ILLAWARRA TUTORING

In this worksheet, you will tackle exponential equations, expanding your problem-solving toolkit. You will learn to solve equations where the unknown appears in the exponent by rewriting bases, applying logarithms and using substitution techniques.

Easy Questions

1. Solve the equation $2^x = 16$.
2. Solve the equation $3^x = 27$.
3. Solve the equation $5^x = 1$.
4. Solve the equation $e^x = e^5$.
5. Solve the equation $10^x = 1000$.

Intermediate Questions

11. Solve the equation $2^{x+1} = 16$.
12. Solve the equation $3^{2x} = 81$.
13. Solve the equation $4^{x-1} = 64$.
14. Solve the equation $2^{2x} = 32$.
15. Solve the equation $5^x = 125$.
16. Solve the equation $2^x = 10$ and express your answer in logarithmic form.
17. Solve the equation $3^{x+2} = 9$.
18. Solve the equation $10^{2x} = 100$.
19. Solve the equation $2^{3x-1} = 8^{x+1}$.
20. Solve the equation $4^{x+1} = 2^{2x+4}$.
21. Solve the equation $\left(\frac{1}{2}\right)^x = 8$.
22. Solve the equation $9^x = 27$.
23. Solve the equation $2^{2x+1} = 32$.
24. Solve the equation $5^{x+2} = 125 \cdot 5^x$.
25. Solve the equation $3^x = 3^{2x-4}$.

Hard Questions

21. Solve the equation $3^{2x} - 3^{x+1} = 0$.
22. Solve the equation $2^{2x} - 6 \cdot 2^x + 8 = 0$ using an appropriate substitution.
23. Solve the equation $5^x - 5^{x-1} = 20$.
24. Solve the equation $2 \cdot 3^x = 3^{x+1} - 2$.
25. Solve the equation $4^x = 3 \cdot 2^{2x} + 4$.
26. Solve the equation $2^{x+1} = 3^{x-1} + 3^{x-2}$.
27. Solve the equation $10^{2x} - 10^{x+1} - 300 = 0$ by making a substitution.
28. Solve the equation $3^{x+2} = 7 \cdot 3^x + 9$.
29. Solve the equation $2^{2x} = 5 \cdot 2^x + 6$ by substitution.
30. Solve the equation $3^{2x} - 10 \cdot 3^x + 9 = 0$ using an appropriate substitution.