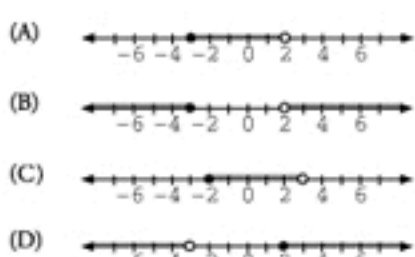


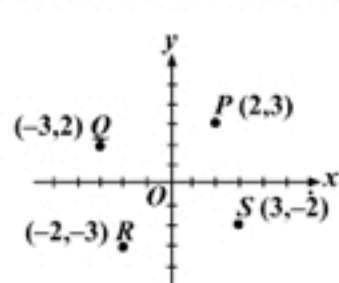
Section-II MATHEMATICS

While the following sample questions do not collectively comprise an entire assessment, they do illustrate the manner in which many of the topics might be assessed. (Calculator use is optional in answering the multiple-choice questions.)

1. Which of the following is the graph of $-3 \leq x < 2$?



2. In the figure below, which pair of points is on the line $2x + 3y = 0$?



- (A) P and Q (B) Q and R (C) Q and S (D) R and S

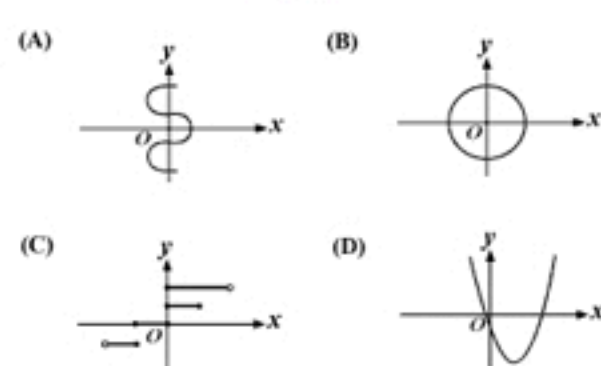
3. For the equation $4y = 2x$, which of the following statements is true?

- (A) The value of y increases 4 times as fast as the value of x .
 (B) The value of y increases 2 times as fast as the value of x .
 (C) The value of y increases $\frac{1}{2}$ as fast as the value of x .
 (D) The value of y increases $\frac{1}{4}$ as fast as the value of x .

4. If $x = -2$, $y = 3$, and $z = -4$, what is the value of $\frac{2x^2 - y}{3z}$?

- (A) $-\frac{13}{12}$ (B) $-\frac{5}{12}$ (C) $\frac{5}{12}$ (D) $\frac{11}{12}$

5. Which of the following is a graph of a function of x ?



6. If $4x - 3(x + 1) = 5$, what is the value of x ?

- (A) $\frac{1}{2}$ (B) 4 (C) 6 (D) 8

7. When a new movie opened at a local theater, the numbers of tickets sold in each of the first four days were w , x , y , and z , respectively. If $w > x > y > z$, then which of the following could be true?

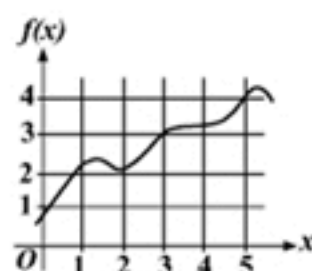
- (A) $x = w + y$ (B) $w = x + y$ (C) $w + x = x + z$ (D) $w + x + y = z$

8. What is the slope of the line $2x - 5y = 15$?

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

9. In the equation $y = x^2$, if x is increased by 3, then y is increased by

- (A) 6 (B) 9 (C) $6x + 6$ (D) $6x + 9$



10. The figure above shows a portion of the graph of a function f . According to the graph, if $f(x) = 3.6$, then x is between which of the following?

- (A) 1 and 2 (B) 2 and 3 (C) 3 and 4 (D) 4 and 5

11. There are 150 weights. While some are 1 kg, others are 2 kg. The sum of all the weights is 260. What is the number of 1 kg. weights?

- (a) 45 (b) 35 (c) 40 (d) 50

12. A car travels 12 kms. with his $\frac{4}{5}$ filled tank. How far will it travel if its tank is $\frac{1}{3}$ filled?

- (a) 6 kms. (b) 4 kms. (c) 15 kms. (d) 5 kms.

13. The sum of the digits of a two-digit number is 8. When 18 is added to the number, the digits are reversed. Find the number?

- (a) 33 (b) 53 (c) 30 (d) 35

14. Father's age is 5 times his son's age. 4 years back the father was 9 times older than his son. Find the father's present age.

- (a) 42 years (b) 40 years (c) 45 years (d) 38 years

15. If 20 workers take 15 days to complete a job, in how many days can 25 workers finish the same job?

- a) 10 days b) 12 days c) 8 days d) 11 days

16. If Rs. 1,260 is divided between A, B and C in the ratio 2:3:4, what is C's share?

- (a) Rs. 560 (b) Rs. 550 (c) Rs. 540 (d) Rs. 650

17. If A is traveling at 72 km per hour on a highway. B is traveling at a speed of 21 meters per second on a highway. What is the difference in their speed in m/sec?

- (a) 1.2 m/sec (b) 1.1 m/sec (c) 1 m/sec (d) 0.8 m/sec

18. There is a six-letter word UGANDA. How many ways can you arrange the letters in the word in such a way that both A's are together.

- (a) 24 (b) 240 (c) 60 (d) none of these

19. Complete the series: 3, 8, ..., 24, ..., 48, 63.

- (a) 14, 34 (b) 12, 36 (c) 15, 35 (d) none of these

20. Complete the series: 4, -5, 11, -14, 22, ...

- (a) 49 (b) -33 (c) -23 (d) -27

21. A finishes the work in 10 days & B in 8 days individually. If A works for only 6 days then how many days should B work to complete the remaining work?

- (a) 3.2 days (b) 3 days (c) 2.9 days (d) 3.6 days

22. A boy has Rs. 2. He wins or loses Re. 1 at a time. If he wins, he gets Re. 1 and if he loses the game, he loses Re. 1. He can loose only 5 times. He is out of the game if he earns Rs.

- (a) 12 (b) 16 (c) 20 (d) 18

23. $a + 2b = 6$, $ab = 4$, $\frac{2}{a} + \frac{1}{b} =$?

- (a) $\frac{3}{2}$ (b) $\frac{1}{3}$ (c) $\frac{2}{3}$ (d) $\frac{3}{4}$

24. There is a certain number of rows in which if we place 5, 7, or 9 balls per row, then no ball remains. But if we place 11 balls, then one ball is less to complete the row. Find out no of balls.

- (a) 315 (b) 630 (c) 945 (d) cannot be determined

25. A frog tries to jump out of a well 30m high. It jumps 3m up and slips down 2m each time. After how many jumps will it come out of the well?

- (a) 30 (b) 27 (c) 28 (d) cannot be determined

26. Out of 10 white, 9 black and 7 red balls, in how many ways can we select one or more balls

- (a) 234 (b) 52 (c) 630 (d) 879

26. A and B throw a dice. The probability that A's throw is not greater than B's is

- (a) $\frac{5}{12}$ (b) $\frac{7}{12}$ (c) $\frac{11}{12}$ (d) $\frac{5}{36}$

27. Given two numbers A and B, let A denotes the single AM between these and S denotes the sum of n AMs between them. Then S/A depends upon

- (a) n (b) n,a (c) n,b (d) n,a,b

28. If the sum of the roots of the equation $ax^2 + bx + c = 0$ is equal to the sum of the squares of their reciprocals, then, a/c , b/a , c/b are in

- (a) AP (b) GP (c) HP (d) None of these

In the following questions (105 and 106), \int represents the integral sign, for example, $\int_1^2 [f(x)]$ means integration of the function $f(x)$ over the interval 1 to 2.

29. The value of $\int_{-1}^2 [2-x^2] dx$, i.e. integration of the function $[2-x^2]$ over the interval -1 to 2 is

- (a) 0 (b) 1 (c) 2 (d) None of the above

30. If $\int_0^{\pi} [\log \sin x] dx = k$, then the value of $\int_0^{\pi/4} [\log(1 + \tan x)] dx$, where π stands for pi, is

- (a) $-k/4$ (b) $k/4$ (c) $-k/8$ (d) $k/8$

31. If a, b, c be in GP and p, q be respectively AM between a, b and b, c then

- (a) $\frac{2}{b} = \frac{1}{p} + \frac{1}{q}$ (b) $\frac{2}{b} = \frac{1}{p} - \frac{1}{q}$ (c) $2 = \frac{a}{p} - \frac{c}{q}$ (d) None of the above

32. A solution of $KMnO_4$ is reduced to MnO_2 . The normality of solution is 0.6. The molarity is

- (a) 1.8M (b) 0.6M (c) 0.1M (d) 0.2M

33. A person travels 12 km in the southward direction and then travels 5km to the right and then travels 15km toward the right and finally travels 5km toward the left, how far is he from his starting place?

- (a) 5.5 kms (b) 3 km (c) 13 kms (d) 6.4 km

110. X's father's wife's father's granddaughter uncle will be related to X as

- (a) Son (b) Nephew (c) Uncle (d) Grandfather

34. Find the next number in the series 1, 3, 7, 13, 21, 31, ...

- (a) 43 (b) 33 (c) 41 (d) 45

35. If in a certain code "RANGE" is coded as 12345 and "RANDOM" is coded as 123678, then the code for the word "MANGO" would be

- (a) 82357 (b) 89343 (c) 84629 (d) 82347

36. Integrate $3x + 5 / (x^3 - x^2 - x + 1)$

- (a) $\frac{1}{2} \log |(x+1)(x-1)| - \frac{4}{(x-1)}$ (b) $\log |2 + \tan x|$
 (c) $-(1 + \log x)x$ (d) $2 \log(\tan x)(\tan x + 2)$

37. If $y = \cos^{-1}(\cos x + 4 \sin x)$, then dy/dx is

- (a) 0 (b) 1 (c) -1 (d) none of these