

ALGEBRA (SHEET-03)

बीजगणित

UPDATED

CLASS ROOM SHEET

FOR ALL EXAMS

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 Rankers Gurukul

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ALGEBRA / बीजगणित

(CLASSROOM SHEET-03)

CONCEPT OF SYMMETRY

- If $xy + yz + zx = 1$, then $\frac{1+y^2}{(x+y)(y+z)} = ?$
 (a) 0 (b) 1
 (c) 2 (d) 3
- If $x^2 + y^2 + z^2 = xy + yz + zx$ then the value of $\frac{3x^4 + 7y^4 + 5z^4}{5x^2y^2 + 7y^2z^2 + 3z^2x^2}$ is
 (a) 2 (b) 1
 (c) 0 (d) -1
- If $a^2 + b^2 + c^2 = ab + bc + ca$ then $\frac{a+c}{b}$ is
 (a) 0 (b) 2
 (c) 1 (d) -1
- If $\frac{4x-3}{x} + \frac{4y-3}{y} + \frac{4z-3}{z} = 0$ then $\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$ is
 (a) 9 (b) 3
 (c) 4 (d) 6
- If $\frac{2+a}{a} + \frac{2+b}{b} + \frac{2+c}{c} = 4$ then the value of $\frac{(ab+bc+ca)}{abc}$ is
 (a) 2 (b) 1
 (c) 0 (d) $\frac{1}{2}$
- If $\frac{x+a^2+2c^2}{b+c} + \frac{x+b^2+2a^2}{c+a} + \frac{x+c^2+2b^2}{a+b} = 0$, find x
 (a) $a^2 + b^2 + c^2$ (b) $-(a^2 + b^2 + c^2)$
 (c) $a^2 + 2b^2 + c^2$ (d) $-(a^2 + 2b^2 + c^2)$
- If $\frac{x-a^2}{b^2+c^2} + \frac{x-b^2}{c^2+a^2} + \frac{x-c^2}{b^2+a^2} = 3$, find the value of x .
 (a) $a^2 + b^2 - c^2$ (b) $a^2 + b^2 + c^2$
 (c) $a^2 - b^2 - c^2$ (d) $a^2 + b^2$
- If $bc + ca + ab = abc$ then $\frac{b+c}{bc(a-1)} + \frac{c+a}{ca(b-1)} + \frac{a+b}{ab(c-1)} = ?$
 (a) 0 (b) 1
 (c) 2 (d) 3
- If $a^2 = b + c$, $b^2 = c + a$, $c^2 = a + b$, then $\frac{1}{1+a} + \frac{1}{1+b} + \frac{1}{1+c}$
 (a) 0 (b) 1
 (c) 2 (d) 3
- If a, b, c are non zero, $a + \frac{1}{b} = 1$ & $b + \frac{1}{c} = 1$ then (i) abc is (ii) $c + \frac{1}{a}$ is
 (a) -1, 1 (b) 3, -1
 (c) -3, 1 (d) 1, 1
- If $a^x = (x + y + z)^y$, $a^y = (x + y + z)^z$ and $a^z = (x + y + z)^x$, then $x + y + z = ?$ ($a \neq 0$)
 (a) 0 (b) 1
 (c) a^3 (d) a
- If $a + b + c = 0$, then the value of $\frac{a^2 + b^2 + c^2}{a^2 - bc}$
 (a) 0 (b) 1
 (c) 2 (d) 3
- If $a + b + c = 0$ then the value of $\frac{a^2 - bc}{b^2 - ca}$ is :
 (a) 0 (b) 1
 (c) 2 (d) 3

14. If $a + b + c = 0$ then the value of $\frac{a^2 + b^2 + c^2}{ab + bc + ca}$ is

(a) 2 (b) -2
(c) 0 (d) 4

CONCEPT OF VALUE PUTTING

15. If $x + y = 1$, then what is the value of $x^3 + 3xy + y^3$?

SSC CGL MAINS (08/08/2022)

(a) 0 (b) 2
(c) 1 (d) -1

16. If $a + b = 6$ and $ab = 5$, then what is the value of $a^3 + b^3$?

SSC CGL MAINS (08/08/2022)

(a) 136 (b) 126
(c) 116 (d) 106

17. If $a^3 + b^3 = 217$ and $a + b = 7$, then the value of ab is:

SSC CPO 24/11/2020 (Shift- 02)

(a) -6 (b) -1
(c) 7 (d) 6

18. If $r + \frac{64}{r} = 16$, then the value of $r^4 + \frac{1}{r^3}$ is.

SSC CHSL 25/05/2022 (Shift- 03)

(a) $4096 \frac{1}{512}$ (b) 512
(c) $512 \frac{1}{4096}$ (d) 4096

19. If $a - \frac{12}{a} = 1$, $a > 0$, find $a^2 + \frac{16}{a^2}$?

(a) 15 (b) 19
(c) 17 (d) 11

20. If $(x+6y) = 8$, and $xy = 2$, where $x > 0$, what is the value of $(x^3 + 216 y^3)$?

SSC CGL 11/04/2022 (Shift- 01)

(a) 288 (b) 224
(c) 368 (d) 476

21. If $a^2 + b^2 = 65$ and $ab = 8$, $a > b > 0$, then find the value of $a^2 - b^2$.

SSC CGL 21/04/2022 (Shift- 02)

(a) 65 (b) 60
(c) 72 (d) 63

22. If $x^2 + 9y^2 = 40$ and $xy = 4$, where $x > 0$, $y > 0$, then what is the value of $(x^3 + 27y^3)$?

SSC PHASE IX 2022

(a) 224 (b) 416
(c) 440 (d) 800

23. If $xy = -6$ and $x^3 + y^3 = 19$ (x and y are integers), then what is the value of $\frac{1}{x^{-1}} + \frac{1}{y^{-1}}$?

SSC CGL MAINS (08/08/2022)

(a) -2 (b) 2
(c) -1 (d) 1

24. If $a + b + c = 0$, then

$$\left(\frac{a+b}{c} + \frac{b+c}{a} + \frac{c+a}{b} \right) \left(\frac{a}{b+c} + \frac{b}{c+a} + \frac{c}{a+b} \right) \text{ is :}$$

SSC CGL 06/06/2019 (Shift- 01)

(a) 8 (b) 9
(c) -3 (d) 0

25. If $x - y + z = 0$, then find the value of

$$\frac{y^2}{2xz} - \frac{x^2}{2yz} - \frac{z^2}{2xy}$$

SSC CGL 12/04/2022 (Shift- 03)

(a) $\frac{3}{2}$ (b) $\frac{1}{2}$
(c) -6 (d) $-\frac{3}{2}$

26. If $a + b + c = 0$, then what is the value of

$$\frac{(b+c)^2}{bc} + \frac{(c+a)^2}{ca} + \frac{(a+b)^2}{ab} ?$$

SSC CGL 18/08/2021 (Shift- 03)

(a) 1 (b) -3
(c) -1 (d) 3

27. If $a + b - c = 0$, then what is the value of

$$\frac{(b-c)^2}{4bc} \frac{(c-a)^2}{4ca} \frac{(a+b)^2}{4ab} ?$$

SSC CHSL 06/08/2021 (Shift- 01)

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

28. If $x + y + z = 0$, then what will be the value of $\left(\frac{x^2}{yz}\right) + \left(\frac{y^2}{zx}\right) + \left(\frac{z^2}{xy}\right)$?

SSC CHSL 24/05/2022 (Shift- 01)

- (a) $\frac{3(x^2 + y^2 + z^2)}{xyz}$ (b) $x^2 + y^2 + z^2$
(c) $\frac{x^2 y^2 z^2}{x}$ (d) 3

29. If $a + b + c = 0$, then

$$\left(\frac{a+b}{c} + \frac{b+c}{a} + \frac{c+a}{b}\right) \left(\frac{a}{b+c} + \frac{b}{c+a} + \frac{c}{a+b}\right) \text{ is :}$$

SSC CGL 06/06/2019 (Shift- 01)

- (a) 8 (b) 9
(c) -3 (d) 0

30. If $x = \frac{a}{b} + \frac{b}{a}$, $y = \frac{b}{c} + \frac{c}{b}$, $z = \frac{c}{a} + \frac{a}{c}$, then what is the value of $xyz - x^2 - y^2 - z^2$?

- (a) -4 (b) -2
(c) -1 (d) -6

31. If $a^3 b = abc = 180$, a, b, c are positive integers, then the value of c is :

- (a) 110 (b) 1
(c) 4 (d) 25

32. If $x = a + \frac{1}{a}$ and $y = a - \frac{1}{a}$ then

$$\sqrt{x^4 + y^4 - 2x^2 y^2} \text{ is equal to :}$$

SSC CGL 06/06/2019 (Shift- 01)

- (a) $16a^2$ (b) 8
(c) $\frac{8}{a^2}$ (d) 4

33. If $x = 2 - p$, then $x^3 + 6xp + p^3$ is equal to :

SSC CGL 07/06/2019 (Shift- 01)

- (a) 12 (b) 6
(c) 8 (d) 4

34. Find the product of

$$(a + b + 2c)((a^2 + b^2 + 4c^2 - ab - 2bc - 2ca).$$

SSC CGL 07/03/2020 (Shift- 03)

- (a) $a^3 + b^3 + 8c^3 - 6abc$
(b) $a^3 + b^3 + 6c^3 - 6abc$
(c) $a^3 + b^3 + 8c^3 - 2abc$
(d) $a^3 + b^3 + 8c^3 - abc$

35. If $a + b - c = 5$ and $ab - bc - ac = 10$, then find the value of $a^2 + b^2 + c^2$.

SSC CGL 18/04/2022 (Shift- 01)

- (a) 15
(b) 45
(c) 5
(d) 40

36. If $a + b + c = 11$ and $ab + bc + ca = 28$, then find the value of $a^3 + b^3 + c^3 - 3abc$.

SSC CGL 19/04/2022 (Shift- 03)

- (a) 407 (b) 1639
(c) 2255 (d) 1093

MISCELLANEOUS QUESTIONS

37. If $p = 11$, then the value of $p(p^2 + 3p + 3)$ is:

SSC CHSL 25/05/2022 (Shift- 03)

- (a) 1629 (b) 1225
(c) 1727 (d) 1111

38. If $p = 38$, then the value of $p(p^2 + 3p + 3)$ is _____.

SSC CHSL 06/06/2022 (Shift- 03)

- (a) 39313 (b) 59319
(c) 39318 (d) 59318

39. If $x = 9$, then the value of $x^5 - 10x^4 + 10x^3 - 10x^2 + 10x - 1$ is:

SSC CHSL 30/05/2022 (Shift- 02)

- (a) 10 (b) 8
(c) 9 (d) 1

40. If $a^4 + b^4 + a^2 b^2 = 273$ and $a^2 + b^2 - ab = 21$, then one of the values of $\left(\frac{1}{a} + \frac{1}{b}\right)$ is:

SSC CGL 24/08/2021 (Shift- 01)

- (a) $-\frac{9}{4}$ (b) $-\frac{3}{4}$
(c) $\frac{9}{8}$ (d) $\frac{3}{2}$

41. If $x^4 + y^4 + x^2 y^2 = 17\frac{1}{16}$ and $x^2 - xy + y^2 = 5\frac{1}{4}$, then one of the values of $(x - y)$ is:

SSC CGL MAINS 03/02/2022

- (a) $\frac{5}{2}$ (b) $\frac{3}{4}$
(c) $\frac{5}{4}$ (d) $\frac{3}{2}$

42. If $2^x = 3^y = 6^z$, then $\frac{1}{x} + \frac{1}{y} - \frac{1}{z}$ is equal to:

SSC Phase X 01/08/2022 (Shift- 03)

- (a) 1 (b) $\frac{3}{2}$
(c) 0 (d) $\frac{-1}{2}$

43. If $3^a = 27^b = 81^c$ and $abc = 144$, then the value of $12\left(\frac{1}{a} + \frac{1}{2b} + \frac{1}{5c}\right)$ is :

SSC CGL 06/03/2020 (Shift- 01)

- (a) $\frac{17}{120}$ (b) $\frac{18}{10}$
(c) $\frac{18}{120}$ (d) $\frac{33}{10}$

44. If $2^{x+y-2z} = 8^{8z-5-y}$; $5^{4y-6z} = 25^{y+z}$; $3^{4x-3z} = 9^{x+z}$ then the value of $2x + 3y + 5z$ is :

CHSL 13/10/2020 (Shift- 01)

- (a) 56 (b) 44
(c) 32 (d) 28

45. If $5^{\sqrt[3]{x}} + 12^{\sqrt[3]{x}} = 13^{\sqrt[3]{x}}$, then the value of x is :

SSC CHSL 05/07/2019 (Shift- 02)

- (a) 2 (b) 8
(c) 1 (d) 4

46. If $6^{\sqrt[4]{x}} + 8^{\sqrt[4]{x}} = 10^{\sqrt[4]{x}}$, then the value of x is :

SSC CHSL 08/07/2019 (Shift- 02)

- (a) 2 (b) 16
(c) 4 (d) 8

47. If $\sqrt{86 - 60\sqrt{2}} = a - b\sqrt{2}$, then what will be the value of $\sqrt{a^2 + b^2}$, correct to one decimal place?

CGL Tier-II 11/09/2019

- (a) 8.4 (b) 8.2
(c) 7.8 (d) 7.2

48. If $x = \sqrt{1 + \frac{\sqrt{3}}{2}} - \sqrt{1 - \frac{\sqrt{3}}{2}}$, then the value of $\frac{\sqrt{2-x}}{\sqrt{2+x}}$ will be closest to :

CGL Tier-II 11/09/2019

- (a) 0.17 (b) 0.12
(c) 1.4 (d) 1.2

49. $ab(a-b) + bc(b-c) + ca(c-a)$ is equal to :

CGL Tier-II 13 09/2019

- (a) $(a+b)(b-c)(c-a)$
(b) $(a-b)(b+c)(c-a)$
(c) $(a-b)(b-c)(c-a)$
(d) $(b-a)(b-c)(c-a)$

50. Let $x = \sqrt[6]{27} - \sqrt{6\frac{3}{4}}$ and $y = \frac{\sqrt{45} + \sqrt{605} + \sqrt{245}}{\sqrt{80} + \sqrt{125}}$, then the value of $x^2 + y^2$ is :

CGL Tier-II 13/09/2019

- (a) $\frac{223}{36}$ (b) $\frac{221}{36}$
(c) $\frac{221}{9}$ (d) $\frac{227}{9}$

51. If $x^4 + x^2y^2 + y^4 = 21$ and $x^2 + xy + y^2 = 7$, then the value of $\left(\frac{1}{x^2} + \frac{1}{y^2}\right)$ is :

SSC CGL 03/03/2020 (Shift- 02)

- (a) $\frac{5}{2}$ (b) $\frac{7}{4}$
(c) $\frac{5}{4}$ (d) $\frac{7}{3}$

52. If $x^4 + x^2y^2 + y^4 = 273$ and $x^2 - xy + y^2 = 13$, then the value of xy is :

SSC CGL 05/03/2020 (Shift- 02)

- (a) 4 (b) 8
(c) 10 (d) 6

53. If $16a^4 + 36a^2b^2 + 81b^4 = 91$ and $4a^2 + 9b^2 - 6ab = 13$, then what is the value of $3ab$?

SSC CGL 04/03/2020 (Shift- 01)

- (a) -3 (b) $\frac{3}{2}$
(c) 5 (d) $-\frac{3}{2}$

54. If $\frac{7(x^2+1)-17x}{7x} = 2$, then $\left(\frac{x+1}{\sqrt{x}}\right)^2 = ?$

- (a) 6.45 (b) 6.53
(c) 6.86 (d) 6.31

55. If $\frac{7(2\sqrt{2}-x)}{x} = 7 + \frac{14}{x^2}$ then

$$\sqrt{(23x^{64} + 42x^{12} + 163)}$$

(a) 12 (b) $12\sqrt{2}$

(c) $12\sqrt{3}$ (d) 24

56. If $8k^6 + 15k^3 - 2 = 0$, then the positive value of $\left(k + \frac{1}{k}\right)$ is:

SSC CGL 12/04/2022 (Shift- 03)

(a) $2\frac{1}{2}$ (b) $2\frac{1}{8}$

(c) $8\frac{1}{2}$ (d) $8\frac{1}{8}$

57. If $x = \sqrt{1 + \frac{\sqrt{3}}{2}} - \sqrt{1 - \frac{\sqrt{3}}{2}}$ then the value of $\frac{\sqrt{3}-x}{\sqrt{3}+x}$ (correct to one decimal place) is?

SSC CGL MAINS 29/01/2022

(a) 0.25 (b) 0.17

(c) 0.19 (d) 0.27

58. If $(ab + bc + ca) = 0$, then what is the value of $\left(\frac{1}{a^2 - bc} + \frac{1}{b^2 - ca} + \frac{1}{c^2 - ab}\right)$?

SSC CHSL 09/06/2022 (Shift- 01)

(a) 2 (b) 0

(c) 1 (d) $a + b + c$

59. If $px^3 + x^2 + 3x + q$ is exactly divisible by $(x + 2)$ and $(x - 2)$, then the values of p and q are:

SSC CHSL 08/06/2022 (Shift- 03)

(a) $p = -\frac{3}{4}$ and $q = 4$

(b) $p = \frac{3}{4}$ and $q = 4$

(c) $p = \frac{3}{4}$ and $q = -4$

(d) $p = -\frac{3}{4}$ and $q = -4$

60. What is the value of the following expression?

$$2^2 \left(\frac{x^a}{x^b}\right)^{(a+b)} \times 3^2 \left(\frac{x^b}{x^c}\right)^{(b+c)} \times 6^{-2} \left(\frac{x^c}{x^a}\right)^{(a+c)}$$

SSC CHSL 08/06/2022 (Shift- 02)

(a) 1 (b) 0

(c) 4 (d) 9

61. Simplify the following expression.

$$\frac{5(a^6 - b^6)^3 + 5(b^6 - c^6)^3 + 5(c^6 - a^6)^3}{2(a^3 - b^3)^3 + 2(b^3 - c^3)^3 + 2(c^3 - a^3)^3}$$

SSC CGL 24/08/2021 (Shift- 02)

(a) $\frac{5}{2} (a^3 + b^3)(b^3 + c^3)(c^3 + a^3)$

(b) $\frac{5}{2} (a^3 + b^3)(b^3 - c^3)(c^3 - a^3)$

(c) $\frac{5}{2} (a^3 - b^3)(b^3 + c^3)(c^3 + a^3)$

(d) $\frac{5}{2} (a^3 - b^3)(b^3 - c^3)(c^3 + a^3)$

62. If $x^3 + 4x = 8$, find $x^7 + 64x^2$?

(a) 32

(b) 64

(c) 128

(d) 256

63. If $x^2 - 5x + 25 = 0$ then $x^5 - 5x^4 - 3100$?

(a) 25

(b) $25\sqrt{2}$

(c) $25\sqrt{3}$

(d) None

64. If $(x + 5)(x + 6) + \frac{9}{x(x - 1)} = 0$, Find $3x^2 + 15x - 1$?

(a) 4

(b) 6

(c) 8

(d) 10

65. If $ax + by = 8$, $ay + bx = 6$, $a^2 + b^2 + x^2 + y^2 = 29$

Find $\frac{a^2 + b^2}{(x^2 + y^2)}$; $a^2 + b^2 > x^2 + y^2$?

(a) $\frac{25}{4}$

(b) $\frac{27}{4}$

(c) $\frac{23}{4}$

(d) $\frac{29}{4}$

66. If $3^a = 27^b = 81^c$ and $abc = 144$, then the value

of $12\left(\frac{1}{a} + \frac{1}{2b} + \frac{1}{5c}\right)$ is:

(a) $\frac{33}{10}$

(b) $\frac{18}{10}$

(c) $\frac{17}{120}$

(d) $\frac{18}{120}$

67. If $\frac{a^2 + b^2 + c^2 - 1024}{ab - bc - ca} = -2$ and $a + b = 5c$,

where $c > 0$, then the value of c is ____.

(a) 8

(b) 4

(c) 12

(d) 5

68. If $a^3 - b^3 = 602$ and $a - b = 2$, then find the value of $(a^2 + b^2)$.

IB ACIO GRADE II 17/01/2024 (Shift-01)

- (a) 156 (b) 240
(c) 202 (d) 260

69. If $x = 7 + 7^{\frac{2}{3}} + 7^{\frac{1}{3}}$, then which of the options below is correct.

IB ACIO GRADE II 17/01/2024 (Shift-02)

- (a) $x^3 + 21x^2 - 126x - 252 = 0$
(b) $x^3 + 21x^2 - 126x + 252 = 0$
(c) $x^3 - 21x^2 - 126x + 252 = 0$
(d) $x^3 - 21x^2 + 126x - 252 = 0$

70. Select the option that is true regarding the following labelled Assertion (A) and Reason (R).

Assertion (A): The value of

$$\frac{[(3.9)^3 + 9 \times 1.3 \times 4.29 + 11.7 \times (1.1)^2 + 1.331]}{[1.23 \times 1.23 + 0.77(0.77 + 0.6 \times 4.1)]}$$

is 31.25.

Reason (R): Using $(a + b)^3 = a^3 + b^3 + 3ab(a + b)$ and $(x + y)^2 = x^2 + y^2 + 2xy$

IB ACIO GRADE II 18/01/2024 (Shift-01)

- (a) A is true and R is false.
(b) Both A and R are true but R is not a correct explanation of A.
(c) Both A and R are true and R is a correct explanation of A.
(d) A is false and R is true.

ANSWER KEY

1.(b)	2.(b)	3.(b)	4.(c)	5.(d)	6.(b)	7.(b)	8.(b)	9.(b)	10.(a)
11.(d)	12.(c)	13.(b)	14.(b)	15.(c)	16.(b)	17.(d)	18.(a)	19.(c)	20.(b)
21.(d)	22.(a)	23.(d)	24.(b)	25.(a)	26.(d)	27.(a)	28.(d)	29.(b)	30.(a)
31.(b)	32.(d)	33.(c)	34.(a)	35.(c)	36.(a)	37.(c)	38.(d)	39.(b)	40.(b)
41.(a)	42.(c)	43.(d)	44.(b)	45.(b)	46.(b)	47.(c)	48.(a)	49.(d)	50.(a)
51.(c)	52.(a)	53.(d)	54.(a)	55.(a)	56.(a)	57.(d)	58.(b)	59.(d)	60.(a)
61.(a)	62.(c)	63.(a)	64.(c)	65.(a)	66.(a)	67.(a)	68.(c)	69.(d)	70.(c)