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Questions:

3 Marks

1. Give an example of two irrational numbers whose:
   (a) Sum is rational
   (b) Product is rational
   (c) Quotient is rational
2. Simplify: $\frac{3\sqrt{2}}{\sqrt{6}-\sqrt{3}} - \frac{4\sqrt{3}}{\sqrt{6}+\sqrt{3}}$
3. Simplify the following expression by rationalizing the denominator $\frac{3}{\sqrt{3}+\sqrt{2}} - \frac{3\sqrt{2}}{\sqrt{6}+\sqrt{3}} + \frac{4\sqrt{3}}{\sqrt{2}+\sqrt{6}}$
4. Express $\frac{3}{\sqrt{3}-\sqrt{2}+\sqrt{5}}$ with rational denominator.
5. If a and b are rational numbers and $\frac{2+\sqrt{3}}{2-\sqrt{3}} = a + b\sqrt{3}$, find the value of a^2+b^2.
6. Find the value of $(16)^{0.16} \times (16)^{0.09}$.
7. Rationalize the denominator of $\frac{30}{5\sqrt{3}-3\sqrt{5}}$
8. Simplify: $\left(\sqrt{3}+1\right)\left(1-\sqrt{12}\right) + \frac{9}{\left(\sqrt{3}+\sqrt{12}\right)}$
9. If $x = \frac{1}{3-2\sqrt{2}}$ and $y = \frac{1}{3+2\sqrt{2}}$, then find the value of x + y + xy.
10. Find the sum of $(3\sqrt{3}+7\sqrt{2})$ and $(\sqrt{3}-5\sqrt{2})$

2 Marks

11. Solve $0.\overline{6} + 0.4\overline{7}$
12. Simplify: $\frac{23^{-10}}{23^{-7}}$
13. If $a = 8 + 3\sqrt{7}$ and $b = \frac{1}{a}$, What will be the value of a^2+b^2 ?
14. If $a = \frac{\sqrt{3}+1}{\sqrt{3}-1}$ and $b = \frac{1}{a}$, find the value of $a^2 + ab + b^2$
15. Simplify: $\frac{\sqrt{5}-2}{\sqrt{5}+2} - \frac{\sqrt{5}+2}{\sqrt{5}-2}$
16. Find a and b if: $\frac{\sqrt{7}-1}{\sqrt{7}+1} + \frac{\sqrt{7}+1}{\sqrt{7}-1} = a + b\sqrt{7}$
17. Simplify: $\left(\frac{15^{\frac{1}{3}}}{9^{\frac{1}{3}}}\right)^{-6}$
18. Evaluate: $125^{-1/3}\left[125^{1/3} - 125^{2/3}\right]$
19. If $\left(\frac{a}{b}\right)^{x-1} = \left(\frac{b}{a}\right)^{2x-8}$ then find the value of x.
20. Simplify $\left(\frac{81}{625}\right)^{1/4}$.
21. If $a^2-b^2 = 1$, find the value of $\left[(\mu)^{a-b}\right]^{a+b}$
22. If $a = \frac{2^{x-1}}{2^{x-y}}$, $b = \frac{2^{-x}}{2^{x+1}}$ and a-b=0, find the value of x.
23. Simplify: $8\sqrt{3}-2\sqrt{3}+4\sqrt{3}$
24. If x = x = $3-2\sqrt{2}$, find the value of $\sqrt{x} + \frac{1}{\sqrt{x}}$
25. Simplify: $[5[8^{\frac{1}{3}} + 27^{\frac{1}{3}}]^3]^{\frac{1}{4}}$

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