Longitudinal Study of American Youth

MATHEMATICS

Form (B)

INTRODUCTION

This booklet contains questions about mathematics for you to answer. You will be able to answer some of the questions quickly and others will require more thought. Please do not feel discouraged if you are not absolutely sure of an answer. Some questions will ask about things you have covered in class, but others will not. Please do your best to answer each question. If you are not sure of the answer, read the question again, and make your best guess.

MARKING YOUR ANSWERS

Each question is followed by a set of possible answers labeled A, B, C, etc. Read each question carefully, then choose the *one* answer you think is the best, and darken in the letter on your *Answer Sheet* next to the number for that question. Be sure to mark only *one* letter for each question. Do not skip any questions.

Do not make any stray marks on your *Answer Sheet*. Do all of your calculations on the Question Booklet, and use the *Answer Sheet* only to record your answers.

If you have any questions while taking this test, raise your hand, and the person giving the test will come to your seat to help you.

Social Science Research Institute

Northern Illinois University   DeKalb, Illinois   60115

1. . Which of the following sentences is true when any number is substituted for x?

(A) $x + 1 = x$ (C) $x \cdot 1 = 1$

(B) $x + 0 = 0$ (D) $x \cdot 1 = x$ N264701

2. If $7x + 4 = 5x + 8$, then $x =$

(A) 1   (C) 4

(B) 2   (D) 6   N210601

3. . $2x + 3y + 4x =$

(A) $9xy$

(B) $9x^2y$

(C) $5xy + 4x$

(D) $6x + 3y$ N255701

4. If $V = \dfrac{6a^2b^3}{5}$, what is the value of V when $a = 1$ and $b = 2$?

(A) $\dfrac{288}{5}$ (C) $\dfrac{72}{5}$

(B) $\dfrac{216}{5}$ (D) $\dfrac{48}{5}$ N210401

5. If a fair coin is tossed, the probability that it will land heads up is $\dfrac{1}{2}$. In four successive tosses the coin lands heads up each time. What happens when it is tossed a fifth time?

(A) It will most likely land tails up.

(B) It is more likely to land tails up than heads up.

(C) It is more likely to land heads up than tails up.

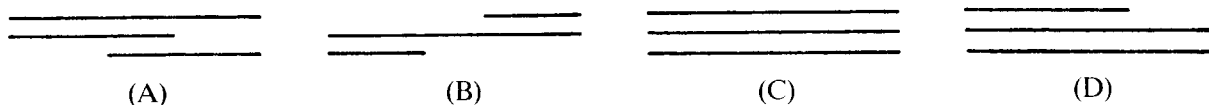(D) It is equally likely to land heads up or tails up.   N222401

6. Jan has 3 dimes in her pocket and nothing else. If she takes 1 coin from her pocket, what is the probability that it will be a dime?
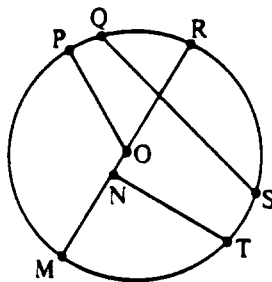
(A) $\dfrac{1}{10}$ (B) $\dfrac{3}{10}$ (C) $\dfrac{1}{3}$ (D) 1   N236101

7. Which set of line segments CANNOT make a triangle?

(A)   (B)   (C)   (D)   N253701
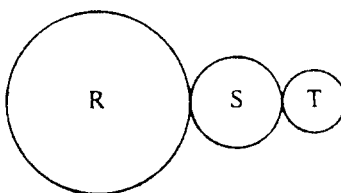

8. Which points are the end points of an arc?

(A) O, P   (C) N, T

(B) Q, S   (D) N, M   N212903

9. In △ ABC, AB = BC. Which of the following must be true?

(A) $m\angle A + m\angle C = 90°$ (C) $m\angle A > m\angle B$

(B) $m\angle A = m\angle C$ (D) $m\angle C < m\angle B$ N213501
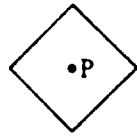

10. The three gears above are connected so that S rotates 2 times and T rotates 3 times for each complete rotation of R. When S makes 10 rotations, how many rotations are made by T?
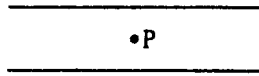
(A) $3\dfrac{1}{3}$ (B) $6\dfrac{2}{3}$ (C) 11   (D) 15   N233402
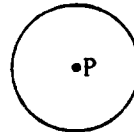
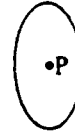**11.** Which of these figures has all of its points the same distance from point P?
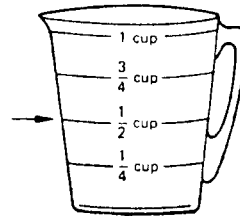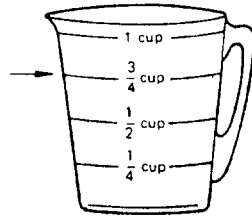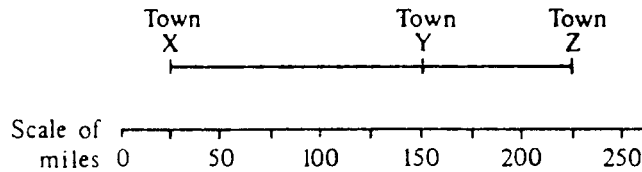
(A)   (B)   (C)   (D)

12. The measuring cup on the left is filled with water to the line marked with the arrow. The measuring cup on the right is filled with water to the line marked with the arrow. How much water is in both cups together?

(A) $^4/_6$ cups   (C) 2 cups

(B) $^3/_8$ cups   (D) $1^1/_4$ cups

Town X   Town Y   Town Z

Scale of miles   0   50   100   150   200   250

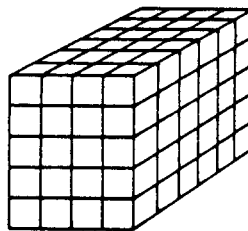**13.** According to the scale above, about how far is it from Town X to Town Y?

(A) 100 miles   (C) 175 miles
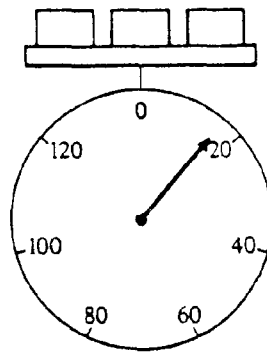
(B) 125 miles   (D) 200 miles

14. This is a diagram of a rectangular solid model made of wooden cubes with 1-centimeter edges. What are the dimensions of the solid in centimeters?
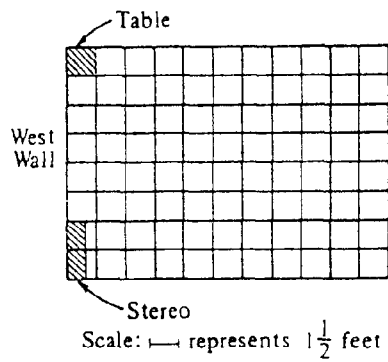
(A) 30 by 20 by 24   (C) 6 by 4 by 5

(B) 7 by 5 by 6   (D) 5 by 3 by 5

15. Each of the three blocks in the figure above weighs the same. The weight of each block is closest to how many units?

(A) 3

(B) 6

(C) 9

(D) 20

N219001

Scale: ⊢—⊣ represents $1\frac{1}{2}$ feet

16. The scale drawing above shows the floor plan of a living room. A sofa is to be placed along the west wall between the table and the stereo. What is the maximum length for the sofa?

(A) 5 feet

(B) $6\frac{1}{2}$ feet

(C) $7\frac{1}{2}$ feet

(D) 8 feet

N232901

17. Chang has three coins. Only one is a penny. Exactly two are each worth less than a dime. Each of the coins is worth less than a quarter. What three coins does Chang have?

(A) 1 penny, 2 dimes

(B) 1 penny, 1 nickel, 1 dime

(C) 3 dimes

(D) 1 penny and 2 quarters

N262301

18. Hank, Jim, Roberto and Willie were on the same side in a baseball game. One of them hit a home run. From the following information, see if you can determine which one.

    (1) The one who hit it plays shortstop and lives on Vine Street.
    (2) Willie had to leave at the end of the 6th inning when the score was 2-0 in favor of the other side.
    (3) Roberto pitched all innings of the game with no walks.
    (4) After the game, Roberto and Jim went home together since they live next to each other on Cypress Street.

Which boy hit the home run?

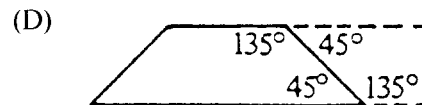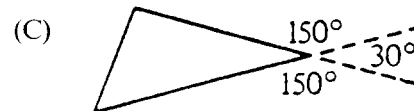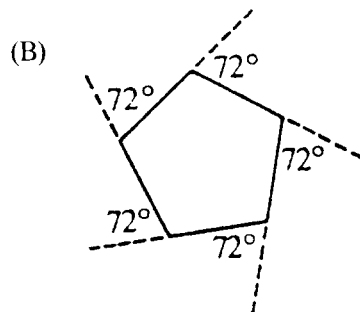(A) Hank
(B) Jim

(C) Roberto
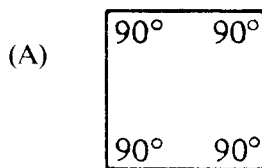(D) Willie   N262701
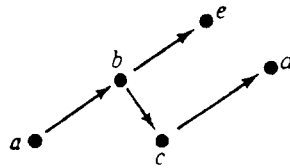
19. The letters in the diagram above represent numbers. If $\overset{\bullet}{x} \longrightarrow \overset{\bullet}{y}$ means $x > y$, which of the following is NOT necessarily true?

(A) $b > d$
(B) $e > d$

(C) $a > d$
(D) $a > c$ N220701

20. In geometry it is proved that the sum of the exterior angles of a polygon is 360°. Which figure shows that relationship?

(A)

90°	90°
90°	90°

(C) 150° / 30° / 150°
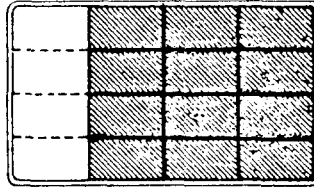
(B) 72° 72° 72° 72° 72°

(D) 135° 45° / 45° 135°

N214101

21. In a pet shop there are 12 animals. Seven are dogs and the rest are cats. What is the ratio of dogs to cats?

(A) 12:7
(B) 5:7

(C) 7:12
(D) 7:5   N208101

22. The picture shows a chocolate cake.

Joan and Joe told their mother that part of the chocolate cake had disappeared. Joan said, "Look, $\frac{4}{16}$ of the cake has disappeared!" Joe said, "No, only $\frac{1}{4}$ of the cake is gone." Which of the following is true?

(A) Joan is correct and Joe is wrong.   (C) Both Joan and Joe are right.
(B) Joe is correct and Joan is wrong.   (D) Both Joan and Joe are wrong.   N201801

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23. Here are the ages of five children:

13, 8, 6, 4, 4

What is the average age of these children?

(A) 4   (C) 7   (E) 9
(B) 6   (D) 8   (F) 13   N263501

24. Change 75% to a common fraction.

(A) $^1/_{75}$ (C) $^5/_7$
(B) $^3/_4$ (D) $^7/_5$ N274802

25. Allen's batting average is 0.425. What is his batting average as a percent?

(A) 0.0425%   (C) 42.5%
(B) 4.25%   (D) 425%   N202501

26. What can be said about the sum of two even numbers?

(A) It is always an odd number.
(B) It is always an even number.
(C) It is always a prime number.
(D) It is sometimes an even number and sometimes an odd number.   N282202

27. On the average, a baby's head is one-fourth the total length of the baby. If a baby's head is 10 centimeters long, about how long is the baby?

(A) 2.5 cm
(B) 14 cm

(C) 24 cm
(D) 40 cm

N207801

► Questions 28-29.

POPULATIONS OF DETROIT AND LOS ANGELES

1920–1970

YEAR	CITY	
	DETROIT	LOS ANGELES
1920	950,000	500,000
1930	1,500,000	1,050,000
1940	1,800,000	1,500,000
1950	1,900,000	2,000,000
1960	1,700,000	2,500,000
1970	1,500,000	2,800,000

28. How many more people were living in Los Angeles in 1960 than 1940?

(A) 100,000
(B) 500,000

(C) 800,000
(D) 1,000,000

(E) 2,500,000

N286001

29. What was the first year listed in which the population of Los Angeles was greater than the population of Detroit?

(A) 1920
(B) 1930

(C) 1940
(D) 1950

(E) 1960
(F) 1970

N286002

SPEED CURVES OF THREE TEST CARS
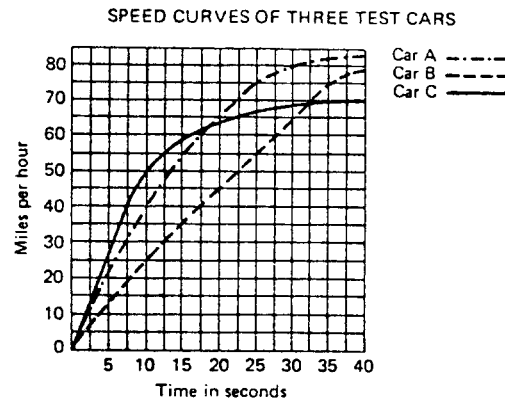
30. According to the graph above, which car reached 60 miles per hour in the shortest time?

(A) Car A

(B) Car B

(C) Car C

N263202

31. $\dfrac{^-15}{^-5} =$

    (A) $^+3$ (B) $^-3$ (C) $^-5$ (D) $^+5$ (E) $^-20$ N286501

32. SIMPLIFY. $4(1 + 6y) + 15$

    (A) $24y + 19$ (C) $6y + 19$

    (B) $28y + 15$ (D) $24y + 64$ N270701

33. SIMPLIFY. $3 - 5(4 - x)$

    (A) $-8 + 2x$ (C) $-17 + 5x$

    (B) $-8 - 2x$ (D) $-17 - 5x$ N270702

34. Which of the following are equivalent equations?

    (A) $x + 2 = 9$ and $x - 2 = 9$ (C) $z - 6 = 3$ and $z = 3$

    (B) $y - 3 = 7$ and $y + 5 = 15$ (D) $1 + 2 = w$ and $w + 1 = 2$ N209301

35. Which of the following is true for all numbers x and y, as long as y is not 0?

    (A) $\dfrac{x}{y} = \dfrac{3x}{3y}$

    (B) $\dfrac{x}{y} < \dfrac{3x}{3y}$

    (C) $\dfrac{x}{y} > \dfrac{3x}{3y}$ N255601

MUSICAL FAVORITES	
SINGERS	NUMBER OF VOTES
MICHAEL JACKSON	20
NATALIE COLE	10
JULIO IGLESIAS	10
RANDY TRAVIS	5
GENESIS	5

36. According to the chart above, what percent of all votes went to Michael Jackson?

(A) 20%   (B) 40%   (C) 50%   (D) 66²/₃%   N204401

37. According to the table below, what is the total amount of protein contained in two boiled eggs and one-half cup of whole milk?

NUTRITIVE VALUE OF CERTAIN FOODS

	Measure	Calories	Protein (grams)	Carbohydrates (grams)
Banana, raw	1	100	1	26
Beef hamburger	3 oz.	245	21	0
Whole milk	1 cup	160	9	12
Doughnut	1	125	1	16
Eggs, boiled	2 eggs	160	13	1

(A) 30.5 grams   (C) 17.5 grams
(B) 22 grams   (D) 7 grams   N263001

38. Edith has an average (mean) score of 90 on five tests. What score does she need on the next test to raise her average to 91?

(A) 91
(B) 92
(C) 95
(D) 96   N225001
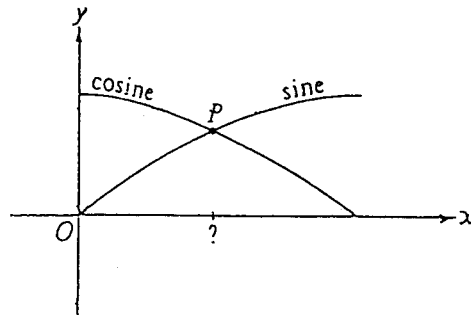
39. The graphs of the sine and the cosine functions intersect at point P as shown above. The x − coordinate of point P is

(A)   0   (B) $\dfrac{\pi}{4}$ (C) $\dfrac{\pi}{2}$ (D) π

N212501
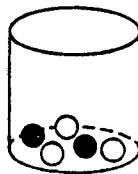
40. The jar shown above contains 2 black and 3 white marbles. Al picks one marble without looking. What is the probability that he picks a black marble?

(A) $\dfrac{1}{5}$ (B) $\dfrac{2}{5}$ (C) $\dfrac{2}{3}$ (D) 5   N221901
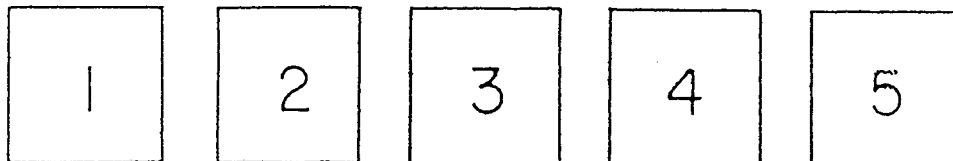
41. In a game you are given these 5 cards.

A rule says you must select 2 cards and form a 2-digit number such as:
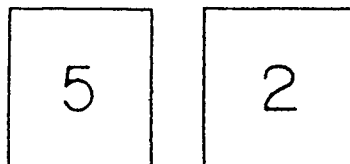
N250501

How many different 2-digit numbers can you form including the one above?

(A) 10
(B) 15
(C) 20
(D) 25
(E) 30
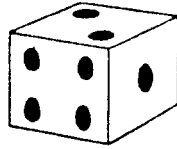
42. Scott rolls a number cube with 1, 2, 3, 4, 5, and 6 dots on its faces. What is the probability of Scott NOT getting a 4 on his roll?

(A) 0   (B) $\dfrac{1}{6}$ (C) $\dfrac{2}{6}$ (D) $\dfrac{3}{6}$ (E) $\dfrac{4}{6}$ (F) $\dfrac{5}{6}$

N262802

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43. Which drawing below shows PERPENDICULAR LINES?

(A)   (B)   (C)   (D)   N254602

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44. In which of the figures below is the dotted line a line of symmetry?

I   II   III
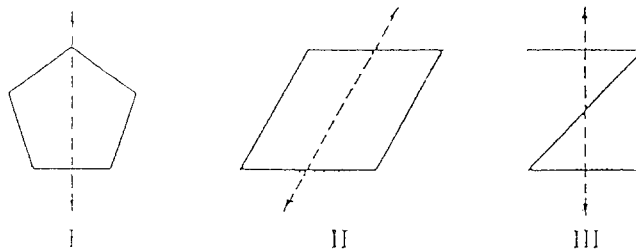
(A) I only
(B) II only
(C) I and II only
(D) I, II, and III

N214501

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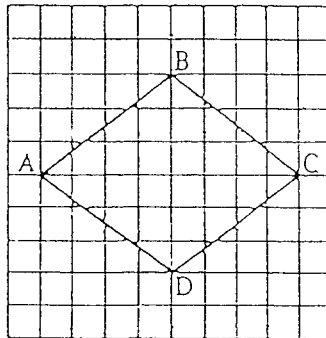
45. Quadrilateral ABCD has been drawn on squared paper as shown above. If each square has a side of 1 centimeter, what is the perimeter of ABCD in centimeters?

(A) 14
(B) 16
(C) 20
(D) 24

N230801
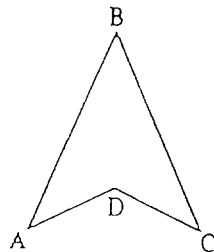
46. A tiny figure of a polygon like the one above is placed under a microscope. Under the microscope, the polygon looks larger. If the <u>actual figure</u> and its <u>image as seen through the microscope</u> are compared, what property changes?

(A) The measure of angle A
(B) The length of segment BC
(C) The intersection point of lines AD and CD
(D) The sum of interior angles   N214801

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47. The area of a rectangle is 24, and the measures of its length and width are whole numbers. Which of the following are NOT possible dimensions for the rectangle?

(A) L = 8, W = 3   (C) L = 6, W = 4
(B) L = 12, W = 12   (D) L = 24, W = 1   N218501

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48. What is the distance all the way around a rectangle that is 8 meters long and 5 meters wide?

(A) 13 meters   (C) 40 meters
(B) 26 meters   (D) 80 meters   N252001

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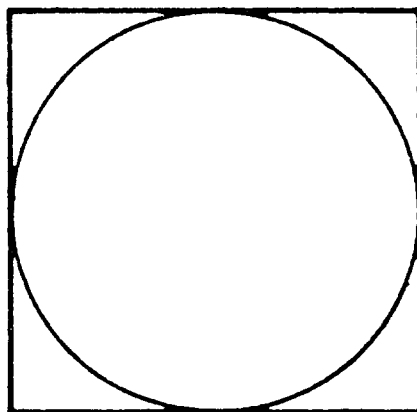
49. The length of a side of this square is 6. What is the radius of the circle?

(A) 2   (C) 4   (E) 8
(B) 3   (D) 6   (F) 9   N251701
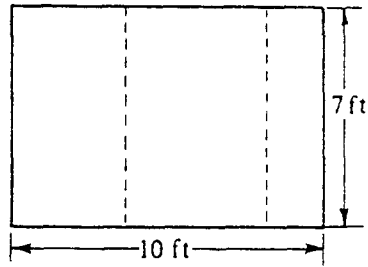
50. If the rectangle above is cut along the dotted lines and the three pieces are separated, what is the combined area of the three pieces?

(A) 49 sq ft
(B) 70 sq ft
(C) 100 sq ft
(D) It cannot be determined from the information given.

N231801
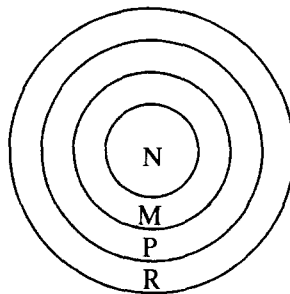
51. On the target shown above there are four different areas, each with a different score value.

If M + N = 19,
   M + N + P = 26,
   M + N + R = 30,
and N + P + R = 21,
what is the value of N?

(A) 3
(B) 7
(C) 11
(D) It cannot be determined from the information given.

N220201
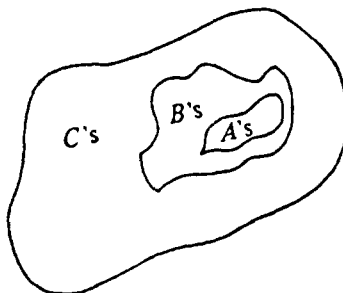
52. Which two of the following may be concluded from the diagram above?

I. All B's are A's	(A) I and III only
II. All A's are C's	(B) I and IV only
III. Some B's are A's	(C) II and III only
IV. No B's are C's	(D) II and IV only

N220401

53. Larry says that n² ≥ n for all real numbers. Of the following, which value of n shows the statement to be FALSE?

(A) $-\frac{1}{2}$ (B) 0   (C) $\frac{1}{10}$ (D) 1   N220801

54. A theorem of geometry states that "the sum of the angles of a triangle is 180 degrees." This statement is called a theorem because

(A) it has been proved using the definitions and axioms of geometry.

(B) it has been demonstrated by measuring the angles of many triangles.

(C) it is true, but it cannot be proved.

(D) it is assumed true without proof.   N228701

55. ESTIMATE. If pears cost 67¢ per pound, about how much will 8½ lbs. of pears cost?

(A) $6   (D) $60

(B) $9   (E) $90

(C) $50   N281401
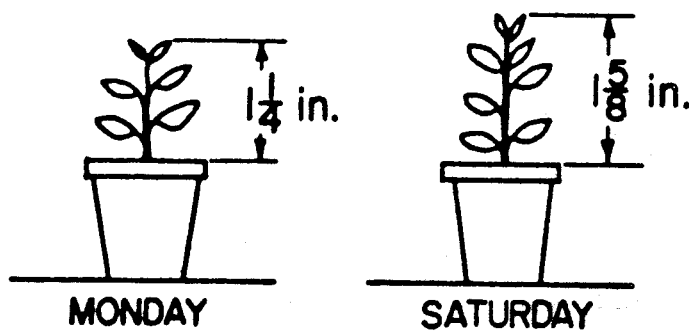
MONDAY   SATURDAY

56. Which one of the following expressions represents how many inches this plant grew from Monday to Saturday?

(A) $1\frac{1}{4} + 1\frac{5}{8}$ (B) $1\frac{5}{8}$ (C) $1\frac{5}{8} - 1\frac{1}{4}$ (D) $1\frac{1}{4} - 1\frac{5}{8}$ N258901

ABOUT THIS TEST

Please answer the following questions after you have completed this test. Record your answers in the box at the end of the answer sheet.

A. How much of the material covered on this test has been taught in your classes?

B. How difficult was this test for you?

C. How well do you think you did on this test?

D. How hard did you work to do well on this test?

WHEN YOU HAVE FINISHED

Please check to make sure you have marked *one* answer for each question. When you have checked your answers, place your *Answer Sheet* inside the front cover of the test booklet. All of the booklets will be collected at the same time after everyone is finished. Please sit quietly while others are completing their work.

LONGITUDINAL STUDY OF AMERICAN YOUTH
MATH TEST (FORM B)

CORRECT MARK
Ⓐ Ⓑ Ⓒ ● Ⓔ

INCORRECT MARKS
Ⓧ ⊕ ⌀ ⊖ ⊘

- Use black lead No. 2 pencil.
- Make heavy marks the full length of the boxes.
- Make only one mark per question.
- Erase cleanly any unintended marks.

Student's Name

Today's Date

PAGE 1
1 Ⓐ Ⓑ Ⓒ Ⓓ
2 Ⓐ Ⓑ Ⓒ Ⓓ
3 Ⓐ Ⓑ Ⓒ Ⓓ
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ABOUT THIS TEST

A. How much of the material on this test has been taught in your classes?

All	Almost All	Most	Some	Little
○	○	○	○	○

B. How difficult was this test?

Very Difficult	Difficult	Easy	Very Easy
○	○	○	○

C. How well do you think you did?

Very Well	Well	Poorly	Very Poorly
○	○	○	○

D. How hard did you work?

Very Hard	Pretty Hard	Not Very Hard	Not Hard At All
○	○	○	○