

MATHEMATICS – IX

- 1) If $a = 2 + \sqrt{3}$, then find the value of $a - \frac{1}{a}$
- 2) $\frac{6}{3\sqrt{2}-2\sqrt{3}} = 3\sqrt{2} - a\sqrt{3}$, find the value of a?
- 3) In each of the following determine rational numbers a and b:
 - (i) $\frac{2\sqrt{2}-\sqrt{3}}{2\sqrt{2}-2\sqrt{3}} = a+b\sqrt{24}$
 - (ii) $\frac{4+\sqrt{2}}{2+\sqrt{2}} = a - \sqrt{b}$
 - (iii) $\frac{4+3\sqrt{5}}{4-3\sqrt{5}} = a + b\sqrt{5}$
- 4) If $\sqrt{2} = 1.414$, then find the value of:
 - (i) $\sqrt{8} + \sqrt{50} + \sqrt{72} + \sqrt{98}$
 - (ii) $3\sqrt{32} - 2\sqrt{50} + 4\sqrt{128} - 20\sqrt{18}$
- 5) If $\sqrt{3} = 1.732$, then find the value of:
 - (i) $\sqrt{27} + \sqrt{75} + \sqrt{108} - \sqrt{243}$
 - (ii) $5\sqrt{12} - 3\sqrt{48} + 6\sqrt{75} + 7\sqrt{108}$
- 6) Simplify:
 - (i) $\sqrt[3]{24} + \sqrt[3]{81} - \sqrt[3]{192}$
 - (ii) $7\sqrt{6} - \sqrt{252} - \sqrt{294} + 6\sqrt{7}$
- 7) Find the value of $\frac{6}{\sqrt{5}-\sqrt{3}}$. Use ($\sqrt{3} = 1.732$ and $\sqrt{5} = 2.236$).
- 8) Simplify :
 - (i) $\frac{1}{2+\sqrt{3}} + \frac{2}{\sqrt{5}-\sqrt{3}} + \frac{1}{2-\sqrt{5}}$
 - (ii) $\frac{2}{\sqrt{5}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{2}} - \frac{3}{\sqrt{5}+\sqrt{2}}$
 - (iii) $\frac{3\sqrt{2}-2\sqrt{3}}{3\sqrt{2}+2\sqrt{3}} + \frac{\sqrt{12}}{\sqrt{3}-\sqrt{2}}$
 - (iv) $\frac{7+3\sqrt{5}}{3+\sqrt{5}} - \frac{7-3\sqrt{5}}{3-\sqrt{5}}$
 - (v) $\frac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} - \frac{2\sqrt{5}}{\sqrt{6}-\sqrt{5}} - \frac{3\sqrt{2}}{\sqrt{15}-3\sqrt{2}}$

9) If $a = \frac{3+\sqrt{5}}{2}$, then find the value of $a^2 + \frac{1}{a^2}$?

10) If $a = 5+2\sqrt{6}$ and $b = \frac{1}{a}$, then find the value of a^2+b^2 ?

11) If $x = 1-\sqrt{2}$ then find the value of

(i) $x + \frac{1}{x}$ with a rational denominator

(ii) $x^2 + \frac{1}{x^2}$ with a rational denominator

12) Find the value of a and b in the following :

(i) $\frac{2\sqrt{6}-\sqrt{5}}{\sqrt{45}-\sqrt{24}} = a + b\sqrt{30}$

(ii) $\frac{5+\sqrt{3}}{7-4\sqrt{3}} = a + \sqrt{3}b$

(iii) $\frac{1+\sqrt{6}}{3-\sqrt{6}} = a + b\sqrt{6}$

(iv) $\frac{\sqrt{5}-2}{\sqrt{5}+2} - \frac{\sqrt{5}+2}{\sqrt{5}-2} = a - b\sqrt{5}$

(v) $\frac{3+\sqrt{8}}{3-\sqrt{8}} + \frac{3-\sqrt{8}}{3+\sqrt{8}} = a + b\sqrt{2}$

13) If $x = 2+\sqrt{3}$, find the value of $x^3 + \frac{1}{x^3}$?

14) If $x = 3+\sqrt{8}$, then find the value of $x^2 + \frac{1}{x^2}$?

15) If $x = \frac{\sqrt{3}+1}{2}$, then find the value of $4x^3 + 2x^2 - 8x + 7$?

16) Simplify : $\frac{\sqrt{6}}{\sqrt{2}+\sqrt{3}} + \frac{3\sqrt{2}}{\sqrt{6}+\sqrt{3}} - \frac{4\sqrt{3}}{\sqrt{6}+\sqrt{2}}$?

17) Simplify : $\frac{1}{\sqrt{4}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{8}} + \frac{1}{\sqrt{8}+\sqrt{9}}$?

18) If $p = \frac{2-\sqrt{5}}{2+\sqrt{5}}$ and $q = \frac{2+\sqrt{5}}{2-\sqrt{5}}$, then find the values of :

(i) $p+q$

(ii) $p-q$

(iii) p^2+q^2

(iv) p^2-q^2

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(CLASS - 9)

19) If $x = \frac{\sqrt{2}-1}{\sqrt{2}+1}$ and $y = \frac{\sqrt{2}+1}{\sqrt{2}-1}$, then find the value of $x^2+5xy+y^2$?



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