ILLAWARRA TUTORING

In this worksheet students will learn how to work with zero and negative indices to simplify and manipulate algebraic expressions. Remember that for any non-zero number or expression x: $x^0 = 1$ and $x^{-n} = \dfrac{1}{x^n}$.

Easy Questions

1. Do the following: Evaluate 5^0.
2. Do the following: Simplify x^0.
3. Do the following: Evaluate 3^{-1} and express your answer as a fraction.
4. Do the following: Express 2^{-3} as a simplified fraction.
5. Do the following: Evaluate $\left(4^0\right)\left(2^{-2}\right)$.

Intermediate Questions

6. Do the following: Simplify $\dfrac{1}{x^{-3}}$.
7. Do the following: Simplify $\dfrac{b^{-1}}{b^{-3}}$.
8. Do the following: Simplify $(2a)^{-2}$.
9. Do the following: Simplify $\dfrac{(x^{-1})(x^{-2})}{x^{-3}}$.
10. Do the following: Express $\dfrac{1}{(3c)^{-2}}$ in simplest form.
11. Do the following: Simplify $y^{-4} \cdot y^2$.
12. Do the following: Evaluate $(4^{-1})(2^{-1})$ and simplify your answer.
13. Do the following: Simplify $\dfrac{x^{-3}y^{-2}}{x^{-1}y^{-5}}$.
14. Do the following: Evaluate $\dfrac{2^{-3} \cdot 2^2}{2^{-1}}$.
15. Do the following: Express $\left(\dfrac{a}{b}\right)^{-2}$ in simplest form.

16. Do the following: Simplify $a^{-1}b^{-1}$ so that there are no negative exponents.
17. Do the following: Simplify $\left(\frac{m}{n}\right)^0$.
18. Do the following: Solve for a if $a^{-1} = 8$.
19. Do the following: Simplify $\left(\frac{2a^{-1}}{3b^{-1}}\right)^{-1}$.
20. Do the following: Simplify $\left(\frac{x^{-2}y}{z^{-3}}\right)^{-1}$.

Hard Questions

21. Do the following: Prove that $\frac{a^0}{a^{-n}} = a^n$.
22. Do the following: Simplify $\frac{p^{-2}q}{p^{-5}q^{-3}}$.
23. Do the following: Simplify $\left(\frac{2x^{-2}y^0}{3z^{-1}}\right)^{-2}$.
24. Do the following: Simplify $\left(\frac{a^{-3}b^2}{c^{-4}}\right)^{-1}$ and express your answer as a rational expression with positive exponents.
25. Do the following: Evaluate $\frac{(5^{-2})(5^0)}{(5^{-3})(5^1)}$.
26. Do the following: Simplify $\frac{(m^{-1}-n^{-1})^{-1}}{(n^{-1}-m^{-1})^{-1}}$.
27. Do the following: Simplify $\frac{2^{-1}+4^{-1}}{2^{-1}-4^{-1}}$.
28. Do the following: Simplify $\frac{a^{-1}+b^{-1}}{a^{-1}-b^{-1}}$ and express your answer in its simplest form.
29. Do the following: Simplify $\frac{(2x)^{-2}\cdot 3x^0}{6x^{-1}}$ so that all exponents are positive.
30. Do the following: Simplify $\left(\frac{(2a^{-1}b^0)^2}{4a^{-2}}\right)^{-1}$.