ILLAWARRA TUTORING

In this worksheet you will tackle equations where the unknown appears in the exponent. You will develop techniques such as rewriting expressions with a common base and applying logarithms to solve exponential equations. Work through the easy questions first, then challenge yourself with the intermediate and hard questions.

Easy Questions

1. Solve $2^x = 8$.
2. Solve $3^x = 27$.
3. Solve $10^x = 100$.
4. Solve $5^{x+1} = 25$.
5. Solve $2^{2x} = 16$.

Intermediate Questions

6. Solve $3^{2x} = 81$.
7. Solve $4^{x+1} = 64$.
8. Solve $2^x = 32$.
9. Solve $5^{2x-1} = 125$.
10. Solve $9^x = 27$.
11. Solve (or simplify) $2^{x+2} = 2^x \cdot 4$ and explain why the equation holds for all real numbers x.
12. Solve $\dfrac{1}{2^x} = 16$.
13. Solve $3^x + 3^x = 54$.
14. Solve $2^x = 3^{x-1}$.
15. Solve $4^x = 2^{x+3}$.
16. Solve $5^x = 25^{x-2}$.
17. Solve $10^{2x} = 1000$.

18. Solve $6^x = 216$.
19. Solve $2^{2x+1} = 32$.
20. Solve $7^x = 49$.

Hard Questions

21. Solve $2^{3x+1} = 5 \cdot 2^x$.
22. Solve $3^{2x} - 3^x - 12 = 0$.
23. Solve $2^{x+1} = 3^{x-2}$.
24. Solve $5^{2x} = 125^{x-1}$.
25. Solve $4^{x+2} = 8^{2x-1}$.
26. Solve $2^x + 2^x = 2^{x+3}$.
27. Solve $\left(\frac{1}{3}\right)^{x-2} = 9$.
28. Solve $2^x = 7$.
29. Solve $\sqrt{2}^{4x} = 16$.
30. Solve $3^{x-1} = 2^{x+2}$.