IX **Test-2** Time: 30 mins

(2) 1) If $\sqrt{3} = 1.732$, then find the value of $\sqrt{\frac{2-\sqrt{3}}{2+\sqrt{3}}}$.

(1) 2) Find the value of $(256)^{0.16} \times (256)^{0.09}$

(2) 3) Express $0.00323232\ldots$ in the form $\frac{p}{q}$; where p and q are integers and $q \neq 0$

(2) 4) Simplify: $\left[9\left(64^{\frac{1}{3}} + 125^{\frac{1}{3}}\right)^3\right]^{\frac{1}{4}}$

(2) 5) If $x = 1+\sqrt{2}$, find the value of $\left(x - \frac{1}{x}\right)^3$

(3) 6) Show that $\left(\frac{x^a}{x^b}\right)^{a+b} \times \left(\frac{x^b}{x^c}\right)^{b+c} \times \left(\frac{x^c}{x^a}\right)^{c+a} = 1$

(2) 7) Simplify:

$$(2\sqrt{2}-5)^2 + (3\sqrt{2}+\sqrt{3})^2 - (\sqrt{2}-1)^2$$

(2) 8) If $(2^{3x-1} + 10) \div 7 = 6$, then find the value of x.

(2) 9) If $a = 2$ and $b = 3$, then find the value of $a^b + b^a$

(2) 10) Decimal expansion of a rational number is ____ and that of an irrational number is ____

X Test-2 (Solutions)

1) $\sqrt{\frac{2-\sqrt{3}}{2+\sqrt{3}}} = \sqrt{\frac{(2-\sqrt{3})^2}{(2+\sqrt{3})(2-\sqrt{3})}} = \sqrt{\frac{(2-\sqrt{3})^2}{4-3}} = \sqrt{(2-\sqrt{3})^2}$

$= 2-\sqrt{3} = 2-1.732 = \underline{0.268}$

2) $(256)^{0.16} \times (256)^{0.09} = (256)^{0.16+0.09} = (256)^{0.25}$

$= (256)^{\frac{1}{4}} = 4^{\cancel{4}\times\frac{1}{\cancel{4}}} = \underline{4}$

3) Let $x = 0.00323232\ldots$

$100x = 0.323232\ldots \longrightarrow (1)$

$10000x = 32.323232\ldots \longrightarrow (2)$

$9900x = 32$

$x = \frac{\cancel{32}\ \cancel{16}\ 8}{\cancel{9900}\ \cancel{4950}\ 2475} = \frac{8}{2475}$, which is in $\frac{p}{q}$ form

4) $\left[9\left(64^{\frac{1}{3}}+125^{\frac{1}{3}}\right)^3\right]^{\frac{1}{4}}$

$= \left[9\left(4^{\cancel{3}\times\frac{1}{\cancel{3}}} + 5^{\cancel{3}\times\frac{1}{\cancel{3}}}\right)^3\right]^{\frac{1}{4}}$

$= \left(9(4+5)^3\right)^{\frac{1}{4}}$

$= (9\times 9^3)^{\frac{1}{4}} = (9^4)^{\frac{1}{4}} = 9^{\cancel{4}\times\frac{1}{\cancel{4}}} = \underline{9}$

5) $x = 1+\sqrt{2}$

$\frac{1}{x} = \frac{1}{1+\sqrt{2}} = \frac{1-\sqrt{2}}{(1+\sqrt{2})(1-\sqrt{2})} = \frac{1-\sqrt{2}}{1-2} = \frac{1-\sqrt{2}}{-1} = -(1-\sqrt{2})$

$\therefore \left(x-\frac{1}{x}\right)^3 = \left(1+\sqrt{2}+(1-\sqrt{2})\right)^3$

$= (1+\cancel{\sqrt{2}}+1-\cancel{\sqrt{2}})^3 = 2^3 = \underline{8}$

6) LHS, $(x^{a-b})^{a+b} \times (x^{b-c})^{b+c} \times (x^{c-a})^{c+a}$

$= x^{(a-b)(a+b)} \times x^{(b-c)(b+c)} \times x^{(c-a)(c+a)}$

$= x^{a^2-b^2} \times x^{b^2-c^2} \times x^{c^2-a^2}$

$= x^{\cancel{a^2}-\cancel{b^2}+\cancel{b^2}-\cancel{c^2}+\cancel{c^2}-\cancel{a^2}} = x^0 = \underline{1}$, RHS

7) $(2\sqrt{2}-5)^2+(3\sqrt{2}+\sqrt{3})^2-(\sqrt{2}-1)^2$

$=\left((2\sqrt{2})^2+5^2-2\times2\sqrt{2}\times5\right)+\left((3\sqrt{2})^2+(\sqrt{3})^2+2\times3\sqrt{2}\times\sqrt{3}\right)$
$-\left((\sqrt{2})^2+1^2-2\times\sqrt{2}\times1\right)$

$= 8+25-20\sqrt{2}+18+3+6\sqrt{6}-2-1+2\sqrt{2}$

$= \underline{\underline{51-18\sqrt{2}+6\sqrt{6}}}$

8) $(2^{3x-1}+10)\div7=6$

$\Rightarrow \dfrac{2^{3x-1}+10}{7}=6$

$\Rightarrow 2^{3x-1}+10=42$

$\Rightarrow 2^{3x-1}=32$

$\Rightarrow 2^{3x-1}=2^5$

$\therefore 3x-1=5$

$3x=6$

$\underline{\underline{x=2}}$

9)

$a^b+b^a=2^3+3^2=8+9=\underline{\underline{17}}$

10) Decimal expansion of a rational number is either terminating or non-terminating repeating and that of an irrational number is non-terminating non-repeating.