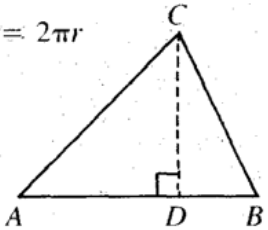
SECTION 2 **Time—50 minutes**
50 Questions

In this section solve each problem, using any available space on the page for scratchwork. Then decide which is the best of the choices given and fill in the corresponding circle on the answer sheet.

The following information is for your reference in solving some of the problems.

Circle of radius r: Area $= \pi r^2$ Circumference $= 2\pi r$
The number of degrees of arc in a circle is 360.
The measure in degrees of a straight angle is 180.



Triangle: The sum of the measures in degrees of the angles of a triangle is 180.

If $\angle CDA$ is a right angle, then
(1) area of $\triangle ABC = \frac{AB \times CD}{2}$
(2) $AC^2 = AD^2 + DC^2$

Definitions of symbols:
$=$ is equal to
$\neq$ is unequal to
$<$ is less than
$>$ is greater than
$\leqq$ is less than or equal to
$\geqq$ is greater than or equal to
$\parallel$ is parallel to
$\perp$ is perpendicular to

Note: Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that its figure is not drawn to scale. All figures lie in a plane unless otherwise indicated. All numbers used are real numbers.

1. If $x > 1$, which of the following expressions decrease(s) in value as x increases?

I. $x + \frac{1}{x}$
II. $x^2 - 10x$
III. $\frac{1}{x + 1}$

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

2. Which of the following has the largest numerical value?
(A) $\frac{1}{5}$ (B) $\left(\frac{1}{5}\right)^2$ (C) 0.3 (D) $\sqrt{0.16}$
(E) 0.01π

3. Which of the following is greater than $\frac{1}{4}$?
(A) $(0.25)^2$ (B) $\sqrt{\frac{1}{4}}$ (C) $\left(\frac{1}{4}\right)^4$ (D) 0.04 (E) $\frac{1}{250}$

4. The equation $x + 3y = 9$ and the equation $2x + 6y = 18$ are plotted on the same graph chart. All of the following points will lie on both graphs EXCEPT
(A) (9,0) (B) (0,3) (C) (6,1)
(D) (12, −1) (E) (3,4)

5. Which of the following has the largest numerical value?
(A) $\sqrt{0.5}$ (B) $\frac{1}{2}$ (C) 0.49 (D) $\left(\frac{1}{7}\right)^2$
(E) $(0.4)^2$

6. What is the thickness (in inches) of a pipe that has an inner diameter of 1.25 inches and an outer diameter of 1.55 inches?
(A) 0.15 (B) 0.2 (C) 0.4 (D) 1.65 (E) 0.3

7. If $x + x + x + x = y + y + y$, then $4x - 3y =$
(A) 0 (B) 1 (C) x (D) y (E) $x - y$

8. The price of a shirt is \$8 more than $\frac{8}{10}$ of its price. What is the price of this shirt?
(A) \$4 (B) \$20 (C) \$40 (D) \$60 (E) \$80

9. If $(x + \frac{1}{2}) + (x - \frac{1}{2}) = 5$, then $2x =$
(A) $\frac{2}{5}$ (B) $\frac{5}{2}$ (C) $2\frac{1}{5}$ (D) 5 (E) 10

10. If two parts of molasses are mixed with three parts of sugar, what part of the mixture is molasses?
(A) $\frac{1}{3}$ (B) $\frac{2}{5}$ (C) $\frac{3}{5}$ (D) $\frac{2}{3}$ (E) $\frac{3}{2}$

11. What percent of 2 is 20% of 20?
(A) 2% (B) 4% (C) 20% (D) 50%
(E) 200%

12. In a school election where 3 candidates sought election the winning candidate received $\frac{3}{5}$ of the votes. One losing candidate received $\frac{1}{4}$ of the remaining votes. What part of the total votes did the candidate with the least number of votes receive?
(A) $\frac{1}{10}$ (B) $\frac{1}{5}$ (C) $\frac{3}{10}$ (D) $\frac{2}{5}$ (E) $\frac{9}{20}$

13. If the complete contents of a fish tank $18 \times 6 \times 8$ inches is poured into a tank with a base of 36×18 inches, the height of the water (in inches) will be
(A) $\frac{1}{6}$ (B) $\frac{1}{3}$ (C) $\frac{3}{4}$ (D) $1\frac{1}{3}$ (E) $1\frac{2}{3}$

14. $r = \frac{rs}{1 - s}$
$s^2 + 2s + 1 =$
(A) $\frac{1}{2}$ (B) $1\frac{1}{2}$ (C) $2\frac{1}{4}$ (D) 3 (E) $3\frac{1}{4}$

15. How many dimes must I give the postal clerk for thirty 25¢ postage stamps?
(A) 12 (B) 75 (C) 120 (D) 30 (E) 750

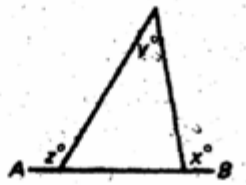
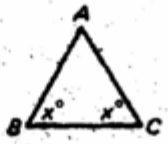
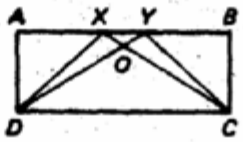
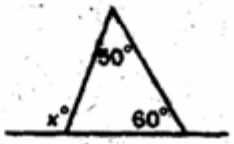
Questions 16-32 each consist of two quantities, one in Column A and one in Column B. You are to compare the two quantities and on the answer sheet fill in circle

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

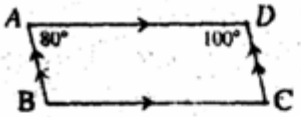
Notes:
1. In certain questions, information concerning one or both of the quantities to be compared is centered above the two columns.
2. In a given question, a symbol that appears in both columns represents the same thing in Column A as it does in Column B.
3. Letters such as x, n, and k stand for real numbers.

EXAMPLES

	Column A	Column B	Answers
E1.	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ
E2.	$180 - x$	y	Ⓐ Ⓑ ● Ⓓ
E3.	$p - q$	$q - p$	Ⓐ Ⓑ Ⓒ ●

	COLUMN A	COLUMN B
16.	x^3	x^2
17.	The sum of a, b, and c, three consecutive integers, is 18. abc	210
18.	$x = 1$ and $y = -1$ $\frac{a(x+y)}{b}$	$\frac{2a(x+y)}{b}$
19.	$\frac{x}{-y-z} = \frac{-a}{y+z}$ x	a
20.	$3x + 5y = 15 + 5y$ $\frac{x}{5}$	1
21.	The time elapsed from 8:55 A.M. until 10:15 the same morning	2 hours, 40 minutes
22.	Z is 4 miles from Y. X is 3 miles from Y. The distance from X to Z	5 miles
23.	$(0.1)(\pi)$	Positive value of $\sqrt{0.17}$
24.	 AB is a straight line and $x = 100$, $y = 40$. z	$x + y$
25.	 $\frac{BC}{AB} \cdot \frac{AC}{BC}$	1
26.	 $ABCD$ is a rectangle. The area of $\triangle XOD$	The area of $\triangle YOC$
27.	 x	70
28.	The product of 2½ and its reciprocal	The product of 3½ and its reciprocal
29.	$3x$	$(-2)x$
30.	The area of a rectangle with length equal to 8 feet	The area of a square with side equal to 8 feet

COLUMN A	COLUMN B



31. The measure of $\angle B$ | The measure of $\angle C$

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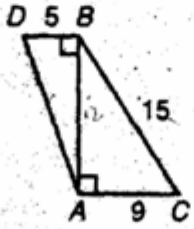
32. 3^{-2} | 2^{-3}

Solve each of the remaining problems in this section using any available space for scratchwork. Then decide which is the best of the choices given and fill in the corresponding circle on the answer sheet.

33. In the town of Toonerville there are two high schools. In one school, $16\frac{2}{3}\%$ of the 300 seniors are planning to go to college. In the other school, 90% of the 500 seniors are not planning to go to college. What percent of the seniors in both schools are planning to go to college?
(A) 12.5% (B) 13.3% (C) 15% (D) 43.3%
(E) 87.5%

34. In the accompanying figure, $\angle BAC$ and $\angle DBA$ are right angles. $AC = 9$, $BC = 15$, and $DB = 5$. What is the length of AD?
(A) 17 (B) $\sqrt{74}$
(C) $5\sqrt{2}$ (D) 13
(E) 19



35. How many pounds of baggage are allowed for a plane passenger if the European regulations permit 20 kilograms per passenger?
(1 kg = 2.2 lbs.)
(A) 11 (B) 44 (C) 88 (D) 91 (E) 440

36. The dial of a meter is divided into equal divisions from 0 to 60. When the needle points to 48, the meter registers 80 amperes. What is the maximum number of amperes that the meter will register?
(A) 33.5 (B) 92 (C) 100 (D) 102 (E) 120

37. On a scale drawing A is 5 inches and B is drawn 11 inches. If the actual size of B is 5 meters, then the size (in meters) of A is
(A) $2\frac{3}{11}$ (B) $4\frac{6}{11}$ (C) 5 (D) 10 (E) 11

38. $ab = 50$, $a^2 = 100$, $b^2 = 25$; $(a - b)^2 =$
(A) 5 (B) $5\sqrt{3}$ (C) 25 (D) 50 (E) 75

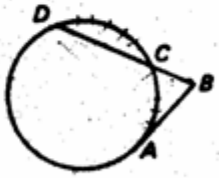
39. Perfume can be purchased in a 0.6-ounce bottle for \$18 or in a 2-ounce bottle for \$50. The difference in price per ounce is
(A) \$1.50 (B) \$2.50 (C) \$5.00 (D) \$10.00
(E) \$25.00

40. Twenty minutes after a car enters a turnpike it is 20 miles from the entrance gate. The average speed (in miles per hour) was
(A) 20 (B) 40 (C) 60 (D) 100 (E) 400

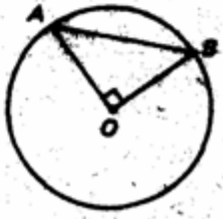
41. How many ice cubes, each $1\frac{1}{2}$ inches on a side, are needed to fill a box which is $9 \times 12 \times 6$ inches? (Assume no space lost in packing the cubes.)
(A) 192 (B) 194.5 (C) 337.5 (D) 436
(E) 648

42. If the diameter of a circle is doubled, then the area will be multiplied by
(A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) 2 (D) 4 (E) 16

43. $\angle B$ is formed by secant DCB and tangent AB. If the measure of $\angle B$ is 70° and $\overset{\frown}{CA}$ is 70°, how many degrees are in $\overset{\frown}{DC}$?
(A) 50 (B) 70 (C) 80
(D) 90 (E) 100



44. In circle O, $AO \perp OB$. The area of $\triangle AOB$ is $\frac{7}{\pi}$. The area of circle O is
(A) 7 (B) 14 (C) 7π
(D) 14π (E) 49π

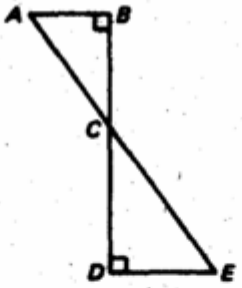


45. If the diagonal of a table with a square top is 6 feet, what is the area of the table top (in square feet)?
(A) $\sqrt{18}$ (B) 9π (C) 18 (D) $18\sqrt{2}$ (E) 36

46. In $\triangle ABC$ the measures of the three angles are represented by $(2x)°$, $(3x - 10)°$, and $(3x + 30)°$. What kind of triangle is ABC?
(A) acute (B) isosceles (C) oblique
(D) obtuse (E) right

47. In the accompanying figure, ACE and BCD are straight lines and B and D are right angles. What is the length of AB if $BC = 12$, $CD = 16$, and $DE = 12$?

(A) 8 (B) 9 (C) $10\frac{2}{3}$
(D) 12 (E) 16



48. The cost of a taxi ride is c cents fo the first $\frac{1}{5}$ mile and x cents for each additional $\frac{1}{5}$ mile. What is the cost (in cents) of a 3-mile taxi ride at these rates?

(A) $14x + c$ (B) $x + 15c$ (C) $15x - c$
(D) $15x + c$ (E) $x + 14c$

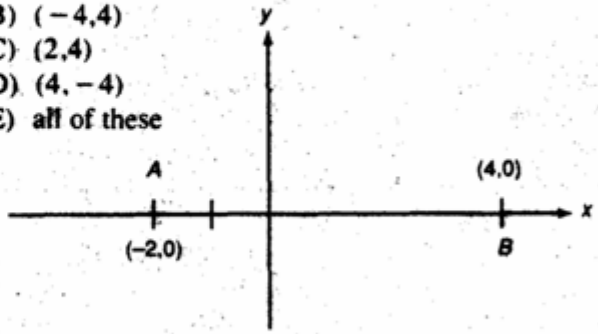
49. If $(a + b)^2 - 4 = 5$, then $(a + b) =$

I. $+3$
II. -3
III. $+1$ or -1

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

50. In the accompanying figure, points A and B are vertices of $\triangle ABC$ (not shown). The area of ABC is 12. Which of the following could be coordinates of vertex C?

(A) $(-4, -4)$
(B) $(-4, 4)$
(C) $(2, 4)$
(D) $(4, -4)$
(E) all of these



Mathematical Aptitude Section

Note: Each correct answer to the mathematics questions is keyed by number to the corresponding topic in Chapters 9 and 10. These numerals refer to the topics listed below, with specific page references in parentheses.

1. Basic Fundamental Operations (155–157)
2. Algebraic Operations (157–160)
3. Using Algebra (160–164)
4. Exponents, Roots and Radicals (159–160)
5. Inequalities (164–165)
6. Fractions (176–178)
7. Decimals (176)
8. Percent (178–180)
9. Averages (180–181)
10. Motion (182–183)
11. Ratio and Proportion (183–185)
12. Mixtures and Solutions (177–178)
13. Work (185–186)
14. Coordinate Geometry (172–173)
15. Geometry (165–172, 173–176)
16. Quantitative Comparisons (189–192)

ANSWER KEY

1. **C** (2)	*11.* **E** (3,8)	*21.* **B** (1,16)	*31.* **A** (15,16)	*41.* **A** (15)
2. **D** (1,6,7)	*12.* **A** (6)	*22.* **D** (15,16)	*32.* **B** (4,16)	*42.* **D** (15)
3. **B** (4,6,7)	*13.* **D** (15)	*23.* **B** (1,4,16)	*33.* **A** (8)	*43.* **C** (15)
4. **E** (3,14)	*14.* **C** (2)	*24.* **B** (15,16)	*34.* **D** (15)	*44.* **B** (15)
5. **A** (4,6,7)	*15.* **B** (1)	*25.* **C** (15,16)	*35.* **B** (11)	*45.* **C** (15)
6. **A** (1,7)	*16.* **D** (4,16)	*26.* **C** (15,16)	*36.* **C** (11)	*46.* **E** (15)
7. **A** (2)	*17.* **C** (1,16)	*27.* **A** (15,16)	*37.* **A** (11)	*47.* **B** (15)
8. **C** (1)	*18.* **C** (2,16)	*28.* **C** (6,16)	*38.* **C** (2)	*48.* **A** (1,6)
9. **D** (2)	*19.* **C** (2,16)	*29.* **D** (2,16)	*39.* **C** (1)	*49.* **D** (2)
10. **B** (6)	*20.* **C** (2,16)	*30.* **D** (15,16)	*40.* **C** (10)	*50.* **E** (14,15)