MCR 3UI: *Exponent Laws Review*

Simplify each of the following:

1. $b^3 \times b^5 \times b$

2. $x^5 \div x^8$

3. $\left(x^3\right)^3$

4. $\left(2x^3\right)(4x)\left(x^2\right)$

5. $4^7 \div 4^3 \div 4$

6. $\left(-3x^2\right)^3$

7. $\left(a^2b^3\right)^3$

8. $\left(xy^3\right)^0$

9. $-(-3)^0$

10. $45x^3 \div 5x^5 \times 3x^{-7}$

11. $\left(4^m\right)^n \times 4^2$

12. $\dfrac{\left(2x^2y^2\right)^{-1}}{\left(2x^2y\right)^{-2}}$

13. $\left(\dfrac{p^2}{q}\right)^{-3} \times \left(\dfrac{q}{p^6}\right)^2$

14. $\left(\dfrac{a^{-2}b}{c^3}\right)^{-3}\left(\dfrac{a^5b^{-2}}{c^3}\right)^{-1}$

15. $\left(x^{-3}y^2\right)^{-1}\left(x^2\right)^{-2}$

16. $\dfrac{\left(3a^4b^2\right)\left(6ab^3\right)}{9a^3b^4}$

17. $\dfrac{\left(-9x^3y^6\right)\left(8x^7y^4\right)}{\left(2x^2y^3\right)\left(-6x^3y\right)}$

18. $\dfrac{\left(-4m^2n^4\right)^3\left(-3m^3n^2\right)^2}{\left(-6m^2n^3\right)^6}$

19. $\left(\dfrac{x}{y}\right)^5\left(\dfrac{2}{x}\right)^4\left(\dfrac{y}{4}\right)^3$

20. $\left(\left(x^3\right)^2\right)^4$

21. $\dfrac{x^{m+n} \cdot x^{2m}}{x^n}$

22. $a^{2+p} \cdot a^{2p} \cdot a^7$

23. $\dfrac{\left(3^6\right)^n \times (81)^{2n}}{\left(3^n\right)^4}$

24. $\dfrac{2^n \times 4^{n-1} \times 8^{3n-2}}{16^{2n-1}}$

25. $\dfrac{32^n \times 16^{1-n} \times 8^{2n}}{\left(4^2\right)^{n+1}}$

26. $\dfrac{2^{n+2} \times 4^{n+1}}{8^n}$

27. $\dfrac{\left(a^{2x-y}\right)\left(a^{x-y}\right)}{\left(3a^{x+y}\right)^2}$

28. $\dfrac{5^{-3}-5^{-2}}{5^{-1}}$

29. $\dfrac{3^{-2}}{3^{-1}+3^0}$

ANSWERS

1. b^9 **2.** $\dfrac{1}{x^3}$ **3.** x^9 **4.** $8x^6$ **5.** 64

6. $-27x^6$ **7.** a^6b^9 **8.** 1 **9.** -1 **10.** $\dfrac{27}{x^9}$

11. 4^{mn+2} **12.** $2x^2$ **13.** $\dfrac{q^5}{p^{18}}$ **14.** $\dfrac{ac^{12}}{b}$ **15.** $\dfrac{1}{xy^2}$

16. $2a^2b$ **17.** $6x^5y^6$ **18.** $\dfrac{-1}{81n^2}$ **19.** $\dfrac{x}{4y^2}$ **20.** x^{24}

21. x^{3m} **22.** a^{3p+9} **23.** 3^{10n} **24.** 2^{4n-4} **25.** 2^{3n}

26. 16 **27.** $\dfrac{a^{x-4y}}{9}$ **28.** $\dfrac{-4}{25}$ **29.** $\frac{1}{12}$