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Holiday Homework

Class: IX **Subject: Mathematics**

1. Visualize $2.\overline{26}$ on the number line, upto 4 decimal places, that is upto 2.2626.

2. If $x = \sqrt{7} + \sqrt{5}$ and $y = \sqrt{7} - \sqrt{5}$, evaluate
   i. xy
   ii. $x^2 + y^2$

3. If $x = \frac{1}{3-2\sqrt{2}}$ and $y = \frac{1}{3+2\sqrt{2}}$, then prove that $xy^2 + x^2y = 6$.

4. If $2^x = 3^y = 12^z$, then show that $\frac{1}{z} = \frac{1}{y} + \frac{2}{x}$

5. If $a + b + c = 5$ and $ab + bc + ac = 10$, then prove that $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab} = 3$.

6. Factorize
   i. $27x^3 - 8y^3 - 125z^3 - 90xyz$
   ii. $x^6 - 729y^6$
   iii. $x^2 - \frac{y^2}{100}$
   iv. $4y^2 - 4y + 1$

7. Consider our two 'postulates' given below:
   i. Given any two distinct points A and B, there exists a third point C which is in between A and B.
   ii. There exist at least three points that are not on the same line.

   Do these postulates contain any undefined terms? Are these postulates consistent? Do they follow Euclid's postulates? Explain.

8. If a point C lies between two points A and B such that $AC = BC$, then prove that $AC = \frac{1}{2}BC$.

9. A rhombus has perimeter 64 m and one of the diagonals is 22 m. Prove that the area of the rhombus is $66\sqrt{15}$ m^2.

10. Find the area of quadrilateral ABCD when AB=9 m, BC= 40 m, CD= 28 m, AD= 15 m and $< ABC = 90°$.