

## Exponents

Simplify the following:

1.  $x^3 \cdot x^5$

2.  $x^5 \cdot x^3 \cdot x^4$

3.  $x^2 y^5 \cdot x^5 y^6$

4.  $x^{\frac{2}{5}} \cdot x^{\frac{7}{5}}$

5.  $y^{\frac{3}{4}} \cdot y^{\frac{1}{3}}$

6.  $5^{3x} \cdot 5^{7x}$

7.  $3^y \cdot 3^x$

8.  $3^x \cdot 5^x$

9.  $(x^2)^5$

10.  $(x^5 y^3)^4$

11.  $(x^y)^3$

12.  $(3^{2x})^x$

13.  $(2^{x+1})^{x-1}$

14.  $(x^{\frac{2}{5}})^{\frac{3}{4}}$

15.  $(x^{\frac{2}{3}} y^{\frac{1}{2}})^{\frac{2}{5}}$

16.  $2^{3x^2-8x+1} \cdot 2^{5x^2+x+1}$

17.  $\frac{x^6}{x^4}$

18.  $\frac{x^3}{x^5}$

19.  $\frac{x^7 y^5}{x^4 y^6}$

20.  $\frac{5^{2x-5}}{5^{x+3}}$

21.  $\frac{x^{\frac{2}{3}}}{x^{\frac{5}{6}}}$

22.  $x^{-5}$

23.  $(x^2 - 3x + 7)^0$

24.  $5^2 \cdot 5^0 \cdot 5^3$

25.  $\frac{2x^{-3}}{-3y^{-2}}$

26.  $(3x^{-2} y^4)^{-3}$

27.  $\frac{3x^{-2} y^5}{2x^{-5} y^3}$

28.  $\frac{(6x^{-2} y)^3 (2x^4 y^{-1})^{-4}}{(3x^{-5} y^4)^2}$

29.  $\frac{2x^{\frac{1}{3}} y^{\frac{1}{2}} \left( 4x^{\frac{1}{4}} y^{\frac{2}{3}} \right)^2}{\left( 8x^{\frac{1}{2}} y^{\frac{3}{4}} \right)^3}$

30.  $\left( x^2 (x^3 y^4 (y^5)^4)^3 \right)^{\frac{2}{3}}$