

## *Simplifying with Exponents: Level 1*

1.  $x^5 \cdot x^{11}$

2.  $3c^3 \cdot 2c^{10}$

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

4.  $a^7 \cdot 4a$

5.  $(x^5)^3$

6.  $(2p^4)^2$

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

8.  $(-4x^2)^4$

9.  $\frac{2^8}{2^5}$

10.  $\frac{1}{x^{-7}}$

11.  $\frac{4k^{10}m^5}{k^3m^2}$

12.  $\frac{6r^9}{3r^8}$

13.  $\frac{4^5 \cdot 4^3}{4^4}$

14.  $\frac{x^{10} \cdot x^{-2}}{x^8}$

15.  $\frac{\pi^4}{\pi \cdot \pi^2}$

16.  $\frac{q^4 \cdot 4^2}{4 \cdot q}$

17.  $\frac{2^{-6}}{2^2} \cdot \frac{2^8}{2^5}$

18.  $\frac{x^4}{x} \cdot \frac{x^{15}}{x^9}$

19.  $\frac{3z^5}{z^2} \cdot \frac{z^8}{3z^4}$

20.  $\frac{w^{12}}{w^2} \cdot \frac{w^7}{w^3}$

21.  $\left(-\frac{1}{4}x^5\right)^{-3}$

22.  $\left(\frac{2}{5}h^7\right)^3$

23.  $(z^2)^4$

24.  $(3j^4)^4$

25.  $\left(-\frac{2}{7}p\right)^2$

26.  $\frac{12x^{-5}y^4}{3x^{-8}y}$

27.  $\frac{15c^7}{5c^4}$

## *Simplifying with Exponents: Level 1—Answers*

1.  $x^5 \cdot x^{11} = x^{16}$

2.  $3c^3 \cdot 2c^{10} = 6c^{13}$

3.  $-2x^3 \cdot x^4 = -2x^7$

4.  $a^7 \cdot 4a = 4a^8$

5.  $(x^5)^3 = x^{15}$

6.  $(2p^4)^2 = 4p^8$

7.  $\left(\frac{2}{3}d^3\right)^2 = \frac{4}{9}d^6$

8.  $(-4x^2)^4 = 256x^8$

9.  $\frac{2^8}{2^5} = 8$

10.  $\frac{1}{x^{-7}} = x^7$

11.  $\frac{4k^{10}m^5}{k^3m^2} = 4k^7m^3$

12.  $\frac{6r^9}{3r^8} = 2r$

13.  $\frac{4^5 \cdot 4^3}{4^4} = 256$

14.  $\frac{x^{10} \cdot x^{-2}}{x^8} = 1$

15.  $\frac{\pi^4}{\pi \cdot \pi^2} = \pi$

16.  $\frac{q^4 \cdot 4^2}{4 \cdot q} = 4q^3$

17.  $\frac{2^{-6}}{2^2} \cdot \frac{2^8}{2^5} = \frac{1}{32}$

18.  $\frac{x^4}{x} \cdot \frac{x^{15}}{x^9} = x^9$

19.  $\frac{3z^5}{z^2} \cdot \frac{z^8}{3z^4} = z^7$

20.  $\frac{w^{12}}{w^2} \cdot \frac{w^7}{w^3} = w^{14}$

21.  $\left(-\frac{1}{4}x^5\right)^{-3} = -\frac{64}{x^{15}}$

22.  $\left(\frac{2}{5}h^7\right)^3 = \frac{8h^{21}}{125}$

23.  $(z^2)^4 = z^8$

24.  $(3j^4)^4 = 81j^{16}$

25.  $\left(-\frac{2}{7}p\right)^2 = \frac{4p^2}{49}$

26.  $\frac{12x^{-5}y^4}{3x^{-8}y} = 4x^3y^3$

27.  $\frac{15c^7}{5c^4} = 3c^3$

## *Simplifying with Exponents: Level 2*

1.  $3^{-3}$

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

3.  $(-2)^3 \cdot (-2)^{-3}$

4.  $4y^0 \cdot 2$

5.  $(-2y)^{-3}$

6.  $x^{-5}$

7.  $\left(\frac{2}{3}d^3\right)^0$

8.  $5^{-1} \cdot 5^{-2}$

9.  $\frac{2^5}{2^8}$

10.  $\frac{x^2}{x^5}$

11.  $\frac{-4}{(-4)^3}$

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

13.  $\frac{4^5 \cdot 4^{-3}}{4^4}$

14.  $\frac{-10x^{-10} \cdot x^2}{5x^{-8}}$

15.  $\frac{\pi^4}{\pi^{-2} \cdot \pi^2}$

16.  $\frac{3^4}{3^{-1} \cdot 3^3}$

17.  $\frac{1}{6^{-2}} \cdot \frac{1}{6^5}$

18.  $\frac{1}{x^5} \cdot \frac{1}{x^{-3}}$

19.  $\frac{1}{z^{-4}} \cdot \frac{1}{z^2}$

20.  $\frac{w^4}{w^6} \cdot \frac{w^7}{w^3}$

21.  $(x^{-5})^2$

22.  $(-x)^{-3}$

23.  $z^{-4} \cdot z^{-3}$

24.  $g^{-7}$

25.  $p^{-2} \cdot p^5$

26.  $\frac{12x^{-6}}{3x^{-8}}$

27.  $\frac{-15c^{-7}}{5c^{-4}}$

## *Simplifying with Exponents: Level 2—Answers*

$$1. 3^{-3} = \frac{1}{27}$$

$$2. 3c^{-4} \cdot 2c^4 = 6$$

$$3. (-2)^3 \cdot (-2)^{-3} = 1$$

$$4. 4y^0 \cdot 2 = 8$$

$$5. (-2y)^{-3} = \frac{1}{-8y^3}$$

$$6. x^{-5} = \frac{1}{x^5}$$

$$7. \left(\frac{2}{3}d^3\right)^0 = 1$$

$$8. 5^{-1} \cdot 5^{-2} = \frac{1}{125}$$

$$9. \frac{2^5}{2^8} = \frac{1}{8}$$

$$10. \frac{x^2}{x^5} = \frac{1}{x^3}$$

$$11. \frac{-4}{(-4)^3} = \frac{1}{16}$$

$$12. \frac{(x^4 \cdot x^3)^2}{x^5} = x^9$$

$$13. \frac{4^5 \cdot 4^{-3}}{4^4} = \frac{1}{16}$$

$$14. \frac{-10x^{-10} \cdot x^2}{5x^{-8}} = -2$$

$$15. \frac{\pi^4}{\pi^{-2} \cdot \pi^2} = \pi^4$$

$$16. \frac{3^4}{3^{-1} \cdot 3^3} = 9$$

$$17. \frac{1}{6^{-2}} \cdot \frac{1}{6^5} = \frac{1}{216}$$

$$18. \frac{1}{x^5} \cdot \frac{1}{x^{-3}} = \frac{1}{x^2}$$

$$19. \frac{1}{z^{-4}} \cdot \frac{1}{z^2} = z^2$$

$$20. \frac{w^4}{w^6} \cdot \frac{w^7}{w^3} = w^2$$

$$21. (x^{-5})^2 = \frac{1}{x^{10}}$$

$$22. (-x)^{-3} = \frac{1}{(-x)^3}$$

$$23. z^{-4} \cdot z^{-3} = \frac{1}{z^7}$$

$$24. g^{-7} = \frac{1}{g^7}$$

$$25. p^{-2} \cdot p^5 = p^3$$

$$26. \frac{12x^{-6}}{3x^{-8}} = 4x^2$$

$$27. \frac{-15c^{-7}}{5c^{-4}} = \frac{-3}{c^3}$$

## Simplifying with Exponents: Level 3

1.  $-2x^0$

2.  $3c^{\frac{1}{4}} \cdot 2c^{\frac{1}{2}}$

3.  $4x^{-3}$

4.  $3g^6 \cdot 8g^{-8}$

5.  $7n^{-5}$

6.  $-4x^{-5}$

7.  $\left(\frac{2}{3}d^3\right)^0 \cdot (-2)^2s^{-3}$

8.  $6x^4 \cdot -2z^0 \cdot x^{-2}$

9.  $\frac{2^{-5}}{2^{-8}}$

10.  $\frac{12x^4y^{-3}}{3x^{-1}} \cdot \frac{-4x^{-3}y^5}{2x^{-3}}$

11.  $\frac{4d^{\frac{5}{3}}}{\frac{2}{d^3}}$

12.  $\frac{7r^{\frac{5}{8}}s^5}{\frac{1}{2r^{\frac{1}{8}}s^3}}$

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

14.  $\frac{8x^2}{4x^8}$

15.  $\frac{\pi^{-4}}{x^0y^0\pi^{-2} \cdot \pi^4}$

16.  $\frac{14u^{-4}}{7u^8}$

17.  $\frac{-36m^{\frac{5}{8}}n^5}{-\frac{1}{6m^{\frac{1}{8}}n^3}}$

18.  $x^5 \cdot \frac{1}{x^{-3}}$

19.  $x^4 \cdot y^{-2} \cdot z^{-3}$

20.  $\frac{2w^4}{w^{-6}}$

21.  $\frac{xy^2z^{-3}}{2x^{-3}z^{-1}} \cdot \frac{-2x^4y^{-3}z}{4x^5y^{-2}}$

22.  $(-2)^{-3} \cdot x^5$

23.  $\left(\frac{1}{a^2}b\right)^4 \cdot (3ab^2)^3$

24.  $\frac{4x^{-3}y^{-1}}{3x^{-5}} \cdot \frac{10x^{-2}y^3}{5y^{-1}}$

25.  $\frac{4a^2b}{a^{-3}b^5} \cdot \frac{6a^6b^{-1}}{3a^7b^{-3}}$

26.  $\frac{12x^{-10}}{3x^{-8}}$

27.  $\frac{2^{-3} \cdot c^{-3} \cdot x^0}{5c^{-4}}$

## *Simplifying with Exponents: Level 3—Answers*

1.  $-2x^0 = -2$

2.  $3c^{\frac{1}{4}} \cdot 2c^{\frac{1}{2}} = 6c^{\frac{3}{4}}$

3.  $4x^{-3} = \frac{4}{x^3}$

4.  $3g^6 \cdot 8g^{-8} = \frac{24}{g^2}$

5.  $7n^{-5} = \frac{7}{n^5}$

6.  $-4x^{-5} = \frac{-4}{x^5}$

7.  $\left(\frac{2}{3}d^3\right)^0 \cdot (-2)^2s^{-3} = \frac{4}{s^3}$

8.  $6x^4 \cdot -2z^0 \cdot x^{-2} = -12x^2$

9.  $\frac{2^{-5}}{2^{-8}} = 8$

10.  $\frac{12x^4y^{-3}}{3x^{-1}} \cdot \frac{-4x^{-3}y^5}{2x^{-3}} = -8x^5y^2$

11.  $\frac{4d^{\frac{5}{2}}}{d^{\frac{3}{2}}} = 4d$

12.  $\frac{7r^{\frac{5}{8}}s^5}{2r^{\frac{1}{8}}s^3} = \frac{7r^{\frac{1}{2}}s^2}{2}$

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

14.  $\frac{8x^2}{4x^8} = \frac{2}{x^6}$

15.  $\frac{\pi^{-4}}{x^0y^0\pi^{-2} \cdot \pi^4} = \frac{1}{\pi^6}$

16.  $\frac{14u^{-4}}{7u^8} = \frac{2}{u^{12}}$

17.  $\frac{-36m^{\frac{5}{8}}n^5}{-6m^{\frac{1}{8}}n^3} = 6m^{\frac{1}{2}}n^2$

18.  $x^5 \cdot \frac{1}{x^{-3}} = x^8$

19.  $x^4 \cdot y^{-2} \cdot z^{-3} = \frac{x^4}{y^2z^3}$

20.  $\frac{2w^4}{w^{-6}} = 2w^{10}$

21.  $\frac{xy^2z^{-3}}{2x^{-3}z^{-1}} \cdot \frac{-2x^4y^{-3}z}{4x^5y^{-2}} = -\frac{x^3y}{4z}$

22.  $(-2)^{-3} \cdot x^5 = \frac{x^5}{-8}$

23.  $(\frac{1}{a^2}b)^4 \cdot (3ab^2)^3 = 27a^5b^{10}$

24.  $\frac{4x^{-3}y^{-1}}{3x^{-5}} \cdot \frac{10x^{-2}y^3}{5y^{-1}} = \frac{8y^3}{3}$

25.  $\frac{4a^2b}{a^{-3}b^5} \cdot \frac{6a^6b^{-1}}{3a^7b^{-3}} = \frac{8a^4}{b^2}$

26.  $\frac{12x^{-10}}{3x^{-8}} = \frac{4}{x^2}$

27.  $\frac{2^{-3} \cdot c^{-3} \cdot x^0}{5c^{-4}} = \frac{c}{40}$