Indices
Practice Questions

Evaluate the following expressions (without your calculator).

1. $10^6 \div 10^4$
2. $2^8 \div 2$
3. 4^0
4. 10^0
5. 3×5^0
6. 10^{-3}
7. 8^{-1}
8. 3^{-3}
9. $49^{1/2}$
10. $8^{2/3}$
11. $25^{3/2}$
12. $32^{3/5}$
13. $\left(2^3\right)^2$
14. $\left(3^4\right)^{1/4}$

Simplify the following expressions.

15. $m^5 \times m^3$
16. $x \times x^2$
17. $x^4 \times x^2$
18. $y^2 \times y^b$
19. $a^m \times a^n$
20. $x^9 \div x^2$
21. $t^4 \div t^2$
22. $x^7 \div x^{-2}$
23. x^0
24. $(ax)^0$
25. $a \times b^0$
26. $x + y^0$
27. $\left(x^3\right)^4$
28. $\left(a^2b^4\right)^4$
29. $\left(p^{-1}q^5\right)^{-1}$
30. $\left(a^{1/2}\right)^3$

Rewrite the following expressions using only positive indices.

31. $\left(\frac{1}{x}\right)^{-1}$
32. y^{-3}

Simplify the following expressions.

33. $2^n \times 2^{2n} \times 2^{3n}$
34. $a^3 \times a^5 \times a^{-2}$
35. $x^2 \times x^4 \times x^3$
36. $\left(p^2q\right)^4 \times \left(q^2p\right)^5$
37. $a^3b^{-2} \times \left(a^2b^2\right)^4$

Rewrite the following expressions using only positive indices.

38. $\left(a^2\right)^0 \times \left(a^{1/2}\right)^4$
39. $\frac{(2x)^{-3}}{x^3}$
40. $\frac{2a^2b^{-2}}{2^{-3}b^{-4}}$
41. $\frac{x^{-1} + y^{-1}}{x + y}$
42. $\frac{10^n - 4^n}{5^n - 2^n}$

Simplify the following expressions.

43. $\frac{\left(2m^2n\right)^3}{\left(mn^3\right)^2 \times \left(4m^2\right)^2}$
44. $\frac{5x^5y^2 \times 3\left(xy^3\right)^2}{15x^2y}$

Find the values of x that make the following equations hold.

45. $3^x = 81$
46. $2^x = 8$
47. $x^{-2} = 9$
48. $x^3 = -125$
49. $4^x = 32$
50. $9 \times 3^{x-1} = \frac{1}{27}$