. [2]