ASSIGNMENT CLASS IX UNIT 1 NUMBER SYSTEM

1) Represent $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$, $\sqrt{10}$, $\sqrt{17}$ on number line.

2) Express the following in $\frac{p}{q}$ form: $1.2\overline{45}$, $2.\overline{35}$, $3.\overline{245}$, $7.23\overline{1}$, $1.4191919\ldots\ldots$

3) Find two rational and two irrational numbers between $\sqrt{2}$ and $\sqrt{3}$

4) Find two rational and two irrational numbers between $\frac{2}{5}$ and $\frac{3}{5}$

5) Find the value of a and b in each of the following:

   i) $\frac{3+\sqrt{2}}{3-\sqrt{2}} = a + b\sqrt{2}$ 　　　　　　ii) $\frac{4+3\sqrt{5}}{4-3\sqrt{5}} = a + b\sqrt{5}$

   iii) $\frac{\sqrt{11}-\sqrt{7}}{\sqrt{11}+\sqrt{7}} = a - b\sqrt{77}$ 　　iv) $\frac{\sqrt{3}-1}{\sqrt{3}+1} = a + b\sqrt{3}$

6) Simplify the following by rationalizing the denominator.

   i) $\frac{4+\sqrt{5}}{4-\sqrt{5}} + \frac{4-\sqrt{5}}{4+\sqrt{5}}$ 　　　　ii) $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}} + \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$

   iii) $\frac{4\sqrt{3}+5\sqrt{2}}{\sqrt{48}+\sqrt{18}}$

7) Prove that: $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2} = 5$

8) If $x = \frac{\sqrt{2}+1}{\sqrt{2}-1}$ and $y = \frac{\sqrt{2}-1}{\sqrt{2}+1}$, find the value of $x^2 + y^2 + xy$

9) If $x = 2 + \sqrt{3}$, find i) $x^2 + \frac{1}{x^2}$ 　　ii) $x^4 + \frac{1}{x^4}$

10) Evaluate: i) $\left[\frac{256}{6561}\right]^{\frac{3}{8}}$ 　　ii) $(0.000064)^{\frac{5}{6}}$ 　　iii) $(17^2 - 8^2)^{\frac{1}{2}}$

11) Find the value of: $\frac{4}{(216)^{\frac{-2}{3}}} + \frac{1}{(256)^{\frac{-3}{4}}} + \frac{2}{(243)^{\frac{-1}{5}}}$

12) Show that $\left(\frac{x^a}{x^b}\right)^{a+b} \cdot \left(\frac{x^b}{x^c}\right)^{b+c} \cdot \left(\frac{x^c}{x^a}\right)^{c+a} = 1$

13) If $27^x = \frac{9}{3^x}$, find the value of x.

14) If $25^{x-1} = 5^{2x-1} - 100$, then find the value of x

15) Show that $\frac{1}{1+x^{a-b}} + \frac{1}{1+x^{b-a}} = 1$

16) If $2^x = 3^y = 6^{-z}$, show that $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0$

17) Simplify: $\frac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} - \frac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} - \frac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}}$

18) Prove that $\frac{2^{30}+2^{29}+2^{28}}{2^{31}+2^{30}-2^{29}} = \frac{7}{10}$

ASSERTION-REASON BASED QUESTIONS

Each of the following questions contains 2 statements Assertion and reason and has following four choices a, b, c, and d, only one of which is correct. Mark the correct ans.

   a) Assertion is true and Reason is true & reason is correct explanation of assertion.
   b) Assertion is true and Reason is true & reason is not correct explanation of assertion.
   c) Assertion is true but reason is false.
   d) Assertion is false but reason is true.

   1) Assertion: $\sqrt{2}$ is an irrational number.
      Reason: 　The decimal expansion of $\sqrt{2}$ is non terminating & non-recurring.

2) Assertion: The decimal representation of $\frac{3}{8}$ is terminating.

   Reason: If the denominator of a rational number is of the form $2^m \times 5^n$, where m, n are non-negative integers, then its decimal representation is terminating.

3) Assertion: $\sqrt{\frac{81}{64}\sqrt{\frac{81}{64}\sqrt{\frac{81}{64}\sqrt{\frac{81}{64}\sqrt{\frac{81}{64}}}}}} \ldots\ldots\ldots \infty = \frac{9}{8}$

   Reason: For any positive real number x: $\sqrt{x\sqrt{x\sqrt{x\sqrt{x\sqrt{x}}}}} \ldots\ldots \infty = x$

4) Assertion: If $(16)^{2x+3} = 64^{x+3}$, then $4^{2x-2} = 256$.

   Reason: If $a \neq 0, \pm 1$, then $a^m = a^n \Rightarrow$ m = n and $(a^m)^n = a^{mn}$