# INDIAN SCHOOL AL WADI AL KABIR

## Department: Mathematics

**Class IX** **Worksheet – Number System** **25-04-2021**

| 1mark questions | |
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| **Q.1.** | Which of the following is not a rational number?<br>(a) $\sqrt{\frac{98}{2}}$ (b) $\frac{\sqrt{23}}{2\sqrt{23}}$ (c) $\frac{2}{3}$ (d) $\frac{\sqrt{5\times9}}{3}$ |
| **Q.2.** | The simplest rationalizing factor of $\frac{1}{\sqrt{12}}$ is<br>(a) $\sqrt{12}$ (b) $\sqrt{3}$ (c) $\sqrt{4}$ (d) $\frac{1}{\sqrt{12}}$ |
| **Q.3.** | Simplify: $\sqrt{72}+\sqrt{800}-\sqrt{18}$<br>(a) $29\sqrt{2}$ (b) $20\sqrt{2}$ (c) $23\sqrt{2}$ (d) $18\sqrt{2}$ |
| **Q.4.** | The value of $\frac{16^{\frac{3}{4}}}{16^{\frac{-1}{4}}}$ is<br>(a) 16 (b) 8 (c) 32 (d) 4 |
| **Q.5.** | The decimal expansion of irrational number is<br>(a) Non-terminating and recurring (b) Recurring<br>(c) Terminating (d) Non-terminating and non-recurring |
| **Q.6.** | If $\sqrt{3}$ = 1.732, evaluate $\frac{1}{2}+\sqrt{3}$<br>(a) 2.232 (b) 6.732 (c) 3.232 (d) 3.732 |
| **Q.7.** | Calculate the decimal which represents the fraction $\frac{7}{8}$.<br>(a) 0.00875 (b) 0.875 (c) 0.87 (d) 0.0875 |

| Case study-based question (1 x 4 = 4 marks) | |
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| **Q.8.** | Nick and Brijesh are friends. They are preparing for their classes. Nick told his friend Brijesh while solving he found that " $\frac{\sqrt{2}+1}{\sqrt{2}-1}$ as a rational number". Brijesh replied that "you are wrong" and further claimed that "the sum of $\sqrt{2}\ and\ \sqrt{1}$ is $\sqrt{2}+\sqrt{1}$ and not $\sqrt{2+1}=\sqrt{3}$. Nick took some time and after verification he accepted his mistake. Justify both the statements said by Brijesh.<br>  |
| **(a)** | What is the rationalizing factor of $\sqrt{2}-1$ ?<br>(i) $\sqrt{2}-1$ (ii) $\sqrt{2}+1$ (iii) $\sqrt{2+1}$ (iv) $\sqrt{2-1}$ |
| **(b)** | Simplify by rationalizing the denominator: $\frac{\sqrt{2}+1}{\sqrt{2}-1}$<br>(i) $3+2\sqrt{2}$ (ii) $3-2\sqrt{2}$ (iii) $2+2\sqrt{2}$ (iv) $5\sqrt{2}$ |
| **(c)** | According to Brijesh's explanation if "the sum of $\sqrt{2}\ and\ \sqrt{1}$ is $\sqrt{2}+\sqrt{1}$ " then find $\sqrt{2}\times 2\sqrt{3}$<br>(i) cannot be multiplied (ii) $2\sqrt{2}$ (iii) $4\sqrt{3}$ (iv) $2\sqrt{6}$ |
| **(d)** | If $\frac{\sqrt{2}+1}{\sqrt{2}-1}=a+b\sqrt{2}$ , then the value of a and b is<br>(i) $a=2\,,b=3$ (ii) $a=3\,,b=\sqrt{2}$<br>(iii) $a=3\,,b=2$ (iv) $a=3\,,b=2\sqrt{2}$ |

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| **2 marks questions** | |
| **Q.9.** | Simplify: $2\sqrt{50} \times 3\sqrt{32} \times 4\sqrt{18}$ . |
| **Q.10.** | Show that $2.2\overline{18}$ can be expressed in the form $\frac{p}{q}$, where p and q are integers and q ≠ 0. |
| **Q.11.** | If a = 2 and b = 3, then find the value of $(a^b + b^a)^{-1}$**.** |
| **Q.12.** | Rationalize the denominator: $\frac{1}{2\sqrt{7}+3\sqrt{3}}$ . |
| **Q.13.** | Find the value of $\frac{4}{(216)^{-\frac{2}{3}}} - \frac{1}{(256)^{-\frac{3}{4}}}$ . |
| **3 marks questions** | |
| **Q.14.** | If $5^{2x-1} - 25^{x-1} = 2500$, then find the value of $x$. |
| **Q.15.** | Represent $\sqrt{17}$ on the number line. |
| **Q.16.** | Evaluate: $\left(\frac{81}{16}\right)^{-\frac{3}{4}} \times \left[\left(\frac{9}{25}\right)^{\frac{3}{2}} \div \left(\frac{5}{2}\right)^{3}\right]$. |
| **Q.17.** | Write four rational numbers and four irrational numbers between $\frac{4}{5}$ *and* $\frac{7}{9}$. |
| **Q.18.** | If $x = 4 - \sqrt{15}$ , then find the value of $\left(x + \frac{1}{x}\right)^2$. |
| **Q.19.** | Represent $\sqrt{8.3}$ geometrically on the number line. |
| **Q.20.** | Prove that $\frac{3^{30} + 3^{29} + 3^{28}}{3^{31} + 3^{30} - 3^{29}} = \frac{13}{33}$ |
| | **5 marks questions** |
| **Q.21.** | Find the values of a and b, if $\frac{2\sqrt{5}+\sqrt{3}}{2\sqrt{5}-\sqrt{3}} + \frac{2\sqrt{5}-\sqrt{3}}{2\sqrt{5}+\sqrt{3}} = a + b\sqrt{15}$. |
| **Q.22.** | If $x = \frac{1}{3-2\sqrt{2}}$ and $y = \frac{1}{3+2\sqrt{2}}$, then find the value of $x + y + xy$. |

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| **Q.23.** | Prove that : $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2}$ . | | | | | | |
| **ANSWERS** | | | | | | | |
| **Q.1** | $\frac{\sqrt{5 \times 9}}{3}$ | **Q.2** | $\sqrt{3}$ | **Q.3** | $23\sqrt{2}$ | **Q.4** | 16 |
| **Q.5** | Non-terminating and non-recurring | **Q.6** | 2.232 | **Q.7** | 0.875 | **Q.8** | (i) $\sqrt{2}+1$ |
| **Q.8** | (ii) $3+2\sqrt{2}$ | **Q.8** | (iii) $2\sqrt{6}$ | **Q.8** | (iv) $a = 3\,, b = 2$ | **Q.9** | $2880\sqrt{2}$ |
| **Q.10** | 122/55 | **Q.11** | 1/17 | **Q.12** | $2\sqrt{7}-3\sqrt{3}$ | **Q.13** | 80 |
| **Q.14** | X = 3 | **Q.16** | 1 | **Q.17** | Numbers between 36/45 and 63/45 (0.8 and 1.4) | **Q.18** | 16 |
| **Q.21** | a = 46/17, b=0 | **Q.22** | 7 | **Q.23** | 5 | | |

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