ANSWERS ↝ Exercise 3 - EXPONENTS

1. 11^{-2}
$$= \frac{1}{11^2}$$
$$= \frac{1}{121}$$

2. $(-123)^0$
$$= 1$$

3. $(-5)^{-2}$
$$= \frac{1}{(-5)^2}$$
$$= \frac{1}{25}$$

4. -13^{-1}
$$= \frac{1}{-13^1}$$
$$= -\frac{1}{13}$$

5. -5^{-2}
$$= \frac{1}{-5^2}$$
$$= \frac{1}{-25}$$

6. $(2^{-3})(4^{-1})$
$$= \left(\frac{1}{2^3}\right)\left(\frac{1}{4^1}\right)$$
$$= \left(\frac{1}{8}\right)\left(\frac{1}{4}\right)$$
$$= \frac{1}{32}$$

7. $2^{-3} + 4^{-1}$
$$= \frac{1}{2^3} + \frac{1}{4^1}$$
$$= \frac{1}{8} + \frac{1}{4}$$
$$= \frac{1}{8} + \frac{2}{8} \quad \text{(common denominator)}$$
$$= \frac{3}{8}$$

8. -15^0
$$= -1$$

9. $-(-13)^0 + 6^0 - 12^0 + (12)^0$

$= -(1) + 1 - 1 + 1$

$= -1 + 1 - 1 + 1$

$= 0$

10. $\dfrac{(5^3)(4^3)}{(10^2)(2^2)(3^1)}$

$= \dfrac{(125)(64)}{(100)(4)(3)}$

$= \dfrac{8000}{1200}$

$= \dfrac{20}{3}$

11. $\dfrac{1}{5^{-2}}$

$= 5^2$

$= 25$

12. $\dfrac{x^{-5} y^{11} z^{-5}}{w^4 x^{-6}}$

$= \dfrac{x^6 y^{11}}{x^5 w^4 z^5}$

$= \dfrac{x y^{11}}{w^4 z^5}$

13. $\dfrac{y^{-5}}{y^6}$

$= y^{-11}$

$= \dfrac{1}{y^{11}}$

14. $x^{-2} + y^{-2}$

$= \dfrac{1}{x^2} + \dfrac{1}{y^2}$

$= \dfrac{y^2 + x^2}{x^2 y^2}$ {common denominator}

15. $(x+y)^{-3}$

$= \dfrac{1}{(x+y)^3}$

$= \dfrac{1}{(x+y)(x+y)(x+y)}$

$= \dfrac{1}{(x^2+2xy+y^2)(x+y)}$

$= \dfrac{1}{x^3+x^2y+2x^2y+2xy^2+xy^2+y^3}$

$= \dfrac{1}{x^3+3x^2y+3xy^2+y^3}$

16. $(x^{-4}+y^{-2})^{-1}$

$= \left(\dfrac{1}{x^4}+\dfrac{1}{y^2}\right)^{-1}$

$= \left(\dfrac{y^2+x^4}{x^4y^2}\right)^{-1}$

$= \dfrac{x^4y^2}{y^2+x^4}$

17. $\left(\dfrac{2}{5}\right)^{-2}$

$= \left(\dfrac{5}{2}\right)^{2}$

$= \dfrac{5^2}{2^2}$

$= \dfrac{25}{4}$

19. $\dfrac{6^{-1}+6^2}{6^{-1}-6^2}$

$= \dfrac{\dfrac{1}{6}+36}{\dfrac{1}{6}-36}$

$= \dfrac{\dfrac{1}{6}+\dfrac{216}{6}}{\dfrac{1}{6}-\dfrac{216}{6}}$

$= \dfrac{\dfrac{217}{6}}{\dfrac{-215}{6}}$

$= \dfrac{217}{6} \times \dfrac{6}{-215}$

$= -\dfrac{217}{215}$

20. $\left(\dfrac{a^{-2}}{b^{-3}}\right)^{-4}$

$= \dfrac{a^8}{b^{12}}$

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

$= \left(\dfrac{n^3}{2m^2}\right)^2$

$= \dfrac{n^6}{4m^4}$

22. $\dfrac{-34x^{-4}y^5}{2x^5y^{-7}z^2}$

$= \dfrac{-34\,y^5\,y^7}{2x^5x^4z^2}$

$= \dfrac{-17y^{12}}{x^9z^2}$

23. $(-3xy^{-5})(2x^{-4}y^{-2})$

$= -6x^{-3}y^{-7}$

$= \dfrac{-6}{x^3y^7}$

24. $\dfrac{(-2x^{-3})(-12x^{-4}y^{-2})}{6xy^{-3}}$

$= \dfrac{24x^{-7}y^{-2}}{6xy^{-3}}$

$= 4x^{-8}y^1$

$= \dfrac{4y}{x^8}$

25. $(w^{-3}+x^{-4})^{-2}$

$= \left(\dfrac{1}{w^3}+\dfrac{1}{x^4}\right)^{-2}$

$= \left(\dfrac{x^4+w^3}{w^3x^4}\right)^{-2}$

$= \left(\dfrac{w^3x^4}{x^4+w^3}\right)^2$

$= \dfrac{w^6x^8}{(x^4+w^3)^2}$

26. $-(x^{12}y^{-89}z^{-4})^0$

$= -(1)$

$= -1$

27. $\left(\dfrac{4x^{-3}y^{4}}{8x^{2}y^{-2}}\right)^{-2}$

$= \left(\dfrac{8x^{2}y^{-2}}{4x^{-3}y^{4}}\right)^{2}$

$= \dfrac{64x^{4}y^{-4}}{16x^{-6}y^{8}}$

$= \dfrac{4\ x^{4}x^{6}}{y^{4}y^{8}}$

$= = \dfrac{4x^{10}}{y^{12}}$

28. $\left(\dfrac{6}{x^{0}+y^{0}}\right)$

$= \dfrac{6}{1+1}$

$= \dfrac{6}{2}$

$= 3$

29. $\left(\dfrac{-12x^{-7}y^{2}}{36x^{9}y^{-5}z^{5}}\right)$

$= \dfrac{-12\ y^{2}y^{5}}{36\ x^{7}x^{9}z^{5}}$

$= \dfrac{-y^{7}}{3x^{16}z^{5}}$