

# Section 1.2 – Exponents and the Order of Operations

## Problem Set 3

Simplify the following expressions.

1.  $b^{-8}$

2.  $b^4 \cdot c^{-4} + b^4 \cdot b^{-3} \cdot c^{-4}$

3.  $\frac{7^{-5}}{7^{-3}}$

4.  $\frac{a^4 t^3 (5u - a)^3}{a^{-2} t^{10} (5u - a)^{12}}$

5.  $\frac{x(x^2 + t)}{xt^2}$

6.  $x^{-12} \cdot z^{-4}$

7.  $\frac{28x^2 z^2}{2x^7} + \frac{2x^2 z^3 \cdot z^{-4}}{z^3 x^{-5}}$

8.  $\frac{(3a - 2)^8}{(3a - 2)^5} - \frac{(4x + 3)^{-3}}{(4x + 3)^{-4}}$

9.  $\frac{99}{11x^{-3}}$

10.  $\frac{h^4 x^{-3}}{h^{-3}}$

11.  $\frac{6n^3 j}{12^{-2} j^{13} n^{-3}}$

12.  $j^4 \cdot j^{-3}$

13.  $w^3 d^{-3} + 2d^{-4} d^{-2}$

14.  $q^{-3} s^2 + q^{-2} s^{-3}$

15.  $\frac{4v^{-3} p^3}{3p^{-4}} + 2p^7 n^3 - \frac{p^6}{p^{-1} v^3}$

16.  $\frac{(4w - 2)^8}{(4w - 2)^{10}}$

Write the following numbers in scientific notation.

17. 425800000

18. -36000000000

19. 0.0000125

20. -0.000000000078

21. 1258900000000

22. -0.000012

23. 1897980200000

24. 0.000000000026

25. **bytes in a gigabyte:** 1073741824

26. **population of China:** 1, 351, 000, 000 people

27. **diameter of Pluto:** 2360 kilometers

28. **seconds in ten years:** 315, 360, 000

Write the following numbers in decimal notation.

29.  $3.6 \times 10^{10}$

30.  $4.21 \times 10^{19}$

31.  $-2.62 \times 10^{-12}$

32.  $-4.669 \times 10^9$

33.  $4.1 \times 10^{-3}$

34.  $1.823 \times 10^{-1}$

35.  $-3.66 \times 10^{17}$

36.  $-2.00001 \times 10^5$

37. **approximate diameter of a hydrogen atom nucleus:**  $1.75 \times 10^{-15}$  m

38. **number of meters in a nanometer:**  $3.0 \times 10^{-7}$  meters

39. **mass of one carbon atom:**  $1.994 \times 10^{-23}$  g

40. **mass of a neutron:**  $1.6749 \times 10^{-27}$  kg