Properties of Exponents

Emphasis on Dividing Like Bases

Simplify each of the following:

1. $\frac{9d^{-6}}{7d}$

$\frac{9}{7dd^6} = \frac{9}{7d^{1+6}} = \boxed{\frac{9}{7d^7}}$

2. $\frac{4b^4}{6b^6w^2}$

$\frac{4}{6b^6b^{-4}w^2} = \frac{4}{6b^{6+(-4)}w^2} = \frac{4}{6b^2w^2} = \boxed{\frac{2}{3b^2w^2}}$

3. $\frac{c^2}{c^{-6}}$

$c^2c^6 = c^{2+6} = \boxed{c^8}$

4. $\frac{9gd^{-4}}{5g^{-2}d^2}$

$\frac{9g^1g^{+2}}{5d^2d^4} = \frac{9g^{1+2}}{5d^{2+4}} = \boxed{\frac{9g^3}{5d^6}}$

5. $\frac{4w^{-6}}{5w^2}$

$\frac{4}{5w^2w^6} = \frac{4}{5w^{2+6}} = \boxed{\frac{4}{5w^8}}$

6. $\frac{d}{d^4}$

$\frac{1}{d^4d^{-1}} = \frac{1}{d^{4+(-1)}} = \boxed{\frac{1}{d^3}}$

7. $\frac{b^9}{b^{-2}}$

$b^9b^2 = \boxed{b^{9+2}} = \boxed{b^{11}}$

8. $\frac{2}{2^8}$

$\frac{1}{2^82^{-1}} = \frac{1}{2^{8+(-1)}} = \boxed{\frac{1}{2^7}}$ OR $\boxed{\frac{1}{128}}$

9. $\frac{8h^3}{2h}$

$\frac{8h^3h^{-1}}{2} = \frac{8h^{3+(-1)}}{2} = \frac{8h^2}{2} = \boxed{4h^2}$

10. $\frac{gh}{8g^4h^6}$

$\frac{1}{8g^4g^{-1}h^6h^{-1}} = \frac{1}{8g^{4+(-1)}h^{6+(-1)}} = \boxed{\frac{1}{8g^3h^5}}$

11. $\frac{7^4}{7^{-6}}$

$7^4 7^6 = 7^{4+6} = \boxed{7^{10}}$

12. $\frac{4w^{-6}}{6w^2}$

$\frac{4}{6w^2 w^6} = \frac{4}{6w^{2+6}} = \frac{4}{6w^8} = \boxed{\frac{2}{3w^8}}$

13. $\frac{d^2}{d^{-2}}$

$d^2 d^2 = d^{2+2} = \boxed{d^4}$

14. $\frac{2c^2}{8c^4}$

$\frac{2}{8c^4 c^{-2}} = \frac{2}{8c^{4+(-2)}} = \frac{2}{8c^2} = \boxed{\frac{1}{4c^2}}$

15. $\frac{gb}{9g^{-2}b^{-5}}$

$\frac{g g^2 b b^5}{9} = \frac{g^{1+2} b^{1+5}}{9} = \boxed{\frac{g^3 b^6}{9}}$

16. $\frac{6k^8}{2k^4}$

$\frac{6k^8 k^{-4}}{2} = \frac{6k^{8+(-4)}}{2} = \frac{6k^4}{2} = \boxed{3k^4}$

17. $\frac{2^{-2}3^3}{2^{-4}3^6}$

$\frac{2^{-2} 2^4}{3^6 3^{-3}} = \frac{2^{-2+4}}{3^{6+(-3)}} = \boxed{\frac{2^2}{3^3}}$ OR $\boxed{\frac{4}{27}}$

18. $\frac{10a^{23}}{5a^{-15}}$

$\frac{10a^{23} a^{15}}{5} = \frac{10a^{23+15}}{5} = \frac{10a^{38}}{5} = \boxed{2a^{38}}$

19. $\frac{b^3 g^{-8} h^{-5} k^7}{b^{-1} g^2 h^3 k^{-2}}$

$\frac{b^3 b^1 k^7 k^2}{g^2 g^8 h^3 h^5} = \frac{b^{3+1} k^{7+2}}{g^{2+8} h^{3+5}} = \boxed{\frac{b^4 k^9}{g^{10} h^8}}$

20. $\frac{3w^{-1}}{9w^6}$

$\frac{3}{9w^6 w^1} = \frac{3}{9w^{6+1}} = \frac{3}{9w^7} = \boxed{\frac{1}{3w^7}}$