

REAL NUMBERS

1. If $2^{x+3} = 8^{x+3}$ then $x =$ _____ (March 2009)
2. $(16)^{1.25} =$ _____ (March 2009)
3. $\lim_{x \rightarrow \infty} \frac{1}{x} =$ _____ (March 2009)
4. $(16)^{0.5} =$ _____ (March 2008)
5. $(64)^x = 2\sqrt{2}$ then $x =$ _____ (March 08)
6. The limiting position of secant of a circle is _____ (March 2008)
7. If $\sqrt{x^a} = x^{\frac{2}{3}}$ then $a =$ _____ (March 2008)
8. If $a^x = b$; $b^y = c$, $c^z = a$ then the value of $xyz =$ _____ (March 2008), (March 2009)
9. $\sum_{n=1}^3 (n^2 + 1) =$ _____ (March 2009)
10. If $(x^{2/3})^p = x^2$ then the value of p is _____
11. $\lim_{x \rightarrow \infty} \frac{2x+3}{3x+5} =$ _____ (June 2009, 10)
12. $a \neq 0$ and if $p + q + r = 0$ then $a^{3p+3q+3r} =$ _____ (June 2007)
13. If $x + \frac{1}{x} = 4$ then $x - \frac{1}{x} =$ _____ (March'10)
14. If $x = -3$ then $|x^2 - 20| =$ _____ (March'10)
15. $\sum_{i=0}^3 4^i =$ _____ (June 2010)
16. If $(64)^x = \frac{1}{(256)^y}$ then $3x =$ _____
17. If $x^{\frac{3}{2}} = 0.027$ then $x =$ _____
18. If $a^{(a\sqrt{a})} = (a\sqrt{a})^a$ then $a =$ _____
19. The rationalising factor of $a^{\frac{1}{3}} + b^{\frac{1}{3}}$ is _____
20. $\lim_{n \rightarrow \infty} \frac{1^3 + 2^3 + 3^3 + \dots + n^3}{n^4} =$ _____
21. $\lim_{x \rightarrow 0} \frac{x^2 + 5x}{x} =$ _____
22. $\frac{1}{1+x^{a-b}} + \frac{1}{1+x^{b-a}} =$ _____
23. $\lim_{x \rightarrow -2} \frac{x^3 - 2x + 2}{2x^2 + 3x + 5} =$ _____
24. $\left(x^{\frac{1}{4}} + y^{\frac{1}{4}} \right) \left(x^{\frac{1}{2}} - x^{\frac{1}{4}}y^{\frac{1}{4}} + y^{\frac{1}{2}} \right) =$ _____
25. If $3^{5x+2} = (27)^4$ then $x =$ _____
26. If $\sqrt[3]{x} + \sqrt[3]{y} + \sqrt[3]{z} = 0$, then $(x + y + z)^3 =$ _____
27. The limit of the sum $1 + \frac{1}{3} + \frac{1}{3^2} + \dots + \alpha$ is _____
28. The value of $(32)^{\frac{-4}{5}} =$ _____
29. $\left(\frac{a^p}{a^q} \right)^{p+q} \cdot \left(\frac{a^q}{a^r} \right)^{q+r} \cdot \left(\frac{a^r}{a^p} \right)^{r+p} =$ _____
30. $\lim_{x \rightarrow a} \frac{x^{-5} - a^{-5}}{x^3 - a^3} =$ _____
31. If $x = -8$ then $|x - 1| =$ _____
32. $\frac{a-b}{\sqrt{a} - \sqrt{b}} =$ _____
33. If $|2x - 3| = 7$ then $x =$ _____
34. The solution of $|2x - 3| \leq 7$ is _____
35. $\lim_{x \rightarrow 4} \frac{x^2 - 16}{x - 4} =$ _____
36. If $a^{x-1} = bc$, $b^{y-1} = ac$, $e^{z-1} = ab$ then $xy + yz + zx =$ _____
37. If $\sqrt{\sqrt{3^x}} = 81$ then $x =$ _____

38. If $\Sigma n = 10$ then $\Sigma n^3 =$ _____
 39. $x^{\frac{3}{5}} x^{\frac{4}{5}} x^{\frac{-2}{5}} =$ _____
 40. $\Sigma n^3 =$ _____
 41. If $\Sigma n = 66$ then $n =$ _____
 42. $a^{2/3} [a^{1/3} (a^{1/4})^4] =$ _____
 43. If $\left(\frac{3^x}{9}\right)^2 = \frac{1}{\sqrt{3}}$ then $x =$ _____
 44. $\text{Lt}_{x \rightarrow 0} \frac{(1+x)^4 - 1}{(1+x)^3 - 1} =$ _____
 45. If $5x - \sqrt{5} = 15 - \sqrt{5}$ then $x^2 =$ _____

KEY

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|---------------------------|--------------------|------------------------|-----------|--|-----------------|---------|
| 1. $x = -3$ | 2. 32 | 3. zero | 4. 4 | 5. 1/4 | 6. Tangent | 7. 4/3 |
| 8. 1 | 9. 17 | 10. $P = 3$ | 11. 2/3 | 12. 1 | 13. $2\sqrt{3}$ | 14. 11 |
| 15. 85 | 16. -4Y | 17. 0.09 | 18. 9/4 | 19. $(a^{2/3} - a^{1/3}b^{1/3} + b^{2/3})$ | | |
| 20. 1/4 | 21. 5 | 22. 1 | 23. -2/7 | 24. $(x^{3/4} + y^{3/4})$ | 25. 2 | |
| 26. 27xyz | 27. 3/2 | 28. 1/16 | 29. 1 | 30. $\frac{-5}{3} a^{-8}$ (or) $\frac{-5}{3a^8}$ | 31. 9 | |
| 32. $\sqrt{a} + \sqrt{b}$ | 33. 5 (or) -2 | 34. $-2 \leq x \leq 5$ | 35. 8 | 36. xyz | 37. 16 | 38. 100 |
| 39. x | 40. $(\Sigma n)^2$ | 41. 11 | 42. a^2 | 43. 7/4 | 44. 4/3 | 45. 9 |

Important Questions

4 Marks

- If $lmn = 1$ show that $\Sigma \frac{1}{1+l+m^{-1}} = 1$?
- If $a+b+c = 0$ show that $x^{a^2b^{-1}c^{-1}} \cdot x^{a^{-1}b^2c^{-1}} \cdot x^{a^{-1}b^{-1}c^2} = x^3$?
- If $y = \sqrt[3]{3} + \frac{1}{\sqrt[3]{3}}$ show that $3y^3 - 9y = 10$?
- If $a^{x-1} = bc$, $b^{y-1} = ca$, $c^{z-1} = ab$, Prove that $xy+yz+zx = xyz$?
- Evaluate $\text{Lt}_{x \rightarrow a} \frac{\sqrt{x+a} - \sqrt{2a}}{x-a}$?

2 Marks

- Solve $|4x + 1| \leq 7$?
- If $(64)^x = \frac{1}{(256)^y} = \sqrt[2]{2}$ then show that $3x+4y = 0$?
- Evaluate $\text{Lt}_{x \rightarrow m} \frac{x^p - m^p}{x^q - m^q}$?
- Evaluate $\text{Lt}_{x \rightarrow 0} \frac{\sqrt{1+x+x^2} - 1}{x}$?
- If $a = x + \sqrt{x^2+1}$ then show that $x = \frac{1}{2}(a - a^{-1})$?
- If $a^x = b$, $b^y = c$, $c^z = a$ show that $xyz = 1$?

1 Mark

- If $\left(x \frac{2}{3}\right)^p = x^2$ find 'P' ?
- Evaluate $\frac{x^{\frac{3}{2}} - a^{\frac{3}{2}}}{x-a}$?
- Simplify $a^{x(y-z)} \cdot a^{y(z-x)} \cdot a^{z(x-y)}$?
- Evaluate $\text{Lt}_{x \rightarrow 0} \frac{x^2 + 5x}{x}$?
- Evaluate $\text{Lt}_{x \rightarrow \infty} \frac{8x+4}{2x+6}$?
- Solve $2^{x+3} = 4^{x+1}$?
- If $a^x = b$, $b^y = c$, $c^z = a$ show that $xyz = 1$?

8. Simplify $\left(\frac{1}{a^3} - \frac{1}{b^3}\right)\left(\frac{2}{a^3} + \frac{1}{a^3b^3} + \frac{2}{b^3}\right)$?

9. Simplify $\frac{b-c}{x} \cdot \frac{c-a}{x} \cdot \frac{a-b}{x}$. ?

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