Sdutions Exponent Rules Review

① $2^3 2^4 = 2^{3+4} = \boxed{2^7}$ ② $e^1 \cdot e^3 = e^{1+3} = \boxed{e^4}$

③ $t^4 \cdot t^4 = t^{4+4} = \boxed{t^8}$ ④ $x^5 x^9 = x^{5+9} = \boxed{x^{14}}$

⑤ $3^4 \cdot x^3 x^5 = 3^4 \cdot x^{3+5} = \boxed{3^4 x^8} = \boxed{81 x^8}$

⑥ $(6x^2)(4x^2) = 6 \cdot 4\, x^2 x^2 = \boxed{24 x^4}$

⑦ $(3x^3y^2)(-6y^5) = (3)(-6) x^3 y^2 y^5 = \boxed{-18 x^3 y^7}$

⑧ $(5p^3)(-m^8 p^2) = (5)(-1) m^8 (p^3)(p^2) = \boxed{-5 m^8 p^5}$

⑨ $(10 g^3 h^8 v^6)(11 g^1 h^8) = (10)(11)(g^3)(g^1)(h^8)(h^8)(v^6)$

$= \boxed{110 g^4 h^{16} v^6}$

⑩ $(4f^9 h^3)(-5f^6)(-3h^2) = (4)(-5)(-3) f^9 f^6 h^3 h^2$

$= \boxed{60 f^{15} h^5}$

⑪ $(-2^2 x^3 y^4)((-3)^2 x^4 y^4) = [-2^2 (-3)^2 x^3 x^4 y^4 y^4$

$= (-4)(9) x^7 y^8$

$= \boxed{-36 x^7 y^8}$

⑫ $(3x^a y^b z^c)(-y^f z^9) = (3)(-1) x^a y^b y^f z^c z^9$

$= \boxed{-3 x^a y^{b+f} z^{c+9}}$

(13) $(p^2)^5 = \boxed{p^{10}}$ (14) $(x^m)^2 = \boxed{x^{2m}}$

(15) $(2^3x^1)^2 = (2^3)^2 x^2 = \boxed{2^6 x^2} = \boxed{64x^2}$

(16) $2(3^1q^2)^3 = 2 \cdot 3^3 q^6 = 2 \cdot 27 q^6 = \boxed{54q^6}$

(17) $(2^1x^1)^2 = 2^2x^2 = \boxed{4x^2}$ (18) $(10^2)^3 = \boxed{10^6} = \boxed{1000000}$

(19) $(-3^2 \cdot x^6)^5 = \boxed{(-1)^1 3^2 x^6]^5} = (-1)^5 (3^2)^5 (x^6)^5$

$= -1 \cdot 3^{10} \cdot x^{30}$

$= \boxed{-59049x^{30}}$

(20) $(7^1j^2)^3 = 7^3 j^6 = \boxed{343j^6}$

(21) $\left(\frac{8^1x^2}{2x^2}\right)^2$ inside/out $\left[\frac{4}{1} \cdot 1\right]^2 = 4^2 = 16$

(21) outside/in $\left[\frac{8^1x^2}{2x^2}\right]^2 = \frac{8^2x^4}{2^2x^4} = \frac{64x^4}{4x^4}$

$= \boxed{16}$

(22) $\left(\frac{3^1x^2}{2^1y^2}\right)^5 = \boxed{\frac{3^5x^{10}}{2^5y^{10}}} = \boxed{\frac{243x^{10}}{32y^{10}}}$

(23) $\frac{a^8}{a^3} = a^{8-3} = \boxed{a^5}$ (24) $\frac{7^{11}}{7^8} = 7^{11-8} = \boxed{7^3}$
$= \boxed{343}$

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(25) $\frac{7 \cdot b^5}{b^4} = 7 \cdot b^{5-4} = \boxed{7b^1}$ (26) $\frac{x^{10}}{x^4} = x^{10-4} = \boxed{x^6}$

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(27) $\frac{12 g^8 h^4}{g^3 h^5} = \frac{12}{1} \frac{g^{8-3}}{1} \cdot \frac{1}{h^{5-4}} = \frac{12}{1} \cdot \frac{g^5}{1} \cdot \frac{1}{h}$

$= \boxed{\frac{12 g^5}{h}}$

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(28) $\frac{4 p^{11}}{8 p^6} = \frac{4}{8} \cdot \frac{p^{11}}{p^6} = \frac{1}{2} p^{11-6} = \boxed{\frac{1}{2} p^5}$

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(29) $\frac{c^9}{6c^4} = \frac{1}{6} \cdot \frac{c^9}{c^4} = \frac{1}{6} \cdot c^{9-4} = \boxed{\frac{1}{6} c^5} = \boxed{\frac{c^5}{6}}$

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(30) $\frac{2 x^3 y^8}{4 y^2} = \frac{2}{4} \frac{x^3}{1} \cdot \frac{y^8}{y^2} = \frac{1}{2} \frac{x^3}{1} \cdot y^{8-2}$

$= \frac{1}{2} \frac{x^3}{1} \cdot y^6 = \boxed{\frac{1}{2} x^3 y^6} = \boxed{\frac{x^3 y^6}{2}}$

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(31) $\frac{3 x^{14} y^{11}}{18 x^2} = \frac{3}{18} \frac{x^{14}}{x^2} \frac{y^{11}}{1} = \frac{1}{6} \frac{x^{14-2}}{1} \cdot \frac{y^{11}}{1}$

$= \boxed{\frac{1}{6} x^{12} y^{11}} = \boxed{\frac{x^{12} y^{11}}{6}}$

(32) $6c^3 \cdot d^{-2} = \frac{6}{1}\frac{c^3}{1} \cdot \frac{1}{d^2} = \boxed{\frac{6c^3}{d^2}}$

(33) $6x^4x^{-10} = \frac{6}{1}\frac{x^4}{1}\frac{1}{x^{10}} = \frac{6}{1}\frac{x^4}{x^{10}} = \boxed{\frac{6}{x^6}}$

(34) $(2^0 \cdot x^{-3})^4 = 2^0 x^{-12} = 1 \cdot \frac{1}{x^{12}} = \boxed{\frac{1}{x^{12}}}$

(36) $\frac{a^{12}b^{-3}}{a^5 b^5} = \frac{a^{12}}{a^5}\frac{1}{b^3 b^5} = \frac{a^7}{1} \cdot \frac{1}{b^8} = \boxed{\frac{a^7}{b^8}}$

(37) $\left(\frac{5^1 x^{13} y^5 z^2}{3^1 \cdot 5^2}\right)^0$ outside/in

$\frac{5^0 x^0 y^0 z^0}{3^0 5^0} = \frac{1 \cdot 1 \cdot 1 \cdot 1}{1 \cdot 1} = \frac{1}{1} = \boxed{1}$

(37) $\left(\frac{5^1 x^{13} y^5 z^2}{3^1 5^2}\right)^0$ Inside/Out

$\left[\frac{1}{3^1}\frac{5^1}{5^2}\frac{x^{13}}{1}\frac{y^5}{1}\frac{z^2}{1}\right]^0 = \left[\frac{1}{3}\frac{1}{5}\frac{x^{13}}{1}\frac{y^5}{1}\frac{z^2}{1}\right]^0$

$= \left(\frac{1}{3}\right)^0 \left(\frac{1}{5}\right)^0 x^0 y^0 z^0$

$= 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 = \boxed{1}$

(38) $(g^3 g^{-2})^4 = (g^1)^4 = g^4$ inside/out

(38) $(g^3 g^{-2})^4 = g^{12} g^{-8} = \frac{g^{12}}{g^8} = g^4$

(39) $\left(\frac{4 c^{-5}}{8^1 d^0}\right)^3 = \frac{4^3 c^{-15}}{8^3 d^0} = \frac{64}{512} \frac{1}{c^{15}} \frac{1}{1}$

$= \frac{1}{8} \frac{1}{c^{15}} = \frac{1}{8c^{15}}$

(39) $\left(\frac{4}{8} \frac{c^{-5}}{d^0}\right)^3 = \left(\frac{1}{2} \frac{1}{c^5} \frac{1}{1}\right)^3 = \left(\frac{1}{2}\right)^3 \left(\frac{1}{c^5}\right)^3 =$

$= \frac{1}{8} \frac{1}{c^{15}} = \frac{1}{8c^{15}}$

(40) $\left(\frac{x^{-8}}{y^{11}}\right)^{-2} = \frac{x^{16}}{y^{-22}} = \frac{x^{16}}{1} \cdot \frac{1}{y^{-22}} = x^{16} y^{22}$

(40) $\left(\frac{1}{x^8} \frac{1}{y^{11}}\right)^{-2} = \frac{1}{x^{-16}} \frac{1}{y^{-22}} = x^{16} y^{22}$

(41) $\frac{(2x^3)(x^4)^2}{8 x^{11}} = \frac{2}{8} \frac{x^3}{x^{11}} \cdot \frac{x^8}{1} = \frac{1}{4} \frac{x^{11}}{x^{11}}$

$= \frac{1}{4}$