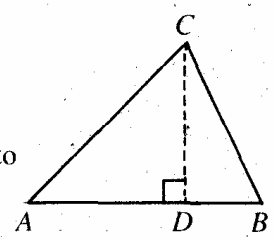
The following information is for your reference in solving some of the problems.

Circle of radius r: Area $= \pi r^2$ Circumference $= 2\pi r$

The number of degrees of an 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	$\leqq$ is less than or equal to
$\neq$ is unequal to	$\geqq$ is greater than or equal to
$<$ is less than	$\parallel$ is parallel to
$>$ is greater than	$\perp$ 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.

23. What is the exact quotient when 133,578 is divided by 543?

(A) 243 (B) 244 (C) 245 (D) 246 (E) 247

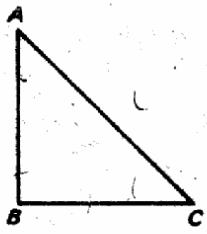
24. What part of an hour elapses from 11:55 A.M. to 12:15 P.M.?

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

25. The enrollment at the North Shore Academy is b boys and g number of girls. What part of the academy student body is composed of girls?

(A) $\frac{b}{b+g}$ (B) $\frac{g}{b}$ (C) $\frac{g}{bg}$ (D) $\frac{g}{b+g}$ (E) b

26. In isosceles right triangle ABC, $AB = BC$ and $AC = 10$. What is the area of $\triangle ABC$?



(A) $5\sqrt{2}$ (B) $2\sqrt{5}$ (C) 5
(D) $\sqrt{25}$ (E) 25

27. If the sum of the lengths of three sides of a square is r, then the perimeter of this square is

(A) $\frac{3}{r} + 1$ (B) $\frac{r}{3} + 4$ (C) $\frac{4r}{3}$ (D) $\frac{r}{3} + 1$

(E) $\frac{3}{r} + r$

28. When the rate for first-class postage was increased from 18¢ to 20¢, the percent of increase was

(A) 1.1% (B) 2% (C) 9% (D) 10% (E) 11.1%

29. If the angles of a triangle are in the ratio 3:4:5, then one of these angles must have a measure in degrees of

(A) 30 (B) 60 (C) 90 (D) 100 (E) 120

30. For which figure is the area equal to the product of two of its sides?

(A) right triangle (B) isosceles triangle
(C) trapezoid (D) rectangle (E) parallelogram

31. What is the average measure of the angles of a triangle?

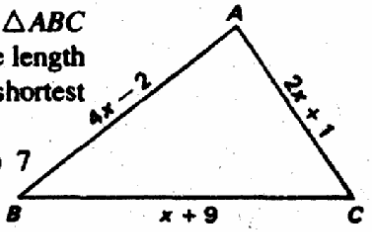
(A) 30° (B) 45° (C) 60° (D) 90°
(E) cannot be determined from the information furnished

32. If $\frac{a+b}{c+2b}$ equals 1, then b equals

(A) $\frac{a}{c+2}$ (B) $a - c$ (C) $a + c$ (D) $\frac{a-c}{2}$

(E) $\frac{a+c}{3}$

33. If the perimeter of $\triangle ABC$ is 29 meters, then the length (in meters) of the shortest side is

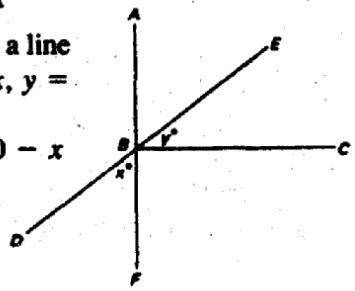


(A) 3 (B) 5 (C) 7
(D) 10 (E) 12

34. The length of a rectangle is 5 more than its width. If the width is represented by x, which expression represents the area of the rectangle?

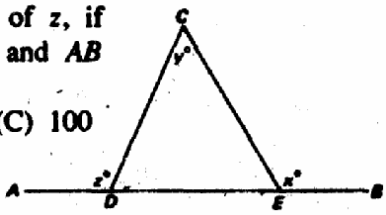
(A) $x^2 + 5x$ (B) $x^2 + 5$ (C) $5x^2$
(D) $4x + 10$ (E) $6x^2$

35. $AB \perp BC$ and DBE is a line segment. In terms of x, $y =$



(A) x (B) $x - 90$
(C) $90 - x$ (D) $180 - x$
(E) $x - 180$

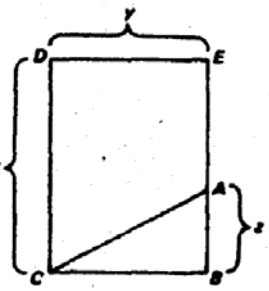
36. What is the value of z, if $x = 100$, $y = 30$, and AB is a line segment?



(A) 30 (B) 80 (C) 100
(D) 110 (E) 120

37. In rectangle *DEBC*, *CA* is drawn, forming $\triangle ABC$. In terms of x, y, and z, what is the area of *ACDE*?

(A) $xy - yz$ (B) $yz - xy$
(C) $xy - z$ (D) $y(x - z)$
(E) $xy - \frac{yz}{2}$



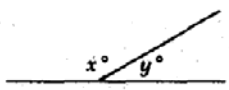
Another type of question you can expect to encounter is the type known as quantitative comparison. Questions 38 to 43 are examples of quantitative comparisons. There are only four choices from which to select an answer. The following instructions are given for these questions.

Questions 38-43 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 oval

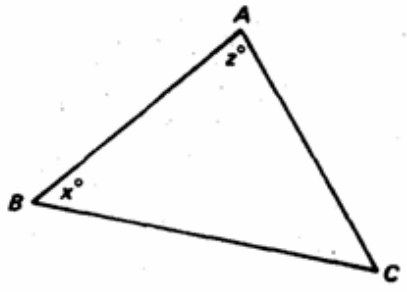
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

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

COLUMN A COLUMN B



$z = 80$ and $x = 50$

	Column A	Column B
38.	*AB*	*AC*

$xy = 16$

	Column A	Column B
39.	x	y
40.	$\frac{k}{400}$	$\frac{k}{4}\%$
41.	$\sqrt{14.4}$	0.12

$a = 2$
$b = 3$
$c = 4$

	Column A	Column B
42.	$\frac{b^2 - a^2}{ab}$	$\frac{a + b}{c}$

1 kilogram = 2.2 pounds

	Column A	Column B
43.	1 pound	0.33 kilogram

ANSWER KEY

23. D	30. D	37. E
24. A	31. C	38. C
25. D	32. B	39. D
26. E	33. C	40. C
27. C	34. A	41. A
28. E	35. C	42. B
29. B	36. D	43. A

of the formal beauty that distinguishes the classical works of Dante and Virgil. Therefore, you can eliminate Choice B.

Meticulous planning of artistic works is a likely characteristic of classicism. The passage talks of the carefully planned compositions of the classicist Dante; it also tells of the structurally flawed compositions of the romantic Goethe. Therefore, you can eliminate Choice **A**.

Only choice **D** is left. It is the correct answer.

19. **D** The author both admires Goethe's writings and notes their flaws; his attitude is one of *measured admiration*.

20. **C** The entire passage shows Bethune's impact on her people's progress.

21. **C** You can arrive at the correct answer by the process of elimination.

Williams assisted Bethune in influencing the advancement of blacks within the NYA. Therefore, you can eliminate Choices **B** and **D**.

The opening sentence of the first paragraph indicates that Williams was one of Bethune's white friends; references to him in the second paragraph suggest he was a liberal. Therefore, you can eliminate Choice **A**.

Nothing in the passage suggests Williams was religious. Therefore, you can eliminate Choice **E**.

Only Choice **C** is left. It is the correct answer.

22. **A** Bethune's success in getting Dickerson's appointment is a clear example of her impact.

Choice **B** is incorrect. The author stresses how helpful Bethune was to Dickerson, not how different Bethune's career was from Dickerson's.

Choice **C** is incorrect. Dickerson is not the subject of the paragraph that follows. Choice **D** is incorrect. The author brings up Bethune's belief in the "New Negro" well after he mentions her assistance to Dickerson. He draws no connection between Dickerson and the "New Negro." Also Choice **E** is incorrect. The author is making a point about Bethune, not about Dickerson.

Mathematical Aptitude Section

23. **D** This is not an arithmetic test. Also, time does not permit using the standard method of long division. Observe that the dividend ends with the digit 8 and the divisor ends with the digit 3. The quotient must end with the digit 6.

$$\text{divisor}\overline{)\text{dividend}}\ \text{quotient}$$

24. **A** Time elapsed is 20 minutes.

$\frac{20}{60}$ is $\frac{1}{3}$ of an hour.

25. **D** The entire student body $= b + g$.

$\frac{g}{b+g}$ = part of entire student body composed of girls

26. **E** Let $x = BC = AB$.

Using the Pythagorean Theorem,

$(x)^2 + (x)^2 = (10)^2$

or $2x^2 = 100$, *or* $x^2 = 50$.

Area of $\triangle ABC = \frac{1}{2}(AB)(BC)$, *or* $\frac{1}{2}(x)(x)$, *or* $\frac{1}{2}(x)^2$, *or* $\frac{1}{2}(50) = 25$

27. **C** If the sum of the lengths of 3 sides of a square $= r$, then each side $= \frac{r}{3}$ and 4 sides $= \frac{4r}{3}$.

28. **E** The increase was $2¢$.

$\frac{\text{increase}}{\text{original}} \times 100 =$ percent increase

$\frac{2¢}{18¢} = \frac{1}{9} = 11.1\%$

29. **B** $3x + 4x + 5x = 180°$

$12x = 180°$

$x = 15°$

$\therefore$ measure of angles $= 45°$, $60°$, and $75°$

30. **D** In a rectangle the length is perpendicular to the width. The area of the rectangle equals the product of the length (one of the sides) and the width (the other side).

31. **C** The sum of the measure of the angles of a triangle equals $180°$: $180° \div 3 = 60°$.

32. **B** If the value of a fraction is 1, the numerator equals (has the same value as) the denominator.

$a + b = c + 2b$

$a - c = b$

33. **C** $4x - 2 + 2x + 1 + x + 9 = 29$

$7x + 8 = 29$

$7x = 21$

$x = 3$

Thus, side $4x - 2 = 10$

side $x + 9 = 12$

side $2x + 1 = 7$ [answer]

34. **A** $x =$ width [given]

$\therefore x + 5 =$ length

$x(x + 5) =$ area, *or* area $= x^2 + 5x$

35. **C** $\angle ABE = \angle DBF$ [vertical angles]

$\angle DBF = x°$ [given]

$\therefore ABE = x°$

$\angle ABC = 90°$ [$AB \perp BC$]

$\therefore EBC = 90° - x°$

$y° = 90° - x°$

$y = 90 - x$

36. **D** $\angle CED \triangleq 80$

$\angle CDE \triangleq 180 - (80 + 30)$ *or* 70

$z° = 180 - 70$ *or* 110

37. **E** The area of $ACDE$ = area of rectangle $BCDE$ − area of $\triangle ABC$.

Area of $BCDE = xy$

Area of $\triangle ABC = \frac{yz}{2}$

Area of $ACDE = xy - \frac{yz}{2}$

38. **C** $\angle ACB \triangleq 180 - (80 + 50)$ *or* 50

$\therefore AB = AC$ [If 2 angles of a $\triangle$ are equal, the sides opposite those angles are equal.]

39. **D** x and/or y may have negative values.

40. **C** % means $\frac{}{100}$.

$$\frac{k}{4}\% = \left(\frac{k}{4}\right)\left(\frac{1}{100}\right) \text{ or } \frac{k}{400}$$

41. **A** $\sqrt{14.4} = 3+$

$3+ > 0.12$

42. **B** $\frac{9-4}{6} = \frac{5}{6}$ [Column A]

$\frac{2+3}{4} = \frac{5}{4}$ [Column B]

$\frac{5}{4} > \frac{5}{6}$

43. **A** 0.33 kilogram is about $\frac{1}{3}$ of a kilogram or $\frac{1}{3}$ of 2.2 pounds, which is 0.7 pound. Column A is 1 pound.