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ASSIGNMENT FOR THE SESSION 2019 – 2020

Class: IX **Subject: Mathematics** **Assignment No. 1**

Number System

1. Find three rational numbers between $\frac{5}{7}$ *and* $\frac{9}{11}$. at equal intervals [CBSE-2014]

2. Represent $\sqrt{4.2}$ on the number line.[CBSE-2016]

3. Express the following in the form $\frac{p}{q}$ where p and q are integers and $q \neq 0$.

   (i) $0.\overline{46}$ (ii) $2.6\overline{72}$ (iii) $0.2\overline{451}$ iv) $2.\overline{8}$

4. Visualize $7.3\overline{5}$ on the number line up to 4 decimal places.

5. Find the value of a and b if $\frac{\sqrt{3}-1}{\sqrt{3}+1} = a + b\sqrt{3}$.[CBSE-2014]

5A. If $\frac{4+3\sqrt{5}}{4-3\sqrt{5}} = a + b\sqrt{5}$, find a and b.

5B. If $\frac{5+\sqrt{3}}{7-4\sqrt{3}} = 94a + 3\sqrt{3}b.$ find a and b. [Dps-Annual- 18]

6. If $\sqrt{5} = 2.236$ and $\sqrt{6} = 2.449$, find the value of $\frac{1+\sqrt{2}}{\sqrt{5}+\sqrt{3}} + \frac{1-\sqrt{2}}{\sqrt{5}-\sqrt{3}}$..[CBSE-2016]

7A. If $a = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ *and* $b = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, find the value of $a^2 + b^2 + 5ab$. [CBSE-2016]

7B. If x= $x = \frac{\sqrt{2}+1}{\sqrt{2}-1}$ and $y = \frac{\sqrt{2}-1}{\sqrt{2}+1}$, Find the value of $x^2 + xy + y^2$. [Dps Annual- 18]Ans: 35

7C. Simplify: $\frac{1}{2+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{8}} + \frac{1}{\sqrt{8}+\sqrt{9}}$.[CBSE-2014]

7D. Prove that : $\frac{1}{3+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{3}} + \frac{1}{\sqrt{3}+1} = 1.$ [CBSE-2011]

7E. Show that: $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2} = 5.$ [CBSE-2011]

8. If x= $\frac{\sqrt{a+2b}+\sqrt{a-2b}}{\sqrt{a+2b}-\sqrt{a-2b}}$, evaluate $bx^2 - ax + b$.

9 If $x = 9 - 4\sqrt{5}$, then find $\sqrt{x} - \frac{1}{\sqrt{x}}$.

10. If $x = 2 - \sqrt{3}$, then find the value of $x^3 + \frac{1}{x^3}$ and $x^3 - \frac{1}{x^3}$

11. Represent each of the following on the no. line. $\frac{1}{4}, -\frac{3}{5}, \frac{2}{3}, \frac{7}{8}$

12. If $\frac{9^n \times 3^2 \times \left(3^{-n/2}\right)^{-2} - 27^n}{3^{3m} \times 2^3} = \frac{1}{27}$, prove that m –n =1. [CBSE-2016]

13) Simplify: $\left(\frac{81}{16}\right)^{\frac{-3}{4}} \times \left[\left(\frac{25}{9}\right)^{\frac{-3}{2}} \div \left(\frac{5}{2}\right)^{-3}\right]$.[CBSE-2014]

14. If 'x' is a positive real number and exponents are rational numbers, simplify:
$\left[\frac{x^b}{x^c}\right]^{(b+c-a)} \times \left[\frac{x^c}{x^a}\right]^{(c+a-b)} \times \left[\frac{x^a}{x^b}\right]^{(a+b-c)}$. [CBSE-2011]

15. Find the value of x if (i) $5^{x-2}.3^{2x-3} = 135$ (ii) $2^{x-7}.5^{x-4} = 1250$

Polynomials

1. Using factor theorem factorize $x^4 - 2x^3 - 9x^2 + 2x + 8$.
2. Determine whether $3x - 2$ is a factor of $3x^3 + x^2 - 20x + 12$. [CBSE-2016]
3. Find the value of $x^3 + y^3 + 9xy - 27$ if $x + y = 3$. [CBSE-2016]
4. Examine which of the numbers 1, -1 and -3 are zeroes of the polynomial $2x^4 + 9x^3 + 11x^2 + 4x - 6$. [CBSE-2014]
5. Find the value of the polynomial $P(x) = x^4 - 4x^3 + 3x^2 - 1$ at $x = 1, \frac{-1}{3}, \frac{1}{2}$ *and* -2. [CBSE-2016]
6. Find the quotient when $f(x) = x^3 + 3x^2 + 3x + 5$ is divided by $g(x) = x + 2$. Also find the remainder. [CBSE-2016]
7. The polynomial $x^4 - 2x^3 + 3x^2 - ax + b$ when divided by $x - 1$ and $x + 1$ leaves remainder 5 and 19 respectively. Find a and b.[Dps Ann -18]
8. Find the value of a and b so that $ax^4 + 2x^3 - 3x^2 + bx + 4$ is exactly divisible by $x^2 - 4$.
9. What must be subtracted from $x^3 + 4x^2 - 6x - 14$ to obtain a polynomial exactly divisible by $x^2 - x - 2$.
10. Find what must be subtracted from the polynomial $4y^4 + 12y^3 + 6y^2\ 50y + 26$ so that the obtained polynomial is exactly divisible by $y^2 + 4y + 2$. [CBSE-2014]
11. Without actually calculating the cubes , find the value of each of the following;
    (i) $(-12)^3 + (8)^3 + (4)^3$
    (ii) $(28)^3 + (-17)^3 + (-11)^3$
12. Factorize:
    (iii) $(1 - x^2)(1 - y^2) + 4xy$
    (iv) $x^2 + \frac{1}{x^2} - 3$
    (iii) $a^3 - b^3 + 1 + 3ab$
    (iv) $-1 + 3(a^2 - b^2) + 10(a^2 - b^2)^2$
    (v) $(y^2 - 2y)^2 - 3(y^2 - 2y)(z - a) + 2(z - a)$
13. Factorise: $9x^2 + y^2 + 4z^2 + 6xy + 4yz + 12zx$.[CBSE-2014]
14. Factorise: $20x^2 - 9x + 1$. [CBSE-2014]
15. Factorise: $x^4 + 4$. [CBSE-2014]
16. Factorise: $2u^3 - 3u^2 - 17u + 30$. [CBSE-2016]
    Factorise: $x^3 + 13x^2 + 32x + 20$. [Dps-Annual-18]
17. Evaluate: $(999)^3$ using suitable identity.
18. If $x + y + z = 0$, show that $x^3 + y^3 + z^3 = 3xyz$. [CBSE-2014]
19. If $x = 2 - y$, then show $x^3 + 6xy + y^3 - 8 = 0$. [CBSE-2014]
20. Factorise: $a^3 - b^3 + 1 + 3ab$. [CBSE-2014]
21. Verify that : $x + y + z - 3xyz = \frac{1}{2}(x + y + z)\left[(x - y)^2 + (y - z)^2 + (z - x)^2\right]$.[Dps-Annual-18]
22. If $a^2 + b^2 + c^2 = 16$ and $ab + bc + ca = 10$, find the value of $a + b + c$. [CBSE-2016]
23. Simplify: $(6m - n)(36m^2\ 6mn + n^2) + (3m + n)^3$ [CBSE-2016]
24. If $(x + a)$ is a factor of $(x^2 + px + q)$ and $(x^2 + mx + n)$then, prove that $a = \frac{n - q}{m - p}$.
25. What are possible expressions for the dimensions of the cuboids where volume is $12ky^2 + 8ky - 20k$

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