

Longitudinal Study of American Youth

MATHEMATICS

Form (C)

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

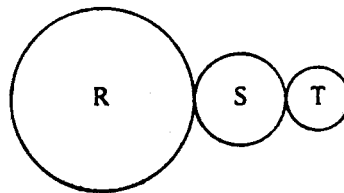
- (A) $9xy$
 (B) $9x^2y$
 (C) $5xy + 4x$
 (D) $6x + 3y$

N255701

2. If $7(t - 5) = \square - 35$, what is \square ?

- (A) $2t$ (C) $7t - 35$
 (B) $7t$ (D) 30

N209401



3. 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?

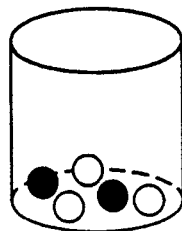
- (A) $3\frac{1}{3}$ (B) $6\frac{2}{3}$ (C) 11 (D) 15

N233402

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

- (A) $\frac{288}{5}$ (B) $\frac{216}{5}$ (C) $\frac{72}{5}$ (D) $\frac{48}{5}$

N210401



5. 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) $\frac{1}{5}$ (C) $\frac{2}{3}$
 (B) $\frac{2}{5}$ (D) 5

N221901

6. Scott rolls the number cube again. What is the probability of Scott NOT getting a 4 on this roll?

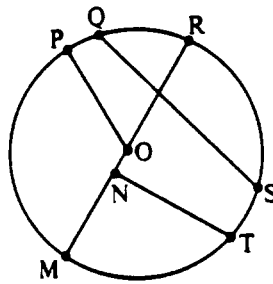
- (A) 0
- (B) $\frac{1}{6}$
- (C) $\frac{2}{6}$
- (D) $\frac{3}{6}$
- (E) $\frac{4}{6}$
- (F) $\frac{5}{6}$

N262802

7. A jar contains 5 red, 6 blue, and 7 green marbles. One marble is drawn from the jar. What is the probability that the marble drawn at random is red or green?

- (A) $\frac{1}{12}$
- (B) $\frac{1}{5}$
- (C) $\frac{1}{2}$
- (D) $\frac{2}{3}$

N222501



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

- (A) O, P
- (B) Q, S
- (C) N, T
- (D) N, M

N212903

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

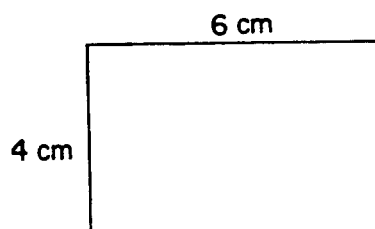
- (A) $m\angle A + m\angle C = 90^\circ$
- (B) $m\angle A = m\angle C$
- (C) $m\angle A > m\angle B$
- (D) $m\angle C < m\angle B$

N213501

10. If a triangle has two equal sides, what can you say about the angles of the triangle?

- (A) Two angles must be equal.
- (B) One angle must be a right angle.
- (C) Two angles must be 45 degree angles.
- (D) All three angles must be equal.

N264601



11. What is the area of this rectangle?

- (A) 4 square cm
- (B) 6 square cm
- (C) 10 square cm
- (D) 20 square cm
- (E) 24 square cm

N269001

12. 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) $L = 8, W = 3$
(B) $L = 12, W = 12$

- (C) $L = 6, W = 4$
(D) $L = 24, W = 1$

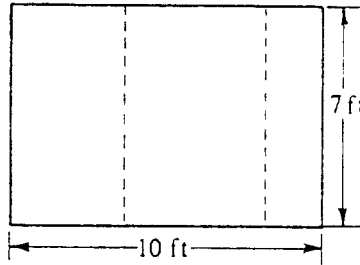
N218501

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

- (A) 13 meters
(B) 26 meters

- (C) 40 meters
(D) 80 meters

N252001



14. 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

15. One liter is how many milliliters?

(A) 10

(B) 100

(C) 1000

N265901

16. If you add the page numbers for two facing pages in a book, the sum is 89. What is one of the page numbers?

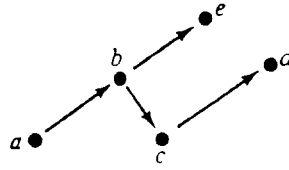
(A) 40

(C) 89

(B) 44

(D) Any of the above

N203201



17. The letters in the diagram above represent numbers. If $\overset{\bullet}{x} \longrightarrow \bullet{y}$ means $x > y$, which of the following is NOT necessarily true?

- (A) $b > d$
- (B) $e > d$
- (C) $a > d$
- (D) $a > c$

N220701

18. Which of the following procedures will give the average grade for the test scores given below?

Score	A = 4	B = 3	C = 2	D = 1	F = 0
Frequency	8	7	0	3	5

- (A) $\frac{4 + 3 + 2 + 1 + 1}{18}$
- (B) $\frac{(8 \times 4) \times (3 \times 7) \times (2 \times 0) \times (1 \times 3) \times (0 \times 5)}{23}$
- (C) $\frac{(8 \times 4) + (7 \times 3) + (0 \times 2) + (3 \times 1) + (5 \times 0)}{23}$
- (D) $\frac{(4 \times 8) + (3 \times 7) + (3 \times 1)}{18}$

N225301

19. Carlos' basketball team won 75% of its games last season. If they played 80 games, how many games did they win?

- (A) 20
- (B) 60
- (C) 68
- (D) 75

N259901

20. ESTIMATE. If pears cost 67¢ per pound, about how much will $8\frac{1}{2}$ lbs. of pears cost?

- (A) \$6
- (B) \$9
- (C) \$50
- (D) \$60
- (E) \$90

N281401

21. What is 8% of 25?

(A) 2

(B) 20

(C) 31.25

(D) 200

N278902

22. The number 1.875 is used as an approximation of 1.8746. The number 1.8746 was rounded to the nearest

(A) thousand

(B) hundredth

(C) ten thousandth

(D) thousandth

N200201

23. Find the quotient: $\frac{-15}{-5} =$

(A) +3

(B) -3

(C) -5

(D) +5

(E) -20

N286501

24. A kite is flying at the end of a taut string that is 50 feet long. The string makes an angle of 25° with the horizontal, and the person flying the kite holds the string 5 feet off the ground. How high is the kite from the ground?

(A) $5 + 50 \sin 25^\circ$

(B) $5 + 50 \cos 25^\circ$

(C) $5 + 50 \tan 25^\circ$

(D) $5 + \frac{50}{\sin 25^\circ}$

(E) $5 + \frac{\sin 25^\circ}{50}$

ACT 7

25. If $\sin \theta = 1/2$, then $\cos \theta = ?$

(A) $1/2$

(B) $-1/2$

(C) $\sqrt{\frac{3}{2}}$

(D) $-\sqrt{\frac{3}{2}}$

(E) $\pm \sqrt{\frac{3}{2}}$

ACT 2

26. If $2\log_3 x - 1/2\log_3 y + \log_3 z$ were written as a single logarithm, to what would it be equal?

(A) $\log_3 \frac{x^2 z}{y}$

(C) $\log_3 \frac{xz}{y}$

(E) $\log_3 (x^2 - \frac{y}{2} + z)$

(B) $\log_3 \frac{x^2}{z\sqrt{y}}$

(D) $\log_3 \frac{4xz}{y}$

ACT3

27. Which of the following trigonometric equations is false for all x ?

(A) $\sin x = \frac{2}{\sqrt{5}}$

(C) $\sec x = \sqrt{\frac{3}{4}}$

(E) $\cos x = -0.1439$

(B) $\tan x = -100$

(D) $\cos^2 x + \sin^2 x = 1$

ACT9

28. In the right triangle ABC, $m\angle C = 90^\circ$, $AC = 2$, and $AB = 5$. What is the value of $\sin A$?

(A) $\frac{2}{5}$

(B) $\frac{5}{2}$

(C) $\sqrt{\frac{21}{2}}$

(D) $\sqrt{\frac{21}{5}}$

(E) $\sqrt{\frac{5}{21}}$

ACT5

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

(A) $24y + 19$

(B) $28y + 15$

(C) $6y + 19$

(D) $24y + 64$

N270701

30. Which of the following are equivalent equations?

(A) $x + 2 = 9$ and $x - 2 = 9$

(B) $y - 3 = 7$ and $y + 5 = 15$

(C) $z - 6 = 3$ and $z = 3$

(D) $1 + 2 = w$ and $w + 1 = 2$

N209301

- Questions 31-32. The formula for the relationship between Fahrenheit and Celsius temperatures is $F = \frac{9}{5} C + 32$, where C is degrees Celsius and F is degrees Fahrenheit.

31. For every increase of one degree Celsius, what is the corresponding increase in degrees Fahrenheit?

- (A) 1
(B) 32
(C) $33\frac{4}{5}$
(D) $\frac{9}{5}$
(E) $\frac{5}{9}$

N255901

32. What is C when $F = 122$?

- (A) 50
(B) $67\frac{7}{9}$
(C) $85\frac{5}{9}$
(D) 162
(E) $251\frac{3}{5}$

N255902

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

- (A) $\frac{x}{y} = \frac{3x}{3y}$
(B) $\frac{x}{y} < \frac{3x}{3y}$
(C) $\frac{x}{y} > \frac{3x}{3y}$

N255601

34. On Monday a TV set was priced at \$100. On Tuesday the store marked the price down 40%. By Thursday the TV had not sold so the price was marked down 40% of Tuesday's price. What was the sale price on Thursday?

- (A) \$20
(B) \$36
(C) \$40
(D) \$64

N205801

35. A coin is tossed and a die is rolled. What is the probability that the coin comes up heads and the die comes up 3?

- (A) $\frac{1}{12}$
- (B) $\frac{1}{8}$
- (C) $\frac{1}{5}$
- (D) $\frac{6}{12}$

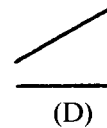
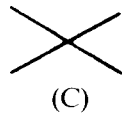
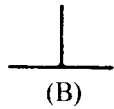
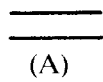
N223001

36. Two fair coins are tossed. What are the chances that at least one head will appear?

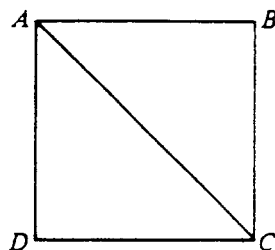
- (A) 1 in 2
- (B) 1 in 3
- (C) 1 in 4
- (D) 3 in 4

N222101

37. Which of the drawings below shows PERPENDICULAR LINES?



N254602

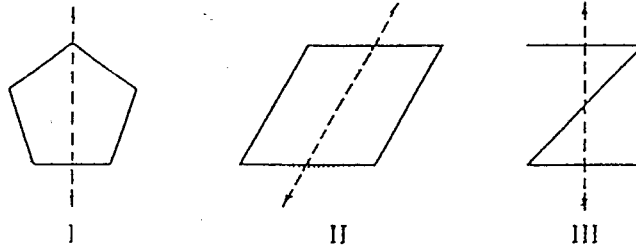


38. The area of square ABCD is 100 square centimeters. Which is true of the length of diagonal AC?

- (A) It is equal to 10 centimeters.
- (B) It is greater than 10 centimeters.
- (C) It is less than 10 centimeters.
- (D) It cannot be determined from the information given.

N226201

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

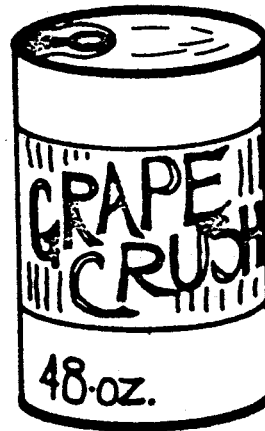


- (A) I only
 (B) II only
 (C) I and II only
 (D) I, II, and III

N214501

40. Grape Crush costs 75¢ for one 48 ounce can. At the school carnival Joan sells cups holding 6 ounces for 15¢. How much money does the school make on each can?

- (A) \$.90
 (B) \$.60
 (C) \$1.20
 (D) \$.45
 (E) \$.15



N264301

41. How many square feet are there in a square yard?

- (A) 6 (B) $\frac{1}{3}$ (C) 9 (D) 3

N266001

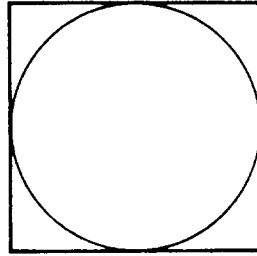
If G, then H.
 If H, then K.
 If K, then L.
 L is NOT true.

42. According to the information above, which of these are FALSE?

- (A) K only (C) K and L only
 (B) L only (D) G, H, K, and L

N221601

► Questions 43-44.



43. In the diagram above, the circle is inscribed in the square. The area of the square is 25 square meters. What is the length in meters of the diameter of the circle?

- (A) 5
- (B) 10
- (C) 20
- (D) 25

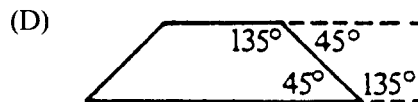
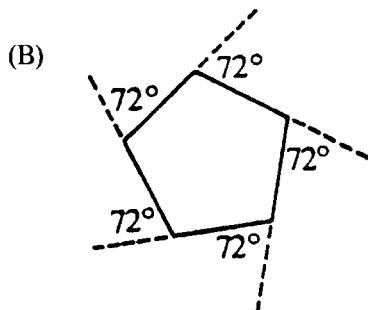
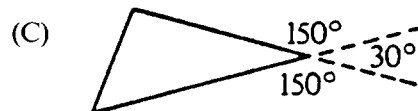
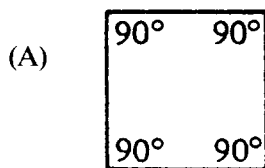
N217701

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

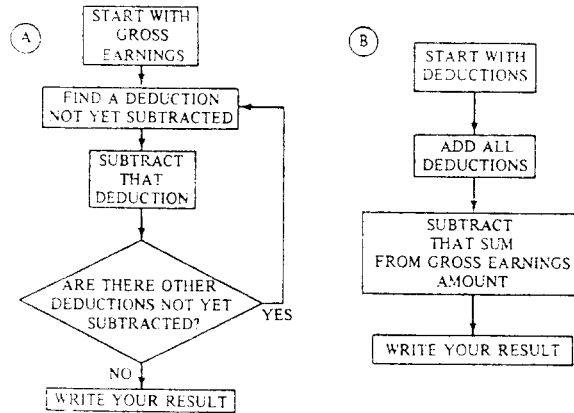
- (A) 2
- (B) 3
- (C) 4
- (D) 6
- (E) 8
- (F) 9

N251701

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



N214101



46. Which of the procedures above can be used to figure out net earnings?

- (A) A only
- (B) B only
- (C) A or B
- (D) Neither A nor B

N230401

47. 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

48. Allen’s batting average is 0.425. What is his batting average expressed as a percent?

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

N202501

49. Christine borrowed \$850 for one year from the Friendly Finance Company. If she paid 12% simple interest on the loan, what was the total amount she repaid?

- (A) \$862
- (B) \$102
- (C) \$10,200
- (D) \$952

N279301

50. $3^{1/5} =$

- (A) $3 \div 1/5$
(B) $3 - 1/5$

- (C) $3 \times 1/5$
(D) $3 + 1/5$

N230201

51. Dan has two 8¢ stamps and six 4¢ stamps. Which of the following amounts of postage will he NOT be able to make with his stamps?

- (A) 20¢
(B) 24¢
(C) 30¢
(D) 40¢

N203001

52. Bill made the lowest score on the test. He only got 27 points. The teacher said the class mean was 63 and the range was 61. Jane made the highest score on the test. What score did Jane make?

- (A) 61
(B) 63
(C) 88
(D) 90

N225601

53. What is the value of $\sin(\cos^{-1} \frac{2}{3})$?

- (A) $\frac{2}{3}$ (B) $\frac{\sqrt{5}}{3}$ (C) $-\frac{\sqrt{5}}{3}$ (D) $\pm \frac{\sqrt{5}}{3}$ (E) $\frac{\sqrt{13}}{3}$

ACT4

54. In which quadrant must θ lie if $\cos \theta > 0$ and $\cot \theta < 0$?

- (A) I (B) II (C) III (D) IV (E) No such angles exist

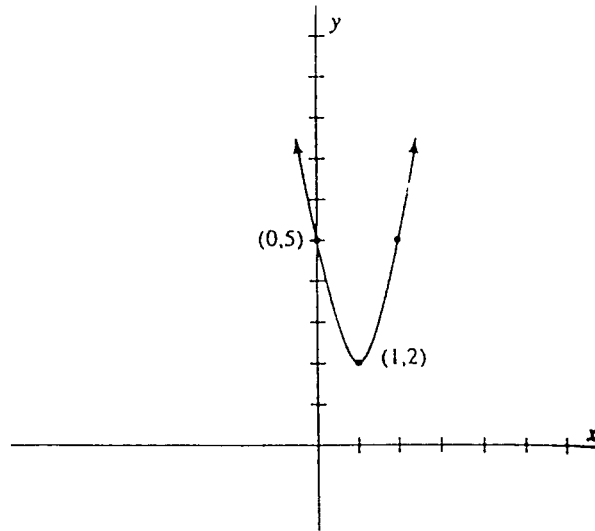
ACT10

55. If $\tan 25^\circ = 0.4663$, then $\tan 875^\circ = ?$

- (A) 0.4663 (C) $\frac{1}{0.4663}$ (E) $35(0.4663)$
 (B) -0.4663 (D) $\frac{-1}{0.4663}$

ACT1

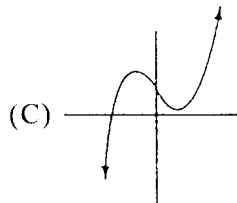
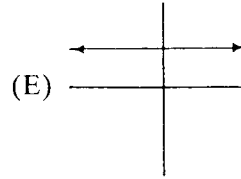
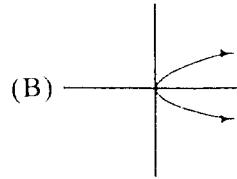
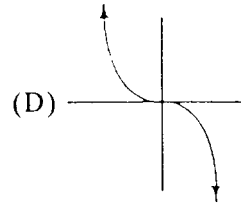
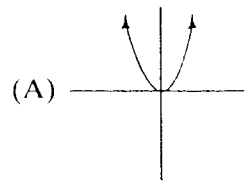
56. Which equation corresponds to the graph?



- (A) $y = 7(x - 1)^2 - 2$
 (B) $y = 3(x - 1)^2 + 2$
 (C) $y = 7(x + 1)^2 - 2$
 (D) $(x - 1)^2 + (y - 2)^2 = 1$
 (E) None of these

ACT6

57. Which of the following is the graph of a one-to-one function?



ACT8

58. Larry says that $n^2 \geq n$ for all real numbers. Of the following, which value of n shows the statement to be FALSE?

(A) $-\frac{1}{2}$

(C) $\frac{1}{10}$

(B) 0

(D) 1

N220801

59. The perimeter of a square is 24 centimeters. What is the area of that square?

(A) 36 square cm

(C) 96 square cm

(B) 48 square cm

(D) 576 square cm

N268901

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.

