

1. a^{-4} for $a = 3$ 2. w^{-6} for $w = -5$ 3. $w^{-2}y$ for $w = 5$ and $y = -3$

4. a^0 for $a = 12$ 5. $(6-w)^{-8}$ for $w = 7$ 6. a^0b^{-3} for $a = 5$ and $b = 10$

$(6-7)^{-8}$
 $(-1)^{-8} \checkmark$
 $\frac{1}{(-1)^8}$
 $\frac{1}{1} = 1$

7. $6w^{-4}$ 8. $\frac{y^7}{w^{-3}}$ 9. $3x^{-2}y^0$ 10. $\frac{w^{-6}}{b^{-4}}$

~~$6w^{-4}$~~
 $\frac{6}{w^4}$

11. Engineering notation can be written in terms of a base unit, with a power of 10 that is a multiple of 3. The table shows some of these equivalences. Simplify each expression.

Selected Engineering Prefixes					
Giga	Mega	Kilo	Milli	Micro	Nano
10^9	10^6	10^3	10^{-3}	10^{-6}	10^{-9}

Giga _____ Kilo _____

Milli _____ Micro _____

Mega _____ Nano _____

12. Find the value of 10^5 . $100,000$

13. Write 0.00000004 as a power of 10.

 4×10^{-8}

14. Write 1,000,000,000,000 as a power of 10.

 1×10^{12}
 10^{12} 15. Find the value of 15.7×10^5 . 1.57×10^6
 $15,700,000$

16. The wavelength of red light is 0.0000007 m.
Write this length in scientific notation.

 7×10^{-7} 17. $3^5 \cdot 3^2$ 3^7 $2,187$ 18. $5^4 \cdot 5^{-2}$ $5^2 = 25$

26. $\left(\frac{2}{3}\right)^3$
 $\frac{2^3}{3^3} = \frac{8}{27}$

27. $\left(\frac{5w^4}{w^2y^6}\right)^2$
 $\frac{5w^2}{y^6} = \frac{25w^4}{y^{12}}$

28. $\left(\frac{3}{4}\right)^{-3}$
 $\left(\frac{4}{3}\right)^3 = \frac{4^3}{3^3} = \frac{64}{27}$

29. $\left(\frac{a^2b^5}{ab^6}\right)^{-2}$
 $\frac{(a^2b^5)^2}{(ab^6)^2} = \frac{a^4b^{10}}{a^2b^{12}} = \frac{a^2b^2}{a^2b^2} = 1$

30. $(9 \times 10^{10}) \div (3 \times 10^4)$
 $\frac{9}{3} \times \frac{10^{10}}{10^4} = 3 \times 10^6$

31. $(4.5 \times 10^6) \div (9 \times 10^9)$
 $\frac{4.5 \times 10^6}{9 \times 10^9} = \frac{4.5}{9} \cdot \frac{10^6}{10^9} = .5 \times 10^{6-9} = .5 \times 10^{-3} = 5 \times 10^{-4}$

32. $(2 \times 10^5) \div (5 \times 10^5)$

$$\frac{2}{5} \cdot \frac{10^5}{10^5}$$

$$.4 \times 10^0$$

$$4 \times 10^{-1}$$

33. $\left(\frac{2}{3}\right)^3$

$$\frac{8}{27}$$

34. $\left(\frac{5w^2}{w^2y^6}\right)^2$

$$\left(\frac{5w^2}{y^6}\right)^2 \frac{5^2(w^2)^2}{(y^6)^2}$$

$$\frac{25w^4}{y^{12}}$$

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

$$4^3$$

$$\frac{64}{27}$$

36. $\left(\frac{a^*b^5}{ab^8}\right)^{-2}$

$$\left(\frac{ab}{a^2b^2}\right)^2$$

$$\frac{a^2b^2}{a^4b^4}$$

37. $\sqrt[3]{x^4y^2}$

$$\sqrt{x^4} \sqrt{y^2}$$

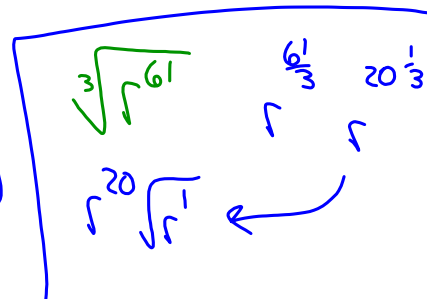
$$x^{4/3} y^{2/3}$$

$$x^2 y$$

38. $\sqrt{q^6}$

$$q^2$$

$$q^{6/3}$$



39. $\sqrt[3]{k^{15}}$

k^5

40. $\sqrt[3]{r^3s^9}$

rs^3