

Simplify. Assume that no denominator is equal to zero.

1) $\frac{8^8}{8^4}$

10) $x^3(y^{-5})(x^{-8})$

19) $\frac{6f^{-2}g^3h^5}{54^{-2}g^{-5}h^3}$

2) $\frac{a^4b^6}{ab^3}$

11) $p(q^{-2})(r^{-3})$

20) $\frac{-12t^{-1}u^5v^{-4}}{2t^{-3}uv^5}$

3) $\frac{xy^2}{xy}$

12) 12^{-2}

21) $\frac{r^4}{(3r)^3}$

4) $\frac{m^5np}{m^4p}$

13) $\left(\frac{3}{7}\right)^{-2}$

22) $\frac{m^{-2}n^{-5}}{(m^4n^3)^{-1}}$

5) $\frac{5c^2d^3}{-4c^2d}$

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

23) $\frac{(j^{-1}k^3)^{-4}}{j^3k^3}$

6) $\frac{8y^7z^6}{4y^6z^5}$

15) $\frac{22r^3s^2}{11r^2s^{-3}}$

24) $\frac{(2a^{-2}b)^{-3}}{5a^2b^4}$

7) $\left(\frac{4f^3g}{3h^6}\right)^3$

16) $\frac{-15w^0u^{-1}}{5u^3}$

25) $\left(\frac{q^{-1}r^3}{qr^{-2}}\right)^{-5}$

8) $\left(\frac{6w^5}{7p^6s^3}\right)^2$

17) $\frac{8c^3d^2f^4}{4c^{-1}d^2f^{-3}}$

26) $\left(\frac{7c^{-3}d^3}{c^5de^{-4}}\right)^{-1}$

9) $\frac{-4c^2}{24^5}$

18) $\left(\frac{x^{-3}y^5}{4^{-3}}\right)^0$

27) $\left(\frac{2x^3y^2z}{3x^4yz^{-2}}\right)^{-2}$

28) A lab technician draws a sample of blood. A cubic millimeter of the blood contains 22^3 white blood cells and 22^5 red blood cells. What is the ratio of white blood cells to red blood cells?

29) The number of three-letter “words” that can be formed with the English alphabet is 26^3 . The number of five-letter “words” that can be formed is 26^5 . How many times more five-letter “words” can be formed than three-letter “words”?