Worksheet 5-1

1. 3^6

2. $(4z)^4$

3. $\left(-\frac{4}{7}\right)^5$

4. base : -4
   exp : 7

5. base : 5
   exp : 9

   the negative is not affected by exponent like #4

6. base : 0.5
   exp : 6

7. 4^{15}

8. $(-6)^8$

9. $(-4)(8)x^3 \cdot x^{12}$
   $= \boxed{(-32)x^{15}}$

10. $10 \cdot 10 \cdot n \cdot n^4 \cdot n^7$
    $= \boxed{100n^{12}}$

11. $(-3)(-4)m^6 m6$
    $= \boxed{12m^{12}}$

12. $3^{5 \cdot 4} = 3^{20}$

13. $(-12)^{7 \cdot 5}$
    $= \boxed{(-12)^{35}}$

14. $-(21^5)^3$
    $= -(21^{5 \cdot 3})$
    $= \boxed{-(21^{15})}$

15. $y^3 z^{4 \cdot 3}$
    $= \boxed{y^3 z^{12}}$

16. $(-2)^6 r^{3 \cdot 6} s^6$
    $= \boxed{(-2)^6 r^{18} s^6}$

17. $4^3 c^{3 \cdot 3} d^{4 \cdot 3}$
    $= \boxed{4^3 c^9 d^{12}}$

18. $\left(-\frac{2^7 a^7}{b^{2.7}}\right)$
    $= -\frac{2^7 a^7}{b^{14}}$

    if the exponent were even, the answer would be positive

19. $\left(\frac{x}{2y}\right)^4$
    $= \boxed{\frac{x^4}{2^4 y^4}}$

20. $\boxed{\frac{-2^3 x^3}{5^3}}$

    if exponent were even, the answer would be positive

21. $\frac{3^4 b^{2.4}}{11^4} = \boxed{\frac{3^4 b^8}{11^4}}$

22. $(5^7 x^{2.7} y^{3.7})(5^4 x^4 y^{4.4})$
    $= 5^7 x^{14} y^{21} \cdot 5^4 \cdot x^4 y^{16}$
    $= \boxed{5^{11} x^{18} y^{37}}$

23. $\frac{k^7 m^{4.7} p^{2.7}}{3^7 n^{4.7}}$
    $= \boxed{\frac{k^7 m^{28} p^{14}}{3^7 n^{28}}}$

24. $6^0 = 1$

25. $-(-8)^0 = -1$

26. $-(12)^0 = -1$

27. $0^8 \cdot 8^0 = 0 \cdot 1 = 0$

28. $4^{-2} = \frac{1}{4^2} = \frac{1}{16}$

29. $(-2)^{-4} = \frac{1}{(-2)^4} = \frac{1}{16}$

30. $\frac{1}{10^2} + \frac{1}{5^2} = \frac{1}{100} + \frac{1}{25} = \frac{5}{100}$
    $= 1/20$

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31 $a^{-4} = \boxed{\frac{1}{a^4}}$

32 $\frac{2}{r^{-7}} = \boxed{2r^7}$

33 $\frac{2x^{-4}}{1} \cdot \frac{1}{3y^{-7}}$

$= \frac{2}{x^4} \cdot \frac{y^7}{3}$

$= \boxed{\frac{2y^7}{3x^4}}$

34 $\frac{2^9}{2^5} = 2^{9-5}$

$= \boxed{2^4}$

35 $\frac{(-2)^8}{(-2)^3} = (-2)^{8-3}$

$= \boxed{(-2)^5}$

36 $\frac{12x^9y^5}{12^4x^3y^7}$

$= \frac{12}{12^4} \cdot \frac{x^9}{x^3} \cdot \frac{y^5}{y^7}$

$= \frac{1}{12^3} \cdot \frac{x^6}{1} \cdot \frac{1}{y^2}$

$= \boxed{\frac{x^6}{12^3y^2}}$

37 $\frac{8b^{-3}c^4}{8^{-4}b^7c^{-3}}$

$= \frac{8}{8^{-4}} \cdot \frac{b^{-3}}{b^7} \cdot \frac{c^4}{c^{-3}}$

$= \frac{8 \cdot 8^4}{1} \cdot \frac{b^{-7}}{b^3} \cdot \frac{c^4c^3}{1}$

$= 8^5 \cdot b^{7-3} \cdot c^7$

$= \boxed{8^5b^4c^7}$

38 $x^{-3}x^3x^9$

$= x^{-3+3}x^9$

$= x^0x^9 = \boxed{x^9}$

39 $(5w^2y^2)^{-2}(4wy^{-3})^2$

$= (5^{-2}w^{2\cdot(-2)}y^{2(-2)})(4^2w^2y^{-3\cdot2})$

$= (5^{-2}w^{-4}y^{-4} \cdot 4^2w^2y^{-6})$

$= 5^{-2} \cdot 4^2 w^{-4+2}y^{-4+-6}$

$= 5^{-2}4^2w^{-2}y^{-10}$

$= \boxed{\frac{4^2}{5^2w^2y^{10}}}$

40 $\frac{c^{10}(c^2)^3}{(c^3)^3(c^2)^{-9}}$

$= \frac{c^{10}c^6}{c^9c^{-18}}$

$= \frac{c^{16}}{c^{-9}} = c^{16}c^9$

$= \boxed{c^{25}}$

41 $\frac{k^{3(-4)}t^{4(-4)}}{k^{2(-4)}t^{(-1)(-4)}}$

$= \frac{k^{-12}t^{-16}}{k^{-8}t^4}$

$= \frac{k^8}{k^{12}} \cdot \frac{1}{t^{16} \cdot t^4} = \boxed{\frac{1}{k^4t^{20}}}$

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$\frac{3^{-2(-4)} \cdot x^{-5(-4)}y^{-4} \cdot 2^2x^{2(2)}y^{-4(2)}}{2^{-2}x^{-2(-2)}y^{2(-2)}}$

$= \frac{3^8x^{20}y^{-4} \cdot 2^2 \cdot x^4y^{-8}}{2^{-2}x^4y^{-4}}$

$= \frac{3^8 2^2 x^{20} y^{-8}}{2^{-2}}$

$= \boxed{\frac{3^8 2^4 x^{20}}{y^8}}$

43 $4579 = 4.579 \times 10^{3}$

44 $209{,}907 = 2.09907 \times 10^{5}$

45 $-0.257 = -2.57 \times 10^{-1}$

46 $.00000413 = 4.13 \times 10^{-6}$

47 25000

48 -2450000

49 0.0064

50 .04007

51 $(7 \times 10^{3})(3 \times 10^{0})$

$= 7.3 \times 10^{3} \cdot 10^{0}$

$= 21 \times 10^{3+0}$

$= \boxed{2.1 \times 10^{4}}$

52 $(3 \times 10^{6})(4 \times 10^{-2})(2 \times 10^{-1})$

$= 3 \cdot 4 \cdot 2 \times 10^{6} \cdot 10^{-2} \cdot 10^{-1}$

$= \boxed{24 \times 10^{3}}$

53 $\dfrac{8 \times 10^{-3}}{4 \times 10^{-7}}$

$= \dfrac{8}{4} \times \dfrac{10^{-3}}{10^{-7}}$

$= 2 \times \dfrac{10^{7}}{10^{3}}$

$= \boxed{2 \times 10^{4}}$