Laws of Exponents

$a\ a_m \bullet n = a_{m\ n+}$	$a_{-n} = \dfrac{1_n}{a}$
$\dfrac{a^m}{a_n} = a_{m\ n-}$	$\dfrac{1_{-n}\ a_n}{a} =$
$\left(a_m\right)_n = a_{mn}$	$\dfrac{a_{-m}\ \underline{b}_n}{b_{-n}\ a_m} =$
$\left(a\ b_{m\ n}\right)_p = a\ b_{mp\ np}$	$\left(\dfrac{\square\underline{a}\square}{\square b\square}\right)_{-p} \left(\dfrac{\square\underline{b}\square}{\square a\square}\right)_p \quad \dfrac{\underline{b}_p}{=\square\ \square = {}_p a}$

Examples:

Simplify the following expressions. Use Positive exponents.

1. $x_2 \bullet x^1 = x_{2\ 5+} = x_7$ 6. $(\ )x_{2\ 3} = x_{2\ 3\bullet} = x_6$

2. $x_{-3} \bullet x_5 = x_{-\ +3\ 5} = x_2$ 7. $\left(3x\ y_5\right)_2 = 3_{1\ 2\ 5\ 2\ 1\ 2\bullet}\ x\ y\bullet \qquad \bullet = 9x\ y_{10\ 2}$

_____

[1]. 10_____   _____$24x\ yxy_{5\ 7-2} = 12x\ y_{1\ 5\ 7}-5\ -\ -(\ 2) = \underline{12x\ y}5_{-4\ 9} = \underline{125xy}_{49}$ 10. $\underline{183x\ yx\ y}_{--6}$
$34 = 6x_{-\ -\ -6}\ (\ 4)\ y_{3\ 1-} = 6x\ y_{-2\ 2} = \underline{6xy}_{22}$

Exercises: Simplify the following expressions. Use Positive exponents.

3. $\underline{y}y^7 = y_{7\,4}{}^- = y^3$ 8. $\left(x_{-2}\right)_3 = x_{-2\,3\cdot} = x_{-6} \overset{=}{} {}^{12}6$

    ${}_4\ x$ 4.   ___$y_{-2} = y_{-\,-6\,2} = y_{-8} = y\underline{1}_8$ 9. ☐☐☐☐ $y\underline{x}_5$ ☐☐☐☐$_{-3}$ =☐☐☐☐ $\underline{y}x_5$ ☐☐☐☐$_3$ =

$y\underline{x}_{1\,35\,3\cdot\cdot} = \underline{y}x_{153}$

y 6
$\underline{x}_5$

3. x_7

4. $\left(4x^{-3}\right)\left(2x^5\right)$

5. $\left(-\,2x\,y^{2\,-3}\right)_4$

6. 14___$4xx_{-\,-12}yy_{-\,-42}$

☐ $\underline{x}_3$ ☐$_{-5}$

___

[1]. $z_6\ {}^\bullet z_3$

[2]. $n\ n_{-1}\ {}^\bullet\ 3$

7. □□ $y\,z_2$ □□□ □

Answers:

1. z^9

2. n^2

3. $x^{\frac{1}{2}}$

4. $8x^2$

5. $\dfrac{16}{y^{12}}\,\dfrac{x}{8}$

6. $7\dfrac{2}{7}y\dfrac{x}{2}$

7. $\dfrac{y}{x^{10}}\,5\,15\,z$