Exponents Review

Simplify the following expressions :

$A = 5^7 \times 5^{-8}$ $= 5^{-1} = \frac{1}{5}$

$B = \frac{2^{-12}}{2^{-15}}$ $= 2^3 = 8$

$C = \frac{5^5 \times 5^{-12}}{5^{-4} \times 5^{-5}}$ $= \frac{5^{-7}}{5^{-9}} = 5^2 = 25$

$D = \left[\left(\frac{2}{5}\right)^{-3} \times \left(\frac{2}{5}\right)^4\right]^{-2}$ $= \left[\left(\frac{2}{5}\right)^1\right]^{-2} = \left(\frac{2}{5}\right)^{-2} = \left(\frac{5}{2}\right)^2 = \frac{25}{4}$

$E = (3x^2y^{-5})^{-4} \times (2x^{-8}y^6)^3$ $= 3^{-4}x^{-8}y^{20} \times 2^3x^{-24}y^{18} = \frac{2^3}{3^4}x^{-32}y^{38} = \frac{8y^{38}}{81x^{32}}$

$F = \left(\frac{25x^{-5}}{125x^3}\right)^{-3}$ $= \left(\frac{1}{5x^8}\right)^{-3} = (5x^8)^3 = 5^3x^{24} = 125x^{24}$

$G = (3x - 5y)^2$ $= 9x^2 - 30xy + 25y^2$

$H = \frac{2^5 - 2^4}{2^4 - 2^3}$ $= \frac{32-16}{16-8} = \frac{16}{8} = 2$ or $\frac{2^4(2-1)}{2^3(2-1)} = 2$

$I = \frac{7^1}{7^3} = \frac{1}{7^2} = \frac{1}{49}$

$J = (6x^3y^{-5})^{-3} \times (36x^{-8}y^7)^2$ $= 6^{-3}x^{-9}y^{15} \times (6^2)^2x^{-16}y^{14} = 6x^{-25}y^{29} = \frac{6y^{29}}{x^{25}}$

$K = \left(\frac{2}{3}x^5y^{-12}\right)^5 \times \left(\frac{3}{2}x^{-6}y^4\right)^3$ $= \left(\frac{2}{3}\right)^5x^{25}y^{-60}\left(\frac{3}{2}\right)^3x^{-18}y^{12} = \left(\frac{2}{3}\right)^5\left(\frac{2}{3}\right)^{-3}x^7y^{-48} = \frac{4x^7}{9y^{48}}$

$L = \left(\frac{8x^3y^{-5}}{2^5x^{-2}y^{-4}}\right)^{-2} \times (32x^6y^8)^{-3}$ $= \left(\frac{x^5}{2^2y^1}\right)^{-2} \times (2^5)^{-3}x^{-18}y^{-24} = \frac{1}{2^4x^{28}y^{22}} = \frac{1}{2048x^{28}y^{22}}$

$M = \left(\frac{2x^5y^3}{3x^{-3}y^8}\right)^{-4}$ $= \left(\frac{2}{3}\right)^{-4}x^{-32}y^{20} = \frac{3^4y^{20}}{2^4x^{32}} = \frac{81y^{20}}{16x^{32}}$

$N = \frac{3x^0y^5 \times (9x^{-5}y^3)^{-2}}{3^5x^{-8}y^{-2}}$ $= \frac{3^1y^5 \cdot 3^{-4}x^{10}y^{-6}}{3^5x^{-8}y^{-2}} = \frac{x^{18}y}{3^8}$