

## C7L4 Notes

### Exponents and Exponential Functions

Simplify. Use only positive exponents with the variables.

$$\begin{aligned} 1. \quad & \frac{5^9}{5^5} \\ & 5^{9-5} \\ & 5^4 \\ & 625 \end{aligned}$$

$$\begin{aligned} 2. \quad & \frac{5^3}{5^6} \\ & 5^{3-6} \\ & 5^{-3} \\ & \frac{1}{5^3} \\ & \frac{1}{125} \end{aligned}$$

$$\begin{aligned} 3. \quad & \frac{n^9}{n^{15}} \\ & n^{9-15} \\ & n^{-6} \\ & \frac{1}{n^6} \end{aligned}$$

$$\begin{aligned} 4. \quad & \frac{x^{-8}}{x^{-5}} \\ & x^{-8-(-5)} \\ & x^{-8+5} \\ & x^{-3} \\ & \frac{1}{x^3} \end{aligned}$$

$$\begin{aligned} 5. \quad & \frac{5a^{-9}}{15a^{-12}} \\ & \frac{5}{15} \cdot a^{-9-(-12)} \\ & \frac{5}{15} a^{-9+12} \\ & \frac{1}{3} \cdot a^3 \\ & \frac{1a^3}{3} \\ & \frac{a^3}{3} \end{aligned}$$

$$\begin{aligned} 6. \quad & \frac{m^9 n^4}{m^9 n} \\ & m^{9-9} n^{4-1} \\ & m^0 n^3 \\ & 1 n^3 \\ & n^3 \end{aligned}$$

$$7. \frac{20x^8y^3}{4x^2y^7}$$

$$\frac{20}{4} x^{8-2} y^{3-7}$$

$$\frac{5}{1} \cdot x^6 y^{-4}$$

$$\frac{5x^6}{1y^4}$$

$$\frac{5x^6}{y^4}$$

$$9. \left(\frac{4}{5}\right)^3$$

$$\frac{4^3}{5^3}$$

$$\frac{64}{125}$$

$$11. \left(\frac{3a}{2b}\right)^4$$

$$\frac{3^4 a^4}{2^4 b^4}$$

$$\frac{81a^4}{16b^4}$$

$$8. \frac{8x^{-2}y^3z^{-4}}{40x^3y^{-7}z^5}$$

$$\frac{8}{40} \cdot x^{-2-3} y^{3-(-7)} z^{-4-5}$$

$$\frac{1}{5} x^{-5} y^{10} z^{-9}$$

$$\frac{1y^{10}}{5x^5z^9}$$

$$\frac{y^{10}}{5x^5z^9}$$

$$\frac{y^{10}}{5x^5z^9}$$

$$10. \left(\frac{1}{x}\right)^5$$

$$\frac{1}{x^5}$$

$$\frac{1}{x^5}$$

$$12. \left(\frac{2n}{7}\right)^3$$

$$\frac{2^3 n^3}{7^3}$$

$$\frac{8n^3}{343}$$

$$13. \left(\frac{3}{5}\right)^{-4}$$

$$\frac{3^{-4}}{5^{-4}}$$

$$\frac{5^4}{3^4}$$

$$\frac{625}{81}$$

$$14. \left(\frac{x^{-3}}{x^{-5}}\right)^6$$

$$\frac{x^{-18}}{x^{-30}}$$

$$x^{-18 - (-30)}$$

$$x^{-18 + 30}$$

$$x^{12}$$

$$15. \left(\frac{5xy}{ab^3}\right)^0$$

$$1$$

$$16. \left(\frac{4ab^6}{a^5b}\right)^{-3}$$

$$\frac{4^{-3} a^{-3} b^{-18}}{a^{-15} b^{-3}}$$

$$4^{-3} a^{-3 - (-15)} b^{-18 - (-3)}$$

$$4^{-3} a^{-3 + 15} b^{-18 + 3}$$

$$4^{-3} a^{12} b^{-15}$$

$$\frac{a^{12}}{4^3 b^{15}}$$

$$17. \left(\frac{x^{-2}x^5}{6x^{-3}y}\right)^{-3}$$

$$\frac{x^6 x^{-15}}{6^{-3} x^9 y^{-3}}$$

$$\frac{x^{-9}}{6^{-15}}$$

$$\frac{x}{6^{-3} x^9 y^{-3}}$$

$$\frac{x}{6^{-3} x^9 y^{-3}}$$

$$6^3 x^{-9-9} y^3$$

$$6^3 x^{-18} y^3$$

$$\frac{216 y^3}{x^{18}}$$

$$18. \left(\frac{3ab^{-6}}{6a^{-8}bz^{-4}}\right)^{-3}$$

$$\frac{3^{-3} a^{-3} b^{18}}{6^{-3} a^{24} b^{-3} c^{12}}$$

$$\frac{6^3}{3^3} \cdot a^{-3-24} b^{18-(-3)} c^{-12}$$

$$\frac{216}{27} \cdot a^{-27} b^{21} c^{-12}$$

$$\frac{8}{1} \cdot a^{-27} b^{21} c^{-12}$$

$$\frac{8 b^{21}}{27 c^{12}}$$