Teachers' Work | Algebraic Expressions & Equations

Algebraic Expressions & Equations সরকারী কিংবা প্রাইভেট যেকোন ব্যাংকের পরীড়্গার অন্যতম গুরম্নত্বপূর্ণ একটি অধ্যায়। বিশেষতঃ ঢাকা বিশ্ববিদ্যালয়ের আর্টস ফ্যাকাল্টির এমসিকিউ প্রশ্নপত্রে বীজগণিতের প্রাধান্য ও কঠিন লেভেলের প্রশ্নসমূহের আধিক্য লক্ষনীয়। লিখিত পরীক্ষার প্রিপারেশন নেবার স্বার্থে এই অধ্যায়ের বেসিক জানাটা ভীষণ জরম্নরী। আবার সমীকরনের সাথে অন্যান্য বিষয় জড়িয়ে **Difficulty Level Hard & Very Hard Level** এর লিখিত পরীড়্গার কিছু সমস্যা থাকে যা ভীষন গুরম্নত্বপূর্ণ অথচ এই অধ্যায়ের লেভেলগুলো আয়ত্ত্ব না করা থাকলে লিখিত পরীক্ষার প্রস্তুতিতে ঋণাত্বক প্রভাব পরিলক্ষিত হতে বাধ্য। পরীড়্গার প্রশ্নপত্রের সাথে সংগতি রেখে ও ক্লাসে পাঠদানের সুবিধা মাথায় রেখে টপিকস/টাইপ অনুসারে (প্রয়োজনীয় ক্ষেত্রে সাব-টাইপসে তথা কেস অনুসারে) নিয়ম ও সংশিস্নষ্ট সমস্যাগুলো দেওয়া হলো।

Discussed Types for MCQ :

- Basic Algebraic Formulas
- One Variable Linear Equation
- Two Variables Linear Equation
- Multi Variables Linear Equation
- Reciprocal Equation
- Validation Theorem of various Equations
- Basic Concept of Function
- Quadratic Equation

Topic - 01 : Basic Algebraic Formulas

01. **If $a + \frac{1}{a} = 2$ then find $a^5 + \frac{1}{a^5} = ?$**

(A) 2 (B) 4 (C) 6 (D) 8 (E) none

02. **If $a + \frac{1}{a} = 2$ then find $a^6 + \frac{1}{a^6} = ?$**

(A) 2 (B) 4 (C) 6 (D) 8 (E) none

Topic - 02: One Variable Linear Equation

Level – Easy :

03. **A number is trebled and 2 are subtracted. If the resultant is divided by 5, it becomes 7. What is the number?**

(A) 10 (B) 6 (C) 8 (D) 7 (E) None of these

04. **A system of equation is as shown below –**

(I) $x + l = 6$ (II) $x - m = 5$ (III) $x + p = 4$ (IV) $x - q = 3$

What is the value of $1 + m + p + q$?

(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

Level – Medium :

05. In an examination, a student scores 1 marks for every correct answer and loses 0.25 mark for every wrong answer. If he attempts in all 100 questions and secures 75 marks, the number of questions he attempts wrongly, is:

(A) 32 (B) 20 (C) 24 (D) 48 (E) None

Level – Difficult :

06. Price of each mango and pineapple is tk. 30 and tk. 20 respectively. The average price of 10 said fruits is tk. 25. If some mangoes are replaced by pineapples, then the average cost become tk. 24. How many mango(es) are replaced by pineapple(s).

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

✍ Topic - 03: Two Variable Linear Equation

Level – Easy :

07. If $\frac{y}{x} = \frac{3}{7}$ and x + 2y = 39 then y is –

(A) 3 (B) 7 (C) 21 (D) 9 (E) None

Level – Medium :

08. A pineapple costs Tk. 20 each. A watermelon costs Tk. 100 each. Lita spends exactly Tk 440 on these fruits. What was the number of pineapples purchased?

(A) 4 (B) 5 (C) 7 (D) 9 (E) Can't be calculated

Level - Difficult

09. For which values of k the equations 2x + y + 5 = 0 and kx + y = 10 has not unique solutions?

(A) 2 (B)-2 (C) 3 (D) -3 (E) 5

10. Find a:b if the equations ax + 2y + 5 = 0 and bx + 3y -11= 0 has not unique solutions?

(A) 2 (B)-2 (C) 3 (D) -3 (E) 5

11. If k = -2 then the equations 2x + y + 5 = 0 and kx – y = 5 has .....

(A) Unique Solution (B)Has not unique Solution (C) Infinite Solution (D) None

Topic - 04: Multi Variable Linear and Polynomial Equations

12. If $xy = 2$ and $xy^2 = 8$, what is the value of x?

(A) $\frac{1}{2}$ (B) 2 (C) 4 (D) 8 (E) 16

13. If $3x - y + 5z = 5$ and $x - y - z = 7$, what is the value of $2x - y + 2z$ = ?

(A) 1 (B) 2 (C) 4 (D) 6 (E) None

Topic - 05: Reciprocal Laws

14. If $\frac{P}{Q} = \frac{2}{3}$ then find = $\frac{2P-Q}{Q-P}$

(A) 0 (B) 1 (C) 2 (D) -2 (E) None

15. If $\frac{P+Q}{P-Q} = 2$ then find $\frac{P}{Q}$ = ?

(A) 0 (B) 1 (C) 2 (D) 3 (E) None

Topic - 06: Validation Concept

16. If $f(x) = \frac{x}{2x-1}$ then f(x) is not valid if

(A) $x = \frac{1}{2}$ (B) $x = -\frac{1}{2}$ (C) x = 0 (D) x = 1 (E) None of these

Topic - 07: Functional Value Determination

17. If $f(x) = \frac{x-1}{2x+1}$ then f(1) = ?

(A) 0 (B) 1 (C) $\frac{1}{2}$ (D) $-\frac{1}{2}$ (E) None of these

18. If $f(x) = \sqrt{x-1}$ and f(x) = 2 then x = ?

(A) 2 (B) – 2 (C) 5 (D) 3 (E) None of these

19. If * is defined for all positive real numbers a and b by a * b = ab/(a + b), then 10 * 2 = ?

(A) 5/3 (B) 5/2 (C) 5 (D) 20/3 (E) None

Topic - 08: Quadratic Equation

20.. If one root of the equation $2x^2 + px - 90 = 0$ is 6, what is the value of p?

(A) 2 (B) 4 (C) 3 (D) 6 (E) 7

21. For which values of c the equations $x^2 + 2x + c = 0$ has real roots?

(A) c = 1 (B) c ≥1 (C) c ≤ 1 (D) c > 1 (E) c < 1

22. If $x^2 - 2x + 3 = 0$ then Roots are?

(A) Real (B) Real and Equal (C) Real but irrational (D) Complex (E) None

23. If $f(x)= x^2 - 2x + 3$ then for which value of x, the equation has a minimum value?

(A)1 (B) 2 (C)-1 (D) 5 (E) Can't be determine

24. If $f(x)= x^2 - 2x + 5$ then find the minimum value?

(A)1 (B) 6 (C) 4 (D) 5 (E) Can't be determine

25. If $f(x)= 5 - 2x - x^2$ then find the maximum value?

(A)1 (B) 6 (C) 4 (D) 5 (E) Can't be determine

Special Home Work (Assignment)

01. A number is doubled and 9 are added. If the resultant is trebled and then divided by 5, it becomes 15. What is the number?

(A) 3.5 (B) 6 (C) 8 (D) 7 (E) None of these

02. In an examination, a student scores 4 marks for every correct answer and loses I mark for every wrong answer. If he attempts in all 60 questions and secures 130 marks, the number of questions he attempts correctly, is:

(A) 35 (B) 38 (C) 40 (D) 45 (E) 56

03. Price of each mango and pineapple is tk. 40 and tk. 30 respectively. The average price of 10 said fruits is tk. 36. If some mangoes are replaced by pineapples, then the average cost become tk. 34. How many mango(es) are replaced by pineapple(s).

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

04. A pineapple costs Tk. 7 each. A watermelon costs Tk. 5 each. Mona spends exactly Tk 38 on these fruits. What was the number of pineapples purchased?

(A) 2 (B) 3 (C) 4 (D) 5 (E) Can't be calculated

05. If $\frac{y}{x} = \frac{3}{7}$ and $x + 2y = 13$ then y is –

(A) 3 (B) 7 (C) 21 (D) 9 (E) None

06. There are two examinations rooms A and B. If 10 students are sent from A to B, then the number of students in each room is the same. If 20 candidates are sent from B to A, then the number of students in A is double the number of students in B. The number of students in room A is:

(A) 20 (B) 80 (C) 100 (D) 200 (E) None

07. For which values of k the equations $2x + y + 5 = 0$ and $kx - y = 5$ has not unique solutions?

(A) 2 (B)-2 (C) 3 (D) -3 (E) 5

07. If $\frac{P}{Q} = \frac{1}{2}$ then find $= \frac{2P - Q}{2P + Q}$

(A) 0 (B) 1 (C) 2 (D) -2 (E) None

08. If $\frac{P + Q}{P - Q} = 3$ then find $\frac{P}{Q} = ?$

(A) 0 (B) 1 (C) 2 (D) -2 (E) None

09. If $f(x)= x^2 - 2x + 3$ then for which value of x, the equation has a maximum value?

(A)1 (B) 2 (C)-1 (D) 5 (E) Can't be determine

10. If $f(x)= x^2 - 2x + 3$ then find the minimum value?

(A)1 (B) 2 (C)-1 (D) 5 (E) Can't be determine

Students' Work | Try Yourself (Teacher will not solve)

01. In a class of 63 children, the children are seat in rows and columns such that there are two children in each column that the number of children seated in each row. How many children are there in each row

A) 7 B) 8 C) 9 D) 10 E) 11

02. If $\sqrt{x} - \sqrt{y} = 3$ and $\sqrt{x} + \sqrt{y} = 19$, then $\sqrt{xy} = ?$

A) 88 B) 78 C) 80 D) 90 E) 100

03. A man has Rs. 480 in the denominations of one-rupee notes, five-rupee notes and ten-rupee notes. The number of notes of each denomination is equal. What is the total number of notes that he has?

A) 75 B) 90 C) 72 D) 70 E) 65

04. There are two examinations rooms A and B) If 10 students are sent from A to B, then the number of students in each room is the same. If 20 candidates are sent from B to A, then the number of students in A is double the number of students in B) The number of students in room A is:

A) 90 B) 95 C) 105 D) 100 E) 85

05. $a - b = 3$ and $a^2 - b^2 = 29$, find the value of ab.

A) 9 B) 10 C) 7 D) 8 E) 12

06. A man has some hens and cows. If the number of heads be 48 and the number of feet equals 140, then the number of hens will be:

A) 28 B) 29 C) 27 D) 26 E) 25

07. If $2x + 3y + z = 55$, $x + z - y = 4$ and $y - x + z = 12$, then what are the values of z?

A) 8 B) 9 C) 10 D) 11 E) 12

08. If $x + y = 1$, find the value of $x^3 + y^3 + 3xy$.

A) 5 B) 2 C) 1 D) 4 E) 3

09. A number consists of two digits, the sum of the digits being 10. If 18 is subtracted from the number, the digits are reversed. Find the number.

A) 62 B) 65 C) 63 D) 64 E) 61

10. The difference of two digits of a number is 3. If 4 times the number is equal to 7 times the number obtained by reversing the digits, find the original number.

A) 62 B) 63 C) 64 D) 65 E) 66

11. Solve the equation $2x^2 - 14x + 14 = -10$ and find the value of x.

A) 3,4 B) 4,5 C) 2,3 D) 5,6 E) 1,2

12. Find $x^3 + y^3 + z^3 - 3xyz$, if $x + y + z = 9$ and $xy + yz + zx = 11$.

A) 430 B) 431 C) 432 D) 433 E) 434

13. If $a + \frac{1}{a-2} = 4$, then the value of $(a-2)^2 + \frac{1}{(a-2)^2}$

A) 2 B) 4 C) 6 D) 4 E) 3

14. If $a^3 - b^3 - c^3 = 0$, then the value of $a^9 - b^9 - c^9 - 3a^3b^3c^3$ is,

A) 1 B) 2 C) 0 D) 4 E) 3

15. If $\frac{x}{y} = \frac{3}{4}$, then find the value of $\frac{y-x}{y+x}$

A) $\frac{3}{4}$ B) $\frac{3}{2}$ C) $\frac{1}{3}$ D) $\frac{1}{7}$ E) None of these

16. If $\frac{x}{y} = \frac{2}{1}$ the value of $\frac{x+y}{x-y}$ is –

A) 2 B) 1 C) 3 D) 4 E) None of these

17. A fires 5 shots to B's 3 but A kills only 1 bird in the 3 shots while B kills only 1 bird in 2 shots. When B has missed 27 times, A has killed how many birds?

A) 20 birds B) 10 birds C) 30 birds D) 40 birds E) None

18. Sanket earns twice as much in the month of March as in each of the other months of the year. What part of his entire annual earning was earned in March?

A) $\frac{2}{13}$ B) $\frac{3}{17}$ C) $\frac{4}{13}$ D) $\frac{2}{17}$ E) None of these

19. $\frac{0.12225 + 0.027}{0.25 - 0.15 + 0.09}$ is equal to –

A) 6 B) 7 C) 8 D) 9 E) None of these

20. If $2x = 5$ and $3y = 8$, then $\frac{4x}{9y}$ is equal to –

A) $\frac{5}{16}$ B) $\frac{2}{13}$ C) $\frac{1}{12}$ D) $\frac{5}{12}$ E) None of these

21. $\left(\frac{1}{2} - \frac{1}{3}\right) + \left(\frac{1}{3} - \frac{1}{4}\right) + \left(\frac{1}{4} - \frac{1}{2}\right)$ is equal to –

A) 2 B) 1 C) 3 D) 4 E) None of these

22. For some value of x; $5(x + 2) = y$. After the value of x is increased by 3; $5(x + 2) = Z$. What is the value of $(z - y)$?

A) 18 B) 12 C) 15 D) 10 E) None of these

23. If $x = 2.0001$, which of the following expressions has the highest value?

A) $\frac{2}{x+2}$ B) $\frac{2}{x-2}$ C) $\frac{x+2}{2}$ D) $\frac{2}{x}$ E) None of these

24. If $\frac{y}{x} = \frac{1}{3}$ and $x + 2y = 10$, then x is —

A) 2 B) 3 C) 4 D) 6 E) None of these

25. If $\frac{1-x}{3} = \frac{1}{15}$, then $x = ?$

A) $\frac{14}{45}$ B) $\frac{1}{5}$ C) $\frac{4}{5}$ D) $\frac{6}{5}$ E) None

26. If $y = 5x + 4$ and $5x + 8 = 40$, then $y = ?$

A) 28 B) 36 C) 42 D) 45 E) None

27. If $y = \frac{a}{a+b}$ and $x = \frac{a}{b}$, then what is y in terms of x?

A) 1 + x B) $1 + \frac{1}{x}$ C) $\frac{x}{1+x}$ D) $\frac{1}{1+x}$ E) None

28. Tanveer earns Tk. 5.00 for every hour he works. Last week he worked for x hours. He purchased y kg of rice. Price of per kg rice is Tk. 12.00. He saved the remaining amount. Which expression below shows his savings?

A) Tk. $(5.00x + 12.00y)$ B) Tk. $(5.00x - 12.00y)$ C) Tk. $5.00\ (x - y)$
D) Tk. $7.00\ (xy)$ E) None of these

29. Shabnam, a student of science group, is reviewing her algebra quiz. She has determined that one of her solutions is incorrect. Which one is it ?

A) $2x + 5\ (x - 1) = 9, x = 2$ B) $p - 3(p - 5) = 10, p = 2.5$ C) $4y + 3y = 28, y = 4$
D) $t - 2t - 3t = 32, t = 8$ E) None of these

30. At a book fair, Danesh buys three pencils that cost Tk. 3.25 each, and a color pen that costs Tk. 5. Which expression represents the amount of change, C, he should get when paying with a twenty taka note?

A) 20 – 3.25 – 3(5) B) 20 – 3(3.25) – 5 C) 3(3.25) – 5 D) 20 – 3.25 – 5 E) None of these

31. One third the sum of 13 and a certain number is the same as one more than twice the number. Find out the number.

A) 6 B) 2 C) 5 D) 3 E) None of them

32. If the sum of two numbers is 33 and their difference is 15, the smaller number is:

A) 9 B) 12 C) 15 D) 18 E) None of these

33. A positive number x is multiplied by 2, and this product is then divided by 3. If the positive square root of the result of these two operations equals x, what is the value of x?

A) $\frac{9}{4}$ B) $\frac{3}{2}$ C) $\frac{4}{3}$ D) $\frac{2}{3}$ E) $\frac{1}{2}$

34. If $a = 7c/(b + 0.5c)$, then c = ?

A) $\frac{2ab}{7 - 0.5a}$ B) $\frac{ab + 2a}{7}$ C) $\frac{a(b + 0.5)}{7}$ D) $\frac{2ab}{14 - a}$ E) None

35. If $(a + 2)(a - 3)(a - 4) = 0$ and $a > 3$, then a = ?

A) 1 B) 2 C) 3 D) 4 E) 5

36. If $\frac{1}{2}$ of the air in a tank is removed with each stroke of a vacuum pump, what fraction of the original amount of air has been removed after 4 strokes?

A) $\frac{15}{16}$ B) $\frac{7}{8}$ C) $\frac{1}{4}$ D) $\frac{1}{8}$ E) $\frac{1}{16}$

37. The unit price of a pen is TK. 20 for the first 50 units. Additional units can be bought for TK. $\{20 - \frac{x}{10}\}$ per unit. If you can buy 150 pens for taka 2,000, what is the value of x?

A) 20 B) 40 C) 50 D) 60 E) none

38. Asad went to the market to by 12 oranges. But he found that he had the money to buy only 10 oranges. He calculated that if the price per pieces of orange was TK. 3 less, he could have bought 12 oranges. How much money did Asad have?

A) 150 B) 160 C) 175 D) 180 E) none of these

39. Faisal purchased brand A shirts for TK. 400 a price and brand B shirts for TK. 280 a piece. If Faisal purchased a total of 12 shirts for TK. 4,200; how many brand B shirts did he purchased?

A) 4 B) 5 C) 6 D) 7 E) 8

40. The number of coins in Rafi's collection is 80% of the number of coins in Pall's collection. If both of them have 900 coins altogether, how many coins does Rafi have?

A) 320 B) 400 C) 500 D) 620 E) None of these

41. Samiul, Azim and Jami divided some money among themselves so that Samiul received 33% of it, Azim received one-fourth of it, and Jami received the remaining Tk. 630. How much money did Azim receive?

A) Tk. 375 B) Tk. 280 C) Tk. 495 D) Tk. 500 E) None

42. Dina purchased PRAN candy for Tk. 4.00 per box and BINGO candy for TK. 2.50 per box. If she purchased a total of 12 boxes of candy for TK. 42. 00, how many boxes of PRAN candies did she purchase?

A) 3 B) 4 C) 5 D) 7 E) 8

43. In a Cox's Bazar hotel, the daily rate for an economy room, which can accommodate a maximum of three persons' is Taka 800 for one person and Taka Y for each additional person. If 3 friends take the room got one day and each pays Take 450 for the room, what is Taka Y?

A) 200 B) 275 C) 350 D) 425 E) 500

44. Mrs. Henna needs to make a cake and some cookies. The cake requires $\frac{3}{8}$ cup of sugar and the cookies require $\frac{3}{5}$ cup of sugar. Mrs. Henna has $\frac{15}{16}$ cups of sugar. Does she have enough sugar, or how much more does she need?

A) She has enough sugar B) She needs $\frac{1}{8}$ of a cup of sugar

C) She needs $\frac{3}{80}$ of a cup of sugar D) She needs $\frac{1}{16}$ of a cup of sugar E) None of these

45. To make an instant coffee drink in a coffee machine, W liters of water is needed for every liter of concentrated liquid coffee mix. In a certain weekday in IBA canteen, C liters of concentrated coffee mix are required and coffee is sold for S taka per liter. If coffee mix is bought for B taka per liter and water us free, what will be the gross profit per day?

A) C (S + W – B) B) S (C + W – B) C) S (C + CW – B)

D) C (S + SW – B) E) none of these

46. In a certain match, Tamim Iqbal scored a half century (50) only by hitting fours and sixed. If there are F fours and S sixes in his score, what is the least possible absolute difference between F and S?

A) 0 B) 2 C) 5 D) 10 E) none of these

47. Some chocolates were distributed among three children X, Y and Z. If X gave 8 chocolates to Y gave 5 chocolates to Z, then all of them would have equal number of chocolates. It the total number of chocolates were 45, how many chocolates did Y get?

A) 10 B) 12 C) 14 D) 15 E) none of these

48. If $2 + \frac{6}{x} = 5$, what is the value of $2x + 8$?

A) 10 B) 12 C) 15 D) 18 E) 20

49. If $x = 2y = 3z$ and $xyz = 36$, what is the value of z ?

A) 2 B) $\sqrt{2}$ C) $\sqrt{3}$ D) 3 E) None of these

50. x varies inversely as square of y. Given that y = 2 for x = 1. The value of x for y = 6 will be equal to :

A) 3 B) 9 C) $\frac{1}{3}$ D) $\frac{1}{9}$ E) None of these

51. If $xy \neq 0$, then $\frac{x-1}{xy}$ = ?

A) $\frac{1}{x}-\frac{1}{xy}$ B) $\frac{x}{y}-\frac{1}{xy}$ C) $\frac{1}{y}-x$ D) $\frac{1}{y}-\frac{1}{xy}$ E) $\frac{1}{x}-\frac{1}{y}$

52. If $x + 2y = 4$ and $\frac{x}{y} = 2$, then x is equal to-

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

53. If $1 + \frac{1}{x} = 2 - \frac{2}{x}$ then x = ?

A) –1 B) $\frac{1}{3}$ C) $\frac{2}{3}$ D) 2 E) None of these

54. If $a^2 + b^2 = 10$ and $a^2 - b^2 = 8$, what is the value of ab?

A) 1 B) $\sqrt{2}$ C) 3 D) 4 E) None of these

55. If $a + 2b = 6$ and $ab = 4$, what is $\frac{2}{a} + \frac{1}{b}$?

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

56. If $(x - y)^2 = 12$ and $xy = 1$, then what is the value of $(x^2 + y^2)$?

A) 12 B) 14 C) 17 D) 18 E) None of these

57. If one root of the equation $2x^2 + 3x - k = 0$ is 6, what is the value of k?

A) 6,000 B) – 6,000 C) 5,000 D) 1,000 E) –1,000

58. The minimum value of $2x^2 + 8x - 5$ is –

A) – 9 B) $\frac{13}{2}$ C) – 13 D) 13 E) None of them

59. If $x - 3y = 3$ and $2x + 9y = 11$, then what are the values of x and y?

A) 2, 3 B) $\frac{1}{4}, \frac{1}{3}$ C) 4, $\frac{1}{3}$ D) $\frac{1}{3}$, 3 E) None of these

60. If one of the roots of the quadratic equation $x^2 + mx + 24 = 0$ is 1.5, then what is the value of m?

A) –22.5 B) 16 C) –10.5 D) –17.5 E) –27.5

61. If $(x + 2)^2 = 9$ and $(y + 3)^2 = 25$, then the maximum value of $\frac{x}{y}$ is

A) $\frac{1}{2}$ B) $\frac{5}{2}$ C) $\frac{5}{8}$ D) $\frac{1}{8}$ E) $\frac{1}{18}$

62. A tank is 2/5 full. If 16 litres of water is added to the tank, it becomes 6/7 full. The capacity of the tank is:

A) 28 litres B) 32 litres C) 35 litres D) 42 litres

63. If $x = 1 - q$ and $y = 2q + 1$, then for what value of q, x is equal to y ?

A) 0 B) 1 C) –1 D) – 2

64. If $a - b = 3$ and $a^2 + b^2 = 29$, find the value of ab.

A) 10 B) 12 C) 15 D) 18

65. A fires 5 shots to B's 3 but A kills only once in 3 shots while B kills once in 2 shots. When B has missed 27 times, A has killed:

A) 30 birds B) 60 birds C) 72 birds D) 90 birds

66. Free notebooks were distributed equally among children of a class. The number of notebooks each child got was one-eighth of the number of children. Had the number of children been half, each child would have got 16 notebooks. Total how many notebooks were distributed?

A) 256 B) 432 C) 512 D) 640 E) None of these

67. If $2 + \frac{6}{x} = 5$, what is the value of $2x + 8$?

A) 10 B) 12 C) 15 D) 18 E) 20

68. If x = 2y = 3z and xyz = 36, what is the value of z?

A) 2 B) $\sqrt{2}$ C) $\sqrt{3}$ D) 3 E) None of these

69. If 2x = y and 3y = 2, the value of 9xy is-

A) 14 B) 13.18 C) 2 D) 28 E) 27

70. If $5x - 3 = 2x + 9$, the value of x is-

A) 2.5 B) 4 C) 6 D) 12.5 E) 11

71. If $1 + \frac{1}{x} = 2 - \frac{2}{x}$ then x = ?

A) –1 B) $\frac{1}{3}$ C) $\frac{2}{3}$ D) 2 E) None of these

72. Find the value of $(p - 1)^3$ if $p = \frac{5}{16}$

A) $\frac{-1231}{4096}$ B) 6 C) 0 D) $\frac{1321}{4906}$ E) None of these

Solution | Students' Work

01. Let the number of children in row = x

The number of children in the column = (x+ 2)

According to the question,

$x(x + 2) = 63 \Rightarrow x^2 + 2x - 63 = 0 \Rightarrow x^2 + 9x - 7x - 63 = 0 \Rightarrow x(x - 9) - 7(x - 9) = 0$

$\Rightarrow (x - 9) - 7(x - 9) = 0 \Rightarrow (x - 9)(x - 7) = 0 \Rightarrow x = 9$ or -7 (Negative value is not possible)

There are 9 children in each row. **Ans. C**

02. $\sqrt{x} - \sqrt{y} = 3$ ---------- (1) $\sqrt{x} + \sqrt{y} = 19$ ---------- (2)

Adding both the equation, $2\sqrt{x} = 22$ $\sqrt{x} = \frac{22}{2} = 11$

Subtracting both the equations, $-2\sqrt{y} = -16$ $\sqrt{y} = 8$ So, $\sqrt{xy} = 11 \times 8 = 88$ **Ans. A**

03. Let number of notes of each denomination be x.

Then $x + 5x + 10x = 480$ $16x = 480$ $x = 30$. **Ans. B**

Hence, total number of notes = 3x = 90.

04. Let the number of students in rooms A and B be x and y respectively.

Then, $x - 10 = y + 10$ $\quad x - y = 20$ .....(i)

and $x + 20 = 2(y - 20)$ $\quad x - 2y = -60$ ..... (ii)

Solving (i) and (ii) we get: $x = 100, y = 80$.

The required answer A = 100. **Ans. D**

05. $2ab = (a^2 + b^2) - (a - b)^2 = 29 - 9 = 20 \quad \therefore ab = 10$.

Ans. B

06. Let the number of hens be x and the number of cows be y.

Then, $x + y = 48$ --------- (i) and $2x + 4y = 140 \Rightarrow x + 2y = 70$ ------ (ii)

Solving (i) and (ii) we get: $x = 26, y = 22$.

The required answer = 26. **Ans. D**

07. The given equations are:

$2x + 3y + z = 55$ ---------- (i); $x + z - y = 4$ ------ (ii); $y - x + z = 12$ ------- (iii)

Subtracting (ii) from (i), we get: $x + 4y = 51$ ------ (iv)

Subtracting (iii) from (i), we get: $3x + 2y = 43$ ------ (v)

Multiplying (v) by 2 and subtracting (iv) from it, we get: $5x = 35$ or $x = 7$.

Putting $x = 7$ in (iv), we get: $4y = 44$ or $y = 11$.

Putting $x = 7, y = 11$ in (i), we get: $z = 8$. **Ans. A**

08. $(x + y)^3 = x^3 + y^3 + 3xy(x + y)$ putting value $\Rightarrow (1)^3 = x^3 + y^3 + 3xy(1) \Rightarrow x^3 + y^3 + 3xy = 1$. **Ans. C**

09. Let the digit at unit's place be y and the digit at ten's place be x

$\therefore$ Original number = $10x + y$

When digits are reversed the number becomes = $10y + x$

According to the conditions.

$x + y = 10$ --------- (i)

$10x + y - 18 = 10y + x$ --------- (ii)

Equation (ii) reduces to

$9x - 9y = 18 \Rightarrow x - y = 2$ --------- (iii)

Adding (i) & (iii), we get

$2x = 12 \quad \therefore x = 6$

Put $x = 6$ in equation (iii); $y = 4$

Original number = 64 **Ans. D**

10. Let the digit at unit's place be y

And the digit at tenn's place be x

Original number = $10x + y$

Number obtained by reversing the digits = $10y + x$

According to the condition, $x - y = 3$ (i)

$4(10x + y) = 7(10y + x) \Rightarrow 40x + 4y = 70y + 7x \Rightarrow 33x = 66y \Rightarrow x = \frac{66}{33}y \quad \therefore x = 2y$

Put $x = 2y$ in (i) we get $2y - y = 3 \quad \therefore y = 3$

Put y = 3 in eqⁿ (i); x = 6

∴ Number is 63 **Ans. B**

11. $2x^2 - 14x + 14 = -10 \Rightarrow 2x^2 - 14x + 24 = 0 \Rightarrow 2x^2 - 8x - 6x + 24 = 0 \Rightarrow 2x(x-4) - 6(x-4) = 0$

$\Rightarrow (2x - 6)(x - 4) = 0 \Rightarrow x = 3, 4$ **Ans. A**

12. $x^3 + y^3 + z^3 - 3xyz$

$= (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx) = (x + y + z)[(x + y + z)^2 - 3(xy + yz + zx)]$

$= 9[81 - 3(11)] = 9 \times [81 - 33] = 9 \times 48 = 432.$ **Ans. C**

13. $a + \frac{1}{a-2} = 4 \Rightarrow a^2\,2a + 1 = 4a - 8 \Rightarrow a^2 - 6a + 9 = 0 \Rightarrow (a-3)^2 = 0 \therefore a = 3$

Now, $(a-2)^2 + \frac{1}{(a-2)^2} = (3-2)^2 + \frac{1}{(3-2)^2} = 1 + 1 = 2.$

14. When, $x + y + z = 0$

then, $x^3 + y^3 + z^3 - 3xyz = 0$

here $x = a^3, y = -b^3, z = -c^3 \quad \therefore a^9 - b^9 - c^9 - 3a^3b^3c^3 = 0$ **Ans. C**

15. Here $\frac{x}{y} = \frac{3}{4} \Rightarrow \frac{y}{x} = \frac{4}{3}$ [Doing Reciprocal] $\Rightarrow \frac{y-x}{y+x} = \frac{4-3}{4+3}$ [বিয়োজন ও যোজন করে] $\therefore \frac{y-x}{y+x} = \frac{1}{7}$ **Ans. D**

16. $\frac{x}{y} = \frac{2}{1} \Rightarrow \frac{x+y}{x-y} = \frac{2+1}{2-1}$ [যোজন ও বিয়োজন করে] $\therefore \frac{x+y}{x-y} = 3$ **Ans. C**

17. Let, the total no. of shots be x

$\therefore$ shots fired by A = $\frac{5}{8}$ of x = $\frac{5x}{8}$ & shots fired by B = $\frac{3}{8}$ of x = $\frac{3x}{8}$

$\therefore$ Killing shots by A = $\frac{1}{3}$ of $\frac{5x}{8} = \frac{5x}{24}$ & Missed shots by B = $\frac{1}{2}$ of $\frac{3x}{8} = \frac{3x}{16}$

ATP, $\frac{3x}{16} = 27 \quad \therefore x = 144 \quad \therefore$ Birds killed by A = $144 \times \frac{5}{24} = 30$ **Ans. C**

18. Let, Sanket earns x tk. in each of the other 11 months

$\therefore$ Sanket earn in March = 2x tk. $\therefore$ Sanket annual earning = (11x + 2x) = 13x tk

$\therefore$ Required fraction = $\frac{2x}{13x} = \frac{2}{13}$ **Ans. A**

19. $\frac{0.12225 + 0.027}{0.25 - 0.15 + 0.09} = \frac{.14925}{.19} = .7855 \approx 8$ **Ans. C**

20. Here, $x = \frac{5}{2}$ and $y = \frac{8}{3} \quad \therefore \frac{4x}{9y} = \frac{4 \times \frac{5}{2}}{9 \times \frac{8}{3}} = \frac{10}{24} = \frac{5}{12}$ Ans. $\frac{5}{12}$ **Ans. D**

21. $\left(\frac{1}{2} - \frac{1}{3}\right) + \left(\frac{1}{3} - \frac{1}{4}\right) + \left(\frac{1}{4} - \frac{1}{2}\right) = \frac{1}{6} + \frac{1}{12} + \frac{3}{4} = \frac{2+1+9}{12} = 1$ Ans. 1 **Ans. B**

22. Here, $y = 5(x + 2) = 5x + 10$
$z = 5(x + 3 + 2) = 5x + 25 \ \therefore z - y = 15$ **Ans: C**

23. B – is Maximum (মান বসিয়ে Try কর) **Ans: B**

24. $\frac{y}{x} = \frac{1}{3} \Rightarrow x = 3y$ and, $x + 2y = 10 \Rightarrow 3y + 2y = 10$
$\therefore y = 2; \therefore x = 3 \times 2 = 6$ **Ans: D**

25. $\frac{1-x}{3} = \frac{1}{15}; \Rightarrow 1 - x = \frac{1}{5}; \Rightarrow 5 - 5x = 1; \Rightarrow 5x = 4. \therefore x = \frac{4}{5}$ **Ans: C**

26. Here, $y = 5x + 4$. Now, $5x + 8 = 40; \Rightarrow 5x + 4 + 4 = 40; \Rightarrow y + 4 = 40 \ \therefore y = 36.$ **Ans: B**

27. Here, $x = \frac{a}{b}; \ \therefore a = bx$. Now, $y = \frac{a}{a+b} = \frac{bx}{bx+b} = \frac{x}{x+1}$ **Ans: C**

28. $5x - 12y$ **Ans: B**

29. For $t = 8t - 2t - 3t = 32$ Not exist **Ans: D**

30. C = Total Payment – Total Cost = $20 - 3(3.25) - 5$ **Ans: B**

31. $\frac{1}{3}(13 + x) = 1 + 2x; \Rightarrow 6x + 3 = 13 + x \ \therefore x = 2$ **Ans: B**

32. $x + y = 33$ ____(i) and $x - y = 15$ ____(ii) (i) – (ii) $= 2y = 18 \ \therefore y = 9$ **Ans: A**

33. $\sqrt{\frac{2x}{3}} = x; \therefore x = \frac{2}{3}$ **Ans: D**

34. $a = \frac{7c}{b+0.5c} = \frac{7c}{b+\frac{c}{2}} = \frac{14c}{c+2b} \Rightarrow 14c = ac = 2ab \Rightarrow c(14 - a) = 2ab \ \therefore c = \frac{2ab}{14-a}$ **Ans: D**

35. $a + 2 = 0$ or $a - 3 = 0$ or $a - 4 = 0 \ \therefore a = -2 \quad \therefore a = 3 \quad \therefore a = 4$ **Ans: D**

36. Air remain after 4 stroke $= \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{16} \therefore$ Air remain $= 1 - \frac{1}{16} = \frac{15}{16}$ **Ans: A**

37. $20 \times 50 + (20 - \frac{x}{10}) \times 100 = 2000 \quad \therefore -x = 100$ **Ans: E**

38. Let, Brand B have = x Brand A have = 12 – x
Now, $400(12 - x) + 280x = 4200 \quad \therefore x = 5$ **Ans: B**

39. Let, Price of per piece of orange= x $\therefore$ Asad have = 10x
Now, $12(x - 3) = 10x \ \therefore x = 18$ Asad have = $10 \times 18 = 180$ **Ans: D**

40. Let, Pall have = 100x ; Rafi have = 80x Now, $100x + 80x = 900 \quad \therefore x = 5$

$\therefore$ Rafi = 80 × 5 = 400 **Ans: B**

41. Jamal = 100% – (33% + 25%) = 42%

$\therefore 42x = 630 \quad \therefore x = \frac{630}{42} \qquad \therefore$ Azim = $25 \times \frac{630}{42} = 375$ **Ans: A**

42. $4x + 2.5(12 - x) = 42; \therefore x = 7$ **Ans: D**

43. $800 + 2y = 1350; \therefore y = 275$ **Ans: B**

44. $(\frac{3}{8} + \frac{3}{5}) - \frac{15}{16} = \frac{3}{80}$ **Ans: C**

45. (CW + W) S – CB **Ans: E**

46. 5 six and 5 four **Ans: C**

47. $x \rightarrow 15 + 8 = 23$

$y \rightarrow 15 - 8 + 5 = 12$

$z \rightarrow 15\text{-}5 = 10$ **Ans: B**

48. $2 + \frac{6}{x} = 5 \Rightarrow \frac{2x+6}{x} = 5 \Rightarrow 2x + 6 = 5x \Rightarrow 3x = 6 \therefore x = 2$

$\therefore 2x + 8 = 2.2 + 8 = 12$ **Ans. B**

49. Here, x = 2y = 3z So, x = 3z and 2y = 3z $\Rightarrow y = \frac{3z}{2}$; $\because xyz = 36$

$\Rightarrow 3z.\frac{3z}{2}.z = 36 \quad \Rightarrow 9z^3 = 72 \Rightarrow z^3 = 8 \Rightarrow z = 2$ **Ans. A**

50. $x \propto \frac{1}{y^2} \Rightarrow x = \frac{k}{y^2} \quad \therefore k = xy^2$

If x = 1 and y = 2 then $k = (1) \times (2)^2 = 4$ Now, for y = 6 $\therefore x = \frac{k}{y^2} = \frac{4}{6^2} = \frac{1}{9}$ **Ans. D**

51. $\frac{x-1}{xy} = \frac{x}{xy} - \frac{1}{xy} = \frac{1}{y} - \frac{1}{xy}$ **Ans. D**

52. Here, $x + 2y = 4$ and $\frac{x}{y} = 2 \Rightarrow x = 2y;$

$2y + 2y = 4; \Rightarrow 4y = 4; \Rightarrow y = 1; \quad \therefore \frac{x}{y} = \Rightarrow \frac{x}{1} = 2 \Rightarrow x = 2$ **Ans. B**

53. $1 + \frac{1}{x} = 2 - \frac{2}{x} \Rightarrow \frac{1}{x} + \frac{2}{x} = 2 - 1 \Rightarrow \frac{1+2}{x} = 1 \Rightarrow \frac{3}{x} = 1 \Rightarrow I = 3;$ **Ans. E**

54. $a^2 + b^2 = 10$ ---------- (i) and $a^2 - b^2 = 8$ ---------- (ii)

solving (i) and (ii) $a^2 = 9$ and $6 = 1 \quad \therefore ab = \sqrt{a^2b^2} = \sqrt{9 \times 1} = 3.$ **Ans. C**

55. Here, a + 2b = 6 and ab = 4

Now, $\frac{2}{a} + \frac{1}{b} = \frac{a+2b}{ab} = \frac{6}{4} = \frac{3}{2}.$ **Ans. C**

56. Here, $(x-y)^2 = 12$ or, $x^2 + y^2 - 2xy = 12$

or, $\left(x^2 + y^2\right) = 12 + 2xy$ or, $(x^2 + y^2) = 12 + 2 \times 1 = 14$ **Ans. B**

57. Here, x = 6 then

$2(6)^2 + 3(6) - k = 0$ বা, $2 \times 36 + 18 - k = 0$ বা, $k = 90$; **Ans. A**

58. Here, $f(x) = 2x^2 + 8x - 5$

$\therefore f'(x) = 4x + 8$

Now, $f'(x) = 0 \quad \therefore x = -2$

Min. $(x) = 2x(-2)^2 + 8(-2) - 5 = 8 - 16 - 5 = -13$. **Ans. C**

59. $x - 3y = 3$ ---------- (I)

$2x + 9y = 11$ ---------- (II)

Performing (I) × 2 – (II), $2x - 6y - 2x - 9y = 6 - 11 \Rightarrow -6y - 9y = -5 \Rightarrow -15y = -5$

$\Rightarrow y = \; y = \frac{-5}{-15} = \frac{1}{3}$

$x - 3.\frac{1}{3} = 3 \Rightarrow x - 1 = 3 \Rightarrow x = 3 + 1 = 4 \quad \therefore (x, y) = (4, \frac{1}{3})$ **Ans. C**

60. *Here, x = 1.5* So, $x^2 + mx + 24 = 0 \Rightarrow (1.5)^2 + m(1.5) + 24 = 0; \Rightarrow 2.25 + 1.5m + 24 = 0$

$\Rightarrow 1.5m = -26.25 \Rightarrow m = \frac{-26.25}{1.5} \quad \therefore m = -17.5$ **Ans. D**

61. $(x+2)^2 = 9 \Rightarrow x + 2 = \pm 3 \Rightarrow x = 1$ or -5

and $(y+3)^2 = 25 \Rightarrow y + 3 = \pm 5 \Rightarrow y = 2$ or $-8 \quad \therefore$ maximum value of $\frac{x}{y} = \frac{-5}{-8} = \frac{5}{8}$. **Ans. C**

62. Let the capacity of the tank be x litres.

Then, $\frac{6x}{7} - \frac{2x}{7} = 16 \Leftrightarrow 30x - 14x = 16 \times 35 \Leftrightarrow x = 35$ **Ans. C**

63. $x = y \Rightarrow 1 - q = 2q + 1$

$\Rightarrow 3q = 0 \Rightarrow q = 0.$ **Ans. A**

64. $2ab = (a^2 + b^2) - (a-b)^2 = 29 - 9 = 20; \Rightarrow ab = 10.$ **Ans. A**

65. Let the total number of shots be x. Then, Shots fired by A = $\frac{5}{8}x$

Shots fired by B = $\frac{3}{8}x$. and Killing shots by A = $\frac{1}{3}$ of $\frac{5}{8}x = \frac{5}{24}x$

Shots missed by B = $\frac{1}{3}$ of $x = \frac{5}{24}x \quad \therefore$ Birds killed by A = $\frac{5x}{24} = (\frac{5}{24} \times 144) = 30.$ **Ans. A**

66. Let total number of children be *x*.

Then, $x \times \frac{1}{8}x = \frac{x}{2} \times 16 \Leftrightarrow x = 64$

Number of notebooks = $\frac{1}{8}x^2 = (\frac{1}{8} \times 64 \times 64) = 512.$ **Ans. C**

67. $2+\frac{6}{x}=5 \Rightarrow \frac{2x+6}{x}=5 \Rightarrow 2x+6=5x \Rightarrow 3x=6 \therefore x=2 \therefore 2x+8=2.2+8=12$ **Ans. B**

68. Here, $x=2y=3z$ So, $x=3z$

and $2y=3z \Rightarrow y=\frac{3z}{2}$; $\because xyz=36 \Rightarrow 3z.\frac{3z}{2}.z=36 \Rightarrow 9z^3=72 \Rightarrow z^3=8 \Rightarrow z=2$ **Ans. A**

69. Here, $3y=2 \Rightarrow y=\frac{2}{3}$

and $2x=y=\frac{2}{3} \Rightarrow \frac{1}{3}$; So, $9xy=9\times\frac{1}{3}\times\frac{2}{3}=2$; **Ans. C**

70. $5x-3=2x+9 \Rightarrow 3x=12 \Rightarrow x=4$

$1+\frac{1}{x}=2-\frac{2}{x} \Rightarrow \frac{1}{x}+\frac{2}{x}=2-1 \Rightarrow \frac{1+2}{x}=1 \Rightarrow \frac{3}{x}=1 \Rightarrow I=3;$ **Ans. E**

71. Here, $x+\frac{1}{x}=2-\frac{2}{x}$ Or, $\frac{3}{x}=1 \therefore x=2$ **Ans. E**

72. দেওয়া আছে, $P=\frac{5}{16}$

$\therefore (p-1)^3=\left(\frac{5}{16}-1\right)^3=\left(\frac{5-16}{16}\right)^3 \Rightarrow \left(-\frac{11}{16}\right)^3=\left(-\frac{121}{256}\right)$ **Ans. E**

বিগত বছরের প্রশ্ন ও সমাধান — ২০১৯ সালের প্রশ্নপত্রের সমাধান

1. Rahim and Karim donated tk. 100 each in charity. Karim gives each tk. 1 more than Rahim and Rahim distributes money to 5 more people than Karim. How may people are there in this charity?

[Sonali Bank Ltd. (Officer-FF, 08-02-2019)]

(A) 45 (B) 72 (C) 90 (D) 60 **Ans. A**

Solution:

Let, Karim gives 100 tk to x people

Rahim gives 100 tk to (x + 5) people

According to the Question, $\frac{100}{x}-\frac{100}{x+5}=1 \Rightarrow \frac{100(x+5)-100x}{x(x+5)}=1 \Rightarrow 100x+500-100x=x^2+5x$

$\Rightarrow x^2+5x-500=0 \Rightarrow x^2+25x-20x-500=0 \Rightarrow x(x+25)-20(x+25)=0 \Rightarrow (x+25)(x-20)=0$

So, $x+25=0$ $\therefore x=-25$ [Which is not acceptable] | or, $x-20=0$ $\therefore x=20$

Karim gives 20 people; Rahim gives = 20 + 5 = 25 people $\therefore$ Total = 20 + 25 = 45 people.

2. The sum of squares of two numbers is 80 and the square of difference between the two numbers is 36. Find the product of two numbers.

[Sonali Bank Ltd. (Officer-FF, 08-02-2019)]

(A) 11 (B) 22 (C) 33 (D) 26 **Ans. B**

Solution:

$x^2 + y^2 = 80$

and $(x - y)^2 = 36 \Rightarrow x^2 + y^2 - 2xy = 36 \Rightarrow 80 - 2xy = 36 \Rightarrow -2xy = 36 - 80 = -44 \Rightarrow xy = \frac{44}{2} = 22$

3. Three number are added in pairs, the sums so obtained are 20, 27 and 23. What are those three numbers?

[Sonali Bank Ltd. (Officer (cash), 22-02-2019)]

(A) 6, 4 and 15 (B) 9, 11 and 14 (C) 8, 12 and 15 (D) 10, 8 and 17 **Ans. C**

Solution:

Let the number be x, y, z

ATQ, $(x + y) + (y + z) + (z + x) = 20 + 27 + 23 = 70$

$\Rightarrow x + y + z = 35$

option (C) $8 + 12 + 15 = 35$ option (D) $10 + 8 + 7 = 35$

Here, $8 + 12 = 20$ (ok) but, $10 + 8 = 18 \neq 20$ $\therefore$ It's not correct

4. If radius of a circle is increased by 30% then its area is increased by?

[Sonali Bank Ltd. (Officer (cash), 22-02-2019)]

(A) 40% (B) 70% (C) 50% (D) 69% **Ans. D**

Solution:

$30 + 30 + \frac{30 \times 30}{100} = 30 + 30 + 9 = 69\%$

5. 0.213 ÷ 0.00213 = ?

[Pubali Bank Ltd. TAJO (Cash),- 25-01-2019]

(A) 1 (B) 10 (C) 100 (D) none of these **Ans. C**

Solution:

$0.213 \div 0.00213 = \frac{0.213 \times 100000}{.00213 \times 1000} = 100$

6. Half of 1 percent written as a decimal is

[Pubali Bank Ltd. TAJO (Cash),- 25-01-2019]

(A) 0.05 (B) 0.005 (C) 0.02 (D) 0.2 **Ans. B**

Solution:

1% of $\frac{1}{2} = \frac{1}{100} \times \frac{1}{2} = \frac{1}{200} = 0.005$

7. (x – 968) ÷ 79 × 4 = 512

[Pubali Bank Ltd. TAJO (Cash),- 25-01-2019]

(A) 10185 (B) 10190 (C) 11080 (D) 11075 **Ans. C**

Solution:

মনে করি, $(x-968) \div 79 \times 4 = 512 \Rightarrow \frac{x-968}{79} \times 4 = 512 \Rightarrow x - 968 = \frac{512 \times 79}{4} = 10, 112$

$\Rightarrow x = 10{,}112 + 968 \quad \therefore x = 11{,}080$

8. 19.99 × 9.9 + 99.9 = ?

[Pubali Bank Ltd. TAJO (Cash),- 25-01-2019]

(A) 129.79 (B) 296.910 (C) 1009 (D) 297.801 **Ans. D**

Solution:

$19.99 \times 9.9 + 99.9 = 197.901 + 99.9 = 297.801$

9. If you subtract – 1 from + 1. What will be the result? [Pubali Bank Ltd. TAJO (Cash),- 25-01-2019]

(A) –2 (B) 0 (C) 2 (D) 1 **Ans. C**

Solution:

$+ 1 - (-1) = 1 + 1 = 2$

10. $6 \times 3\,(3 - 1)$ is equal to = ? [Pubali Bank Ltd. TAJO (Cash),- 25-01-2019]

(A) 19 (B) 20 (C) 53 (D) 36 **Ans. D**

Solution:

Here, $6 \times 3(3-1) = 6 \times 3 \times 2 = 36$

11. If $P = 5 + \sqrt{2}$ then the value of P^2 is [Islami Bank Ltd. PO- 04.03.2019]

(A) $25 + 10\sqrt{2}$ (B) $20 + 5\sqrt{2}$ (C) $27 + 10\sqrt{2}$ (D) 27 **Ans. C**

Solution:

Here, $P = 5 + \sqrt{2}$

$\Rightarrow (P)^2 = (5 + \sqrt{2})^2 \quad \Rightarrow P^2 = 5^2 + 2 \times 5 \times \sqrt{2} + (\sqrt{2})^2 \quad [(a+b)^2 = a^2 + 2ab + b^2]$

$\Rightarrow P^2 = 25 + 10\sqrt{2} + 2 \Rightarrow P^2 = 27 + 10\sqrt{2} \quad \therefore P^2 = 27 + 10\sqrt{2}$

12. If $x^2 - 3x + 1 = 0$, what is the value of $x^2 - \frac{1}{x^2}$? [Islami Bank Ltd. PO- 04.03.2019]

(A) $4\sqrt{3}$ (B) $3\sqrt{5}$ (C) $4\sqrt{5}$ (D) $2\sqrt{3}$ **Ans. B**

Intelligent Solution:

$$x^2 - 3x + 1 = 0 \Rightarrow x\left(x - 3 + \frac{1}{x}\right) = 0 \Rightarrow x + \frac{1}{x} = 3$$

$$x^2 - \frac{1}{x^2} = \left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right) = 3 \times \sqrt{\left(x + \frac{1}{x}\right)^2 - 4 \times x \times \frac{1}{x}} = 3 \times \sqrt{3^2 - 4} = 3\sqrt{5}$$

13. A is greater than b by 2 and b is greater than c by 10. If $a + b + c = 130$, then $(b + c) - a$ = ?

[Pubali Bank Ltd. JO- 01.03.2019]

(A) 42 (B) 38 (C) 34 (D) 44 **Ans. C**

Solution:

Let, $c = x \quad \therefore b = x + 10$ and $a = x + 12$

Now, $a + b + c = 130 \Rightarrow x + 12 + x + 10 + x = 130 \Rightarrow 3x = 130 - 22 = 108$

$\therefore x = \frac{108}{3} = 36$ i.e, $c = 36 \quad \therefore b = 46$ and $a = 48 \quad \therefore (b + c) - a = (46 + 36) - 48 = 34$

14. The face value of 8 in the number 458926 is- [Pubali Bank Ltd. JO- 01.03.2019]

(A) 8,000 (B) 1,000 (C) 8 (D) 8,926 **Ans. C**

Solution:

45 [8] 926 Here, 8 is the face value of 8. So, place value of 8 is 8000.

15. $(0.04)^2 \div (0.008) \times (0.2)^6 = (0.2)^?$ [Pubali Bank Ltd. JO- 01.03.2019]

(A) 5 (B) 6 (C) 8 (D) none **Ans. D**

Solution:

$(0.04)^2 \div (0.008) \times (0.2)^6 = (0.2)^x$

$\Rightarrow \frac{0.0016}{0.008} \times (0.2)^6 = (0.2)^x \quad \Rightarrow (0.2)^1 \times (0.2)^6 = (0.2)^x \Rightarrow (.2)^{1+6} = (0.2)^x \quad \therefore x = 7$

16. $\frac{\mathbf{0.75 \times 4.4 \times 2.4}}{\mathbf{0.6}}$ **= ?** [Pubali Bank Ltd. JO- 01.03.2019]

(A) 4.752 (B) 12 (C) 16.944 (D) 13.2 **Ans. D**

Solution:

$\frac{0.75 \times 4.4 \times 2.4}{0.6} = 2.5 \times 2.2 \times 2.4 = 13.2$

17. 48.95 – 32.006 = ? [Pubali Bank Ltd. JO- 01.03.2019]

(A) 16.089 (B) 16.35 (C) 16.944 (D) 16.89 **Ans. C**

18. $\mathbf{9^3 \times (81)^2 \div (27)^3 = (3)^?}$ [Pubali Bank Ltd. TAJO(Cash) 15.02.2019]

(A) 5 (B) 4 (C) 3 (D) 6 **Ans. A**

Solution:

$9^3 \times 81^2 \div 27^3 = (3)^x$

$\Rightarrow (3^2)^3 \times (3^4)^2 \div (3^3)^3 = 3^x \Rightarrow 3^6 \times 3^8 \times \div 3^9 = 3^x \Rightarrow 3^{6+8-9} = 3^x \Rightarrow 3^5 = 3^x \quad \therefore x = 5$

19. 0.213 ÷ 0.00213 = ? [Pubali Bank Ltd. TAJO(Cash) 15.02.2019]

(A) 1 (B) 100 (C) 10 (D) None of these **Ans. B**

Solution:

$\frac{0.213}{0.00213} = \frac{213 \times 100000}{213 \times 1000} = 100$

20. 19.99 × 9.9 + 99.9 = ? [Pubali Bank Ltd. TAJO(Cash) 15.02.2019]

(A) 129.79 (B) 296.910 (C) 1009 (D) 297.801 **Ans. D**

Solution:

$19.99 \times 9.9 + 99.9 = 197.901 + 99.9 = 297.801$

21. If you subtract-1 from + 1, What will be the result? [Pubali Bank Ltd. TAJO(Cash) 15.02.2019]

(A) –2 (B) 0 (C) 2 (D) 1 **Ans. C**

Solution:

$+1 - (-1) = 1 + 1 = 2$

22. 6 × 3 (3 – 1) is equal to =? [Pubali Bank Ltd. TAJO(Cash) 15.02.2019]

(A) 19 (B) 20 (C) 53 (D) 36 **Ans. D**

Solution:

$6 \times 3 (3-1) = 6 \times 3 \times 2 = 36$

বিগত বছরের প্রশ্ন ও সমাধান | ২০১৮ সালের প্রশ্নপত্রের সমাধান

23. A number is as much greater than 36 as is less than 86. Find the number: BSC {Officer (General)- 2018}

(A) 68 (B) 43 (C) 61 (D) 73

Hints:

Let, the number be x.

$\therefore x - 36 = 86 - x \Rightarrow 2x = 122 \quad \therefore x = 61$

24. If $a + 1/a = 2$ what is $a^3 + 1/a^3$? BSC, 5 Govt. Banks & FI([Officer-18)

(A) ½ (B) 7 (C) 2 (D) 3/2

Hints:

$$a^3 + \frac{1}{a^3} = \left(a + \frac{1}{a}\right)^3 - 3.(A)\frac{1}{a}\left(a + \frac{1}{a}\right) = 2^3 - 3.2 = 8 - 6 = 2$$

25. If 10% of x is equal to 25% of y, and y = 16, what is the value of x? BSC, 5 Govt. Banks & FI([Officer-18)

(A) 4 (B) 6.4 (C) 24 (D) 40

Hints:

$$10\% \text{ of } x = 25\% \text{ of } y \Rightarrow \frac{10}{100} \times = \frac{25}{100} y \Rightarrow 10x = 25y \Rightarrow x = \frac{25}{10} \times 16 \quad \therefore x = 40$$

26. If $3x - 7y = 0$ and $x + 2y = 13$ then y is- BSC, 5 Govt. Banks & FI([Officer-18)

(A) 2 (B) 3 (C) 4 (D) 7

Hints:

$3x - 7y = 0$ .....(i) & $x + 2y = 13$ ..... (ii)

performing (ii) × 3 – (i) $\therefore y = 3$

27. $(3\sqrt{3})^3$ =? BSC, 8 Govt. Banks & FI (SO-18)

A. $27\sqrt{3}$ B. $81\sqrt{3}$ C. 81 D. $9\sqrt{3}$

Hints:

$$(3\sqrt{3})^3 = 3\sqrt{3} \times 3\sqrt{3} \times 3\sqrt{3} = 27 \times (\sqrt{3})^2 \times \sqrt{3} = 81\sqrt{3}$$

28. $x^2 + y^2 = 14$ and $xy = 3$ then $(x-y)^2$ =? BSC, 8 Govt. Banks & FI (SO-18)

A. 8 B. 11 C. 14 D. 17

Hints:

$x^2 + y^2 = ১৪ \Rightarrow (x + y)^2 - 2xy = ১৪ \Rightarrow (x + y)^2 - ২ \times ৩ = ১৪ \quad \therefore (x - y)^2 = ২০$

$\therefore (x - y)^2 = (x + y)^2 - 8xy = ২০ - 8 \times = ২০ - ১২ = ৮$

29. $\left(x-\frac{1}{x}\right) = 5$ হলে $\left(x+\frac{1}{x}\right)^2$ এর মান কত? BSC, 8 Govt. Banks & FI (SO-18)

A. 29 B. 27 C. 25 D. 32

Hints:

$$\left(x+\frac{1}{x}\right)^2 = \left(x-\frac{1}{x}\right)^2 + 4.x.\frac{1}{x} = 5^2 + 4 = 29$$

30. $(0.2)^2 \div (0.1)^3 = ?$ BSC, 8 Govt. Banks & FI (SO-18)

ক. 30 খ. 40 গ. 44 ঘ. 82

Hints:

$$(0.2)^2 \div (0.1)^3 = \frac{0.2\times0.2\times10\times10\times10}{0.1\times0.1\times10\times10} = 40$$

31. The value of k, if (x – 1) is a factor of $4x^3 + 3x^2 – 4x + k$, is- Sonali Bank Ltd. (SO-2018)

(A) 1 (B) 2 (C) –3 (D) 3

Hints:

Though (x – 1) is a factor. So for x = 1 $4x^3 + 3x^2 – 4x + k=0$

$\therefore 4(1)^3 + 3(1)^2 – 4(1) + k = 0 \Rightarrow 4 + 3 – 4 + k = 0$

$\therefore k = – 3.$

32. If a + 2b = 6 and ab = 4 what is 2/a + 1/b? Sonali Bank Ltd. & Janata Bank Ltd. (SO, IT/ICT-18)

(A) ½ (B) 1 (C) 3/2 (D) 2

Hints:

$$\frac{2}{a}+\frac{1}{b}=\frac{2b+a}{ab}=\frac{6}{4}=\frac{3}{2}$$

33. If x + 1/x =3, then x – 1/x = ? Sonali Bank Ltd. (SO-2018)

(A) $\sqrt{5}$ (B) $\sqrt{13}$ (C) $\sqrt{7}$ (D) 0

Hints:

Here, $\left(x-\frac{1}{x}\right)^2 = \left(x+\frac{1}{x}\right)^2 - 4x.\frac{1}{x} \Rightarrow \left(x-\frac{1}{x}\right)^2 = 3^2 - 4 \Rightarrow \left(x-\frac{1}{x}\right)^2 = 9 - 4 \quad \therefore x-\frac{1}{x} = \sqrt{5}$

34. The factors of $x^2 – 5x – 6$ are: Sonali Bank Ltd. (SO-2018)

(A) (x – 6) (x + 1) (B) (x + 6) (x–1) (C) (x – 3) (x + 2) (D) (x – 3) (x – 2)

Hints:

$x^2 – 5x – 6 = x^2 – 6x + x – 6 = x(x – 6) + 1(x – 6) = (x – 6)(x + 1)$

35. Which of the following equals- $-(\sqrt{2}-\sqrt{8})(2\sqrt{2}+\sqrt{8})$? {Sonali Bank Ltd. [Officer (Cash)-2018]}

(A) $-8\sqrt{2}$ (B) –4 (C) $4\sqrt{2}$ (D) 8

Hints:

$-(\sqrt{2}-\sqrt{8})(2\sqrt{2}-\sqrt{8}) = -(2\times2+\sqrt{8} = -(2\times2+\sqrt{16}-2\sqrt{16}-\sqrt{64}) = -(4+4-8-8) = 8$

36. A person needs to pay Tk.500 to buy 100 pencils and Tk. X for any additional unit of pencil. If the Customer pays a total of Tk. 4,700 for 1200 pencils, what is the value of X? Sonali Bank Ltd {Officr [MCQ]18}

(A) 4.00 (B) 3.91 (C) 3.85 (D) 3.5

Hints:

Here, $500 + 1100 \times X = 4700 \Rightarrow X = \frac{4700 - 500}{1100} = \frac{4200}{1100} = 3.81 = 3.85$ (Approx)

37. Find the value of: $6(-3)\left(\frac{1}{3}\right)(-0.25)$ Sonali Bank Ltd. {Officer [MCQ]-2018}

(A) 6 (B) 4.5 (C) 1.5 (D) –0.5

Hints:

$6(-3)\left(\frac{1}{3}\right)(-0.25) = 18 \times \frac{1}{3} \times \frac{1}{4} = \frac{18}{12} = \frac{3}{2} = 1.5$

38. If Kabir loses 8 pounds, he will weigh twice as much as his sister. Together they now weigh 278 pounds. What is Kabir's present weight, in pounds? Sonali Bank Ltd. {Officer [MCQ]-2018}

(A) 147 (B) 188 (C) 135 (D) 139

Hints:

Let, Kabir's weight is x pound and her sister is (278 – x) pound.

ATQ, $(x - 8) = 2(278 - x) \Rightarrow x - 8 = 556 - 2x \Rightarrow 3x = 564 \Rightarrow x = \frac{564}{3}$

$\therefore x = 188 \quad \therefore x = 188 \therefore$ Kabir's weight is 188 pound

39. If $a + 2b = 6$ and $ab = 4$, what is $\frac{2}{a} + \frac{1}{b} = ?$ Sonali Bank Ltd. (Officer-18)

(A) 3/2 (B) 1 (C) ½ (D) 2

Hints:

$\frac{2}{a} + \frac{1}{b} = \frac{2b + a}{ab} = \frac{6}{4} = \frac{3}{2}$

40. Find the valuable of $x^6 + \frac{1}{x^6}$, if $x + \frac{1}{x} = 3$ Sonali Bank Ltd. {Officer [Written]-2018}

Hints:

Given that $x + \frac{1}{x} = 3$

Now, $x^3 + \frac{1}{x^3} = \left(x + \frac{1}{x}\right)^3 - 3.x.\frac{1}{x}\left(x + \frac{1}{x}\right) = (3)^3 - 3 \times 3 = 27 - 9 = 18$

Now, $\left(x^3 + \frac{1}{x^3}\right)\left(x^3 + \frac{1}{x^3}\right) = x^6 + 1 + 1 + \frac{1}{x^6} \Rightarrow 18 \times 18 = x^6 + \frac{1}{x^6} + 2$

$\Rightarrow x^6 + \frac{1}{x^6} = 324 - 2 \quad \therefore x^6 + \frac{1}{x^6} = 322$ (Ans.)

41. The value of k, if $(x - 1)$ is a factor of $4x^3 + 3x^2 - 4x + k$, is- Rupali Bank Ltd. {Officer (Cash) 2018}

(A) 1 (B) 2 (C) –3 (D) 3

Hints:

Though (x – 1) is a factor. So for x = 1 $4x^3 + 3x^2 - 4x + k = 0$

$\therefore 4(1)^3 + 3(1)^2 - 4(1) + k = 0 \Rightarrow 4 + 3 - 4 + k = 0$

$\therefore k = -3.$

42. Solve: $\frac{x}{2} + \frac{6}{y} = 9, \frac{x}{3} + \frac{2}{y} = 5$ Rupali Bank Ltd. {Officer (Cash) 2018 (Cancelled)}

Hints:

$\frac{x}{2} + \frac{6}{y} = 9$ ..... (i)

$\frac{x}{3} + \frac{2}{y} = 5$ ..... (ii)

Performing, (i) $\times \frac{1}{3}$ – (ii) $\times \frac{1}{2}$ we get, $\frac{2}{y} - \frac{1}{y} = 3 - \frac{5}{2} \Rightarrow \frac{2-1}{y} = \frac{6-5}{2} \Rightarrow \frac{1}{y} = \frac{1}{2} \therefore y = 2$

Putting this value in (i) $\Rightarrow \frac{x}{2} + \frac{6}{2} = 9 \Rightarrow \frac{x}{2} = 6 \therefore x = 12 \quad \therefore (x, y) = (12, 2)$ (Ans).

43. দুটি সংখ্যার যোগফল ৬০ এবং বিয়োগফল ১০ হলে, বড় সংখ্যাটি কত? BKB, Data Entry (CO-2018)

ক. ৩৫ খ. ৪০ গ. ৩০ ঘ. ৪৫

Hints:

বড় সংখ্যা = = $\frac{৬০ + ১০}{২} = ৩৫$

44. $x^2 - 5x + 6 = 0$ সমীকরণের মূলদ্বয় কোনটি? BKB, Data Entry (CO-2018)

ক. ২, ৩ খ. ৬, ৩ গ. ৬, ১ ঘ. ৩, – ২

Hints:

$x^2 - 5x + 6 = 0 \Rightarrow x^2 - 3x - 2x + 6 = 0 \Rightarrow x(x-3) - 2(x-3) = 0 \Rightarrow (x-3)(x-2) = 0$

এখন, $x - 3 = 0$ এবং $x - 2 = 0 \quad \therefore x = 3$ এবং $x = 2 \quad \therefore$ সমীকরণের মূলদ্বয় : 2, 3

45. একটি তেলপূর্ণ পাত্রের ওজন ৩২ কেজি এবং অর্ধেক তেল থাকাকালীন পাত্রের ওজন ২০ কেজি। পাত্রটির ওজন কত? BKB, Data Entry (CO-2018)

ক. ১০ কেজি খ. ৮ কেজি গ. ৭ কেজি ঘ. ১৬ কেজি

Hints:

ধরি, পাত্রের ওজন x কেজি এবং পূর্ণ পাত্রের তলের ওজন y কেজি।

$\therefore x + y = ৩২$

$x + \frac{y}{2} = 20$

(–) (–) (–) [(–) করে] $y - \frac{y}{2} = 12 \Rightarrow \frac{y}{2} = 12 \quad \therefore y = 24 \quad \therefore$ পাত্রের ওজন $x = 32 - 24 = 8$ কেজি

46. ১ × ০.১ × ০.০১ এর গুণফল কত? BKB, Data Entry (CO-2018)

ক. ০.১ খ. ০.০১ গ. ০.০০১ ঘ. ০.০০০১

Hints:

$১ \times ০.১ \times ০.০১ = ১ \times \frac{১}{১০} \times \frac{১}{১০০} = \frac{১}{১০০০} = ০.০০১$

47. a + b = 7, $a^2 + b^2 = 25$ হলে ab এর মান ক? BKB, Data Entry (CO-2018)

ক. ১৭ খ. ১৫ গ. ১২ ঘ. ৮

Hints:

$a + b = 7 \Rightarrow (a + b)^2 = (7)^2 \Rightarrow a^2 b^2 + 2ab = 49 \Rightarrow 2ab = 49 - 25$ [$\because a^2 + b^2 = 25$]

$\Rightarrow ab = \frac{24}{2} \therefore ab = 12$

48. Three angles of a triangle are in proportion 5 : 6 : 7. Then what is the difference in degrees between the biggest and the smallest angles? Probashi Kallyan Bank (Senior Executive Officer 2018)

(A) 10° (B) 20° (C) 25° (D) 30°

Hints: আমরা জানি, ত্রিভুজের তিনকোণের সমষ্টি = 180°

$\therefore$ সবচেয়ে ছোট কোণ = $180° \times \frac{5}{18} = 50°$

" বড় " = $180° \times \frac{7}{18} = 70°$

$\therefore$ পার্থক্য = $70° - 50° = 20°$

49. Square of a number plus two times the number equal 63. What is the number? PKB, SEO,(Cash-2018)

(A) 7 (B) 9 (C) –9 (D) 8

[Note: 7 এবং – 9 দুটি উত্তরই সঠিক ।]

Hints:

ধরি, সংখ্যাটি = x

প্রশ্নমতে, $x^2 + 2x = 63 \Rightarrow x^2 + 2x - 63 = 0 \Rightarrow x^2 + 9x - 7x - 63 = 0 \Rightarrow x(x + 9) - 7(x + 9) = 0$

$\Rightarrow x = -9$ অথবা $x = 7$

50. If the perimeter of a certain rectangle is 76 m and its area is 360 m^2, then what is the length of its shortest side? PKB, SEO,(Cash-2018)

(A) 18 (B) 15 (C) 13 (D) 10

Hints:

Let, length and width is x and y

ATQ, $2(x + y) = 76 \Rightarrow x + y = \frac{76}{2} \Rightarrow x + y = 38$ ..... (i) And $xy = 360$ ..... (ii)

Now, $(x - y)^2 = (x + y)^2 - 4xy = (38)^2 - 4 \times 4xy = 1444 - 1440 = 4$

$\therefore x - y = 2$ .... (iii)

Performing (i) – (iii), $2y = 36 \therefore y = 18 \therefore$ Length of the shortest side is 18 meter(Ans)

51. If $x = 1 + \sqrt{2}$ and $y = 1 - \sqrt{2}$, find the value of $(x^2 + y^2)$. PKB, SEO,(Cash-2018)

(A) 12 (B) 10 (C) 8 (D) 6

Hints:

$x = 1+\sqrt{2}$, $y = 1-\sqrt{2}$; $x + y = 1+\sqrt{2} + 1-\sqrt{2} = 2$; $xy = (1+\sqrt{2})(1-\sqrt{2}) = 1^2 - (\sqrt{2})^2 = -1$

$\therefore x^2 + y^2 = (x+y)^2 - 2.xy = 2^2 - 2(-1) = 4 + 2 = 6$

52. Four liters of milk are to be poured into a 2 liter bottle and a 4 liter bottle. If each bottle is to be filled to the same fraction of its capacity, how many liters of milk should be poured into the 4 liter bottle? PKB, SEO,(Cash-2018)

(A) 7/3 (B) 2/3 (C) 8/3 (D) 4/3

Hints:

মনে করি, 4 লিটারের বোতলে ভরা হয় = x লিটার

$\therefore$ 2 " " " " $= 4 - x$ "

প্রশ্নমতে, $\frac{x}{4} = \frac{4-x}{2}$ [যেহেতু ভগ্নাংশ সমান] $\Rightarrow 2x = 16 - 4x \Rightarrow 6x = 16 \Rightarrow x = \frac{16}{6} = \frac{8}{3}$ লিটার

53. যদি ap = b, bq = c এবং cr = a হয়, তাহলে pqr কত? Jiban Bima Corporation (Junior Officer 2018)

(A) 0 (B) 1 (C) 2 (D) 3

Hints: ap = b, bq = c এবং cr = a

এখন, $ap = b \Rightarrow cr.p = b$ [a=cr] $\Rightarrow bqrp = b \Rightarrow pqr = \frac{b}{b}$ $\therefore pqr = 1$

54. $28\sqrt{x} + 1426$ = three-fourths of 2984, find x. Jiban Bima Corporation (Junior Officer 2018)

(A) 659 (B) 694 (C) 841 (D) 859

Hints:

$28\sqrt{x} + 1426 = \frac{3}{4} \times 2984 \Rightarrow 28\sqrt{x} = 2238 - 1426 \Rightarrow \sqrt{x} = \frac{812}{28} \Rightarrow (\sqrt{x})^2 = (29)^2 \quad \therefore x = 841$

55. $a = \sqrt{3} + \sqrt{2}$ হলে $a^3 + \frac{1}{a^3} = ?$ Jiban Bima Corporation (Junior Officer 2018)

(A) $18\sqrt{3}$ (B) $5\sqrt{3}$ (C) $6\sqrt{3}$ (D) $12\sqrt{3}$

Hints:

$a = \sqrt{3} + \sqrt{2}$

এখন, $\frac{1}{a} = \frac{1}{\sqrt{3}+\sqrt{2}} = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{(3)+\sqrt{2}}\sqrt{(3)-\sqrt{2}}} = \frac{\sqrt{3}-\sqrt{2}}{(\sqrt{3^2})-(\sqrt{2^2})} = \frac{\sqrt{3}-\sqrt{2}}{3-2} \quad \therefore \frac{1}{a} = \sqrt{3} - \sqrt{2}$

$a + \frac{1}{a} = \sqrt{3} + \sqrt{2} + \sqrt{3} - \sqrt{2} = 2\sqrt{3} \quad \therefore a^3 + \frac{1}{a^3} = \left(a + \frac{1}{a}\right)^3 - 3.(A)\frac{1}{a}\left(a + \frac{1}{a}\right)$

$= (2\sqrt{3})^3 - 3 \times 2\sqrt{3} = 8 \times 3\sqrt{3} - 6\sqrt{3} = 24\sqrt{3} - 6\sqrt{3} = 18\sqrt{3}$

56. $\sqrt{x+3} = \sqrt{x} + \sqrt{3}$ হলে x = কত? Jiban Bima Corporation (Junior Officer 2018)

(A) 3 (B) –3 (C) 0 (D) $\sqrt{3}$

Hints:

$\sqrt{x+3} = \sqrt{x} + \sqrt{3} : (\sqrt{x+3})^2 = (\sqrt{x} + \sqrt{3})^2 \Rightarrow x + 3 = x + 2\sqrt{x}.\sqrt{3} + 3 \Rightarrow x + 3 = x + 3 + 2\sqrt{3x}$

$\Rightarrow 2\sqrt{3x} = 0 \Rightarrow \sqrt{3x} = 0 \quad \therefore x = 0$

57. $x - y = 2$ এবং $x + y = 60$ হলে $x^2 - y^2$ এর মান কত? ICB, (Cashier 2018)

(A) 130 (B) 30 (C) 120 (D) 60

Hints:

$x - y = 2$ এবং $x + y = 60$

$\therefore x^2 - y^2 = (x + y)(x - y) = 60 \times 2 = 120$

58. – 1 হতে কত বিয়োগ করলে বিয়োগফল 0 (শূণ্য) হবে? ICB, (Cashier 2018)

(A) 2 (B) –1 (C) 1 (D) 4

Hints:

ধরি, –1 থেকে x বিয়োগ করলে বিয়োগফল শূণ্য হবে।

$\therefore -1 - x = 0 \Rightarrow -1 = x \quad \therefore x = -1$

59. x + y = x – y হলে, y এর মান নিচের কোনটি? ICB, (Cashier 2018)

(A) –1 (B) 0 (C) 1 (D) 2

Hints: $x + y = x - y \Rightarrow y + y = x - x \Rightarrow 2y = 0 \therefore y = 0$

60. যদি x = – 3 এবং y = 2 হয়, xy^2 = কত? ICB, (Cashier- 2018)

(A) 36 (B) –36 (C) –12 (D) 12

Hints:

$x = -3$ এবং $y = 2$

$\therefore xy^2 = (-3) \times (2)^2 = -3 \times 4 = -12$

61. $x^2 - x - 12 = 0$ সমীকরণের মূলদ্বয় নিচের কোনটি? ICB, (Cashier 2018)

(A) 3, 4 (B) 3, – 4 (C) – 3, 4 (D) – 3, – 4

Hints:

$x^2 - x - 12 = 0 \Rightarrow x^2 - 4x + 3x - 12 = 0 \Rightarrow x(x - 4) + 3(x - 4) = 0 \Rightarrow (x - 4)(x + 3) = 0 \quad \therefore x = 4, -3$

62. x + y = 3, xy = 2 হলে, $x^3 + y^3$ এর মান কত? ICB, (Cashier 2018)

(A) 9 (B) 18 (C) 19 (D) 27

Hints:

$x^3 + y^3 = (x + y)^3 - 3xy(x + y) = 3^3 - 3.2.3 = 27 - 18 = 9$

63. $9x^2 - 16y$ এর উৎপাদকে বিশেস্নষণ নিচের কোনটি? ICB, (Cashier 2018)

(A) $(3x + 4y)(3x - 4y)$ (B) $(4y - 3x)(4y + 3x)$

(C) $(-4y - 3x)(4y - 3x)$ (D) $(3x + 4y)(-4y - 3x)$

[Note: প্রদত্ত রাশির y এর পরিবর্তে y^2 হলে উত্তর হবে $(3x + 4y)(3x - 4y)$]

Hints:

$9x^2 - 16y^2 = (3x)^2 - (4y)^2 = (3x + 4y)(3x - 4y)$

64. x + y = 6 ও 2x = 4 হলে, y মান কত? ICB, (Cashier 2018)

(A) 2 (B) 4 (C) 6 (D) 8

Hints:

এখানে, $2x = 4 \Rightarrow x = \frac{4}{2} \Rightarrow x = 2$ এখন, $x + y = 6 \Rightarrow 2 + y = 6 \quad \therefore y = 4$

65. The value of p for equation $2x^2 - 4x + p = 0$ to have real roots is- BSC (5 Govt. Banks & Financial Institutes) (O'18)

a. $p \le -2$ b. $p \ge 2$ c. $p \le 2$ d. $p \ge -2$

Hints:

এখানে, $2x^2 - 4x + p = 0$

আমরা জানি, বাস্তবমূলের ক্ষেত্রে, $b^2 - 4ac \ge 0 \Rightarrow (-4)^2 - 4 \times p \ge 0 \Rightarrow 16 - 8p \le 0 \Rightarrow 8p \le 16 \therefore p \le 2$

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66. The difference between two numbers is 5 and the difference between their squares is 65. What is the larger number?

BB, AD (General-2018)

a) 13 b) 11 c) 8 d) 9

Hints :

ধরি, সংখ্যা দুটি যথাক্রমে x এবং y যেখানে, $x > y$.

$\therefore x - y = 5$ .....(i)

এবং $x^2 - y^2 = 65 \Rightarrow (x + y)(x - y) = 65 \Rightarrow x + y = \frac{65}{5}$

$\therefore x + y = 13$ ..... (ii)

(i) + (ii) $\Rightarrow 2x = 18 \therefore x = 9.$

67. If $\frac{y}{x} = \frac{3}{7}$ and x + 2y = 13 then y is –

BB, AD (General-2018)

a) 2 b) 3 c) 4 d) 7

Hints :

$\frac{y}{x} = \frac{3}{7} \Rightarrow \frac{x}{y} = \frac{7}{3} \Rightarrow x = \frac{7}{3}y$ ..... (i)

$\therefore x + 2y = 13 \Rightarrow \frac{7}{3}y + 2y = 13$ [(i) নং হতে] $\Rightarrow \frac{7y + 6y}{3} = 13 \Rightarrow 13y = 39 \Rightarrow y = \frac{39}{13} \therefore y = 3$

68. If * is defined for all positive real numbers a and b by a × b = ab /(a + b), then 10 × 2 = ?

BB, Officer (General- 2018)

a) 5/3 b) 5/2 c) 5 d) 20/3

Hints:

যেহেতু $a \times b = ab/a + b$

$\therefore 10 \times 2 = (10 \times 2) / (10 + 2) = \frac{20}{12} = \frac{5}{3}$

69. $(2\sqrt{27} - \sqrt{75} + \sqrt{12})$ is equal to:

BB, AD (General- 2016)

(A) $4\sqrt{3}$ (B) $\sqrt{3}$ (C) $2\sqrt{3}$ (D) $3\sqrt{3}$

Hints:

$2\sqrt{27} - \sqrt{75} + \sqrt{12} = 2\sqrt{3.9} - \sqrt{3.25} + \sqrt{3.4}$

$= 2\sqrt{3.3^2} - \sqrt{3.5^2} + \sqrt{3.2^2} = 2.3\sqrt{3} - 5\sqrt{3} + 2\sqrt{3} = 6\sqrt{3} - 5\sqrt{3} + 2\sqrt{3} = 3\sqrt{3}$

70. What mathematical operation should come at the place of '?' in the equation: 2? 6 – 12 ÷ 4 + 2 =11

BB, AD (General- 2016)

(A) ÷ (B) + (C) – (D) ×

Hints:

$\Rightarrow 2?\,6 - 12 \div 4 + 2 = 11 \Rightarrow 2\,?\,6 - 3 + 2 = 11$

Now, only multiplication can match both end $2 \times 6 - 3 + 2 = 11$

71. Two numbers are such that the ratio between them is 4:7. If each is increased by 4, the ratio becomes 3:5. The larger number is: BB, AD (General- 2016)

(A) 64 (B) 36 (C) 48 (D) 56

Hints: Let the numbers be 4x and 7x

Now, $\frac{4x+4}{7x+4} = \frac{3}{5} \Rightarrow 20x + 20 = 21x + 12 \Rightarrow x = 8 \;\therefore$ larger number $7 \times 8 = 56$

72. If A + B = 2C and C + D = 2A, then B B, AD (General- 2016)

(A) A + C = 2B (B) A + C = B + D (C) A + C = 2D (D) A + D = B + C

Hints: Given,

$$\begin{array}{r} A + B = 2C \\ C + D = 2A \\ \hline (+)\; A + B + C + D = 2C + 2A \end{array}$$

$\Rightarrow B + D = A + C \;\therefore\; A + C = B + D$

73. If 20 percent of 80 percent of a number is 12.8, then what is the number? BB, AD (FF, QUOTA-2015)

(A) 80 (B) 50 (C) 40 (D) 9

Hints: let, the number be x

$\therefore$ 20% of 80% of x= 12.8 $\Rightarrow x \times \frac{80}{100} \times \frac{20}{100} = 12.8 \Rightarrow 16x = 1280 \Rightarrow x = \frac{1280}{16} \;\therefore x = 80$

74. If you divide 30 by half and add 10 with the resulting figure, then what is the final result? BB, AD (FF, QUOTA-2015)

(A) 25 (B) 70 (C) 45 (D) 55

Hints: নির্ণেয় সংখ্যাটি $= \frac{30}{\frac{1}{2}} + 10 = 60 + 10 = 70$

75. $(0.003)^2$ = ? BB, AD (FF, QUOTA-2015)

(A) 0.009 (B) 0.0009 (C) 0.00009 (D) 0.000009

Hints: $(0.003)^2 = 0.000009$

76. Which of the following is the 250% of 1? BB, AD (FF, QUOTA-2015)

(A) 0.25 (B) 2.5 (C) 25 (D) 0.025

Hints: 1 এর 250% $= 1 \times \frac{250}{100} = 2.5$

77. If $f(x) = x^2 + \frac{1}{x-1} - 1$, then which of the following is correct? BB, AD (FF, QUOTA-2015)

(A) f(0) = a (B) f(1) = – 1 (C) f(1) = 0 (D) $f(-1) = -\frac{1}{2}$

Hints: $f(x) = x^2 + \frac{1}{x-1} - 1$

$\therefore f(-1) = (-1)^2 + \frac{1}{-1-1} - 1 = 1 + \frac{1}{-2} - 1 = -\frac{1}{2}$

78. A student loses 1 mark for every wrong answer and scores 2 marks for every correct answer. If he answers all the 60 questions in an exam and scores 39 marks, how many of them were correct?

BB, AD (FF,QUOTA-15)

a. 33 b. 31 c. 27 d. 37

Solution:

ধরি, সঠিক উত্তর দেওয়ার প্রশ্ন সংখ্যা x

$\therefore 2x - (60 - x) \times 1 = 39 \Rightarrow 2x - 60 + x = 39 \Rightarrow 3x = 99 \quad \therefore x = 33$