DELHI PUBLIC SCHOOL NEWTOWN

SESSION 2020-21

Mathematics Online Assessment Class IX

1. In an assembly a motion was carried by a majority of one third of the voters. Had however 10 of them who voted against the motion voted for it, the majority would have been half the total number of voters. How many voters were there?

2. Solve the following system of equations by the method of elimination.

$$\frac{1}{2(x+2y)} + \frac{5}{3(3x-2y)} = \frac{-3}{2}$$

$$\frac{5}{4(x+2y)} - \frac{3}{5(3x-2y)} = \frac{61}{60}$$

3. Solve the following system of equations by the method of cross-multiplication.

2x + y = 35 and 3x + 4y = 65

4. A father's age is equal to the sum of the ages of his five children. In 15 years his age will be only one- half of the sum of their ages. How old is the father?

5. Solve: $\frac{2}{x} + \frac{2}{3y} = \frac{1}{6}$

$$\frac{3}{x} - \frac{2}{y} = 0$$

and hence find the value of 'a' if y = ax – 4

6. A man when asked how many hens and buffaloes he has, told that his animals have 222 legs and 134 eyes. How many hens and buffaloes does he have?

7. Rishi borrowed a sum of money and agrees to pay off by paying Rs 1100 at the end of first year and Rs 1331 at the end of second year. If the rate of compound interest is 10% per annum. Find the sum.

8. Solve the equation for x: $7^{x+1} + 7^{1-x} = 50$

9. Prapti invests Rs 6000 for two years at a certain rate of interest compounded annually. At the end of the first year it amounts to Rs 6,720. Calculate
i) the rate of interest.
ii) the amount at the end of the second year.

10. If $a^x = b^y = c^z$ and $b^2 = ac$, prove that $y = \frac{2xz}{x+z}$

11. Find the compound interest to the nearest rupee on ₹10,000 for 2years 4 months at 12% per annum.

12. If $\left(\frac{x^{-1}y^2}{x^3y^{-2}}\right)^{1/3} \div \left(\frac{x^6y^{-3}}{x^{-2}y^3}\right)^{1/2} = x^a y^b$, Prove that a + b = -1

13. ₹ 8000 become ₹ 9261 in 3 years. The rate of interest here if the interest is compounded annually is.

A) 5% B) 6% C) 4% D) none of these

14. On what sum of money does the difference between the simple interest and the compound interest in 2 years at 10% p.a. is ₹ 135?

A) ₹15000 B) ₹13500 C) ₹13135 D) none of these

15. If $3^x = 5^y = 75^z$, then the relation between x, y, z is

B) y=2xz(x-z) B) y=2xy/(y-z) C) y=2zx(x-y) D) none of these

16. How much will ₹ 50000 amount to in 2 years at compound interest, if the rate of interests for successive years be 4% and 5% per year?

A) ₹ 50800 B) ₹ 55125 C) ₹ 54600 D) none of these

17.The simplified answer for the given expression will be

$$\left\{\left(x^{a-a^{-1}}\right)^{\frac{1}{a-1}}\right\}^{\frac{a}{a+1}}$$

A) 1 B) x C) 0 D) none of these

18. Solve the pair of simultaneous equations by the method of elimination;

15x – 14y = 117 and 14x - 15y = 115.

19. Solve the given simultaneous equations by the method of substitution and find the values of x and y,

4xy + 6= 15y, 6xy – 8 = 14y

20. Solve the given simultaneous equations by the method of cross-multiplication and find the values of x and y,

3x -7y + 10 = 0, y - 2x = 3

21. Solve the given simultaneous equations and find the values of x and y,

$\frac{4}{x+1}$ **+ 5y = 7 and** $\frac{3}{x+1}$ **+ 4y = 5**

22. The sum of two positive numbers x and y (x > y) is 50 and the difference of their squares is 720. Find the numbers.

23. The cost of 5 kg sugar and 7 kg rice is ₹153, and the cost of 7 kg sugar and 5 kg rice is ₹ 147. Find the cost of 8 kg sugar and 10 kg rice.

24.Solve by the method of cross multiplication:

3x – 7y + 10 = 0
y - 2x = 3

25.Solve the simultaneous equations:

px + qy = p – q
qx – py = p + q

26.Four years ago, Angel was three times old as her daughter. Six years from now, she will be
twice as old as her daughter. Find their present ages.

27. If $x = \frac{1}{x-3}$ **find the value of** $x^2 + \frac{1}{x^2}$ **.**

a) 7 b) ± 7 **c)** $\sqrt{11}$ **d)** ± 11 **e)** 11

28. The value of $249^2 - 248^2$ **is –**
a) 1 b)467 c)497 d) 487 e) 477

29. 3If $a^2 + b^2 + c^2 = 125$ **and** $ab + bc + ca = 50$ **find** $a + b + c$**.**

a) 15 b) 5 c) ± 5 d) ± 15 e) ± 10

30. If $x = 5 - 2\sqrt{6}$, the value of $\sqrt{x} - \frac{1}{\sqrt{x}}$ is –

a) $2\sqrt{3}$ b) $3\sqrt{2}$ c) 8 d) $12\sqrt{3}$ e) $2\sqrt{6}$

31. If $a - b = 7$ and $a^2 + b^2 = 85$ then the value of $a^3 - b^3$ is –

a) 712 b) 721 c) 521 d) 729 e) 216

32. Factorise: $3x^2 - 5xy - 12y^2$.

a)(x-4y)(3x+2y) b) 3(x+y)(x-4y)c) (3x-3y)(x+4y) d) (x+3y)(3x-4y)e) (x-3y)(3x+4y)

33. Which is the factor of $27(x + y)^3 - 8(x - y)^3$?

a) $19x^2 + 7y^2 + 2xy$ b) $19x^2 + 7y^2 - 10xy$ c) $x + 5y$ d) $x - 5y$ e) 5x + y

34. One of the factor of $x^6 - 26x^3 - 27$ is -

a) x + 1 b) x – 1 c) x + 3 d) x – 3 e) 3x + 1

35. $97^3 - 14^3$ is divisible by-

a) 87 b) 111 c) 89 d) 123 e) 83

36. Factorise: $16y^3 - 4y$

a) 2y(2y + 2)(1 – y) b) 4y(1 – y)(1 + y) c) 4y(1 + 2y)(1 – 2y) d) 4y(2y + 1)(2y - 1) e) 4(2 +4y)(2 - 4y)

37. A person invests ₹ 10000 for two years at a certain rate of interest, compounded annually . At the end of one year this sum amounts to ₹ 11200. Calculate : (i) Rate of interest p.a and (ii) Amount at the end of second year.

38. Calculate the compound interest on ₹ 6000 in one year at 5% interest per year when it is compounded semi-annually.

39. In what time will ₹5000 amounts to ₹6498 at 14% per annum when compounded annually?

40.

$If\ 2160 = 2^a \times 3^b \times 5^c\ find\ the\ value\ of\ 3^a \times 2^{-b} \times 5^{-c}$

41. Simplify

$$\left(\frac{x^a}{x^b}\right)^{a^2+ab+b^2} \times \left(\frac{x^b}{x^c}\right)^{b^2+bc+c^2} \times \left(\frac{x^c}{x^a}\right)^{c^2+ca+a^2}$$

42.

$$\textbf{Solve for x : } \left(\sqrt[3]{\frac{2}{3}}\right)^{x-1} = \frac{27}{8}$$

43. Solve: $2^{2x+3} - 9 \times 2^x + 1 = 0$

44. Solve for x: (i) $9 \times 3^x = (27)^{2x-5}$

45. Simplify: (i) $(27)^{\frac{4}{3}} + (32)^{0.8} + (0.8)^{-1}$

46. In how many years Rs.2000 amounts to Rs 2662 at 10% percent C.I (compounded annually)

47. On what sum of money will CI for 2 years at 5% per annum amount to Rs.164.

48. At what rate percent per annum CI will Rs. 2000 amounts to Rs. 2315.25 in 3 years.

49. Prove that $\sqrt{2}$ is an irrational number.

50. If *a* and *b* are rational numbers and $\frac{5+2\sqrt{3}}{7+4\sqrt{3}} = a - b\sqrt{3}$, find the value of *a* and *b*.

51. If $x = 2 - \sqrt{3}$, find the value of $(x - 1/x)^3$

52. ABCD is a rectangle. X and Y are points on sides AD and BC respectively such that AY= BX. Prove that BY= AX and ∠BAY = ∠ABX.

53. In the adjoining figure, AB=CD, CE= BF and ∠ACE = ∠DBF. Prove that

(i) r**ACE is congruent to** r**DBF**
(ii) AE= DF