# Math 9 Assignment 4: Exponents (solutions)

1. $3^4$
   $81$

2. Simplify $w \times w \times w$
   $w^3$

3. $(-2)^4$
   $16$

4. $x \times x^6 \times x^3$
   $x^{10}$

5. $(a^3)(a) \cdot a^7$
   $a^{11}$

6. $(2x^2)^4$
   $16x^8$

7. $\left(\frac{-5}{2}\right)^3$
   $-\frac{125}{8}$

8. Simplify $\frac{x^8}{x^6}$
   $x^2$

9. $x^p \cdot x^q$
   $x^{p+q}$

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

11. $\left(\frac{w}{x}\right)^y$
    $\frac{w^y}{x^y}$

12. Evaluate $-4^2$
    $-16$

13. Evaluate $(-4)^2$
    $16$

14. $\frac{x^7}{x^5} \div \frac{x}{x^3}$
    $x^2 \times x^2 = x^4$

15. $\frac{10ab^2c}{15a^3b^4}$
$\frac{2c}{3a^2b^2}$

16. $\left(x^3\right)^4$
$x^{12}$

17. $\left((a^c)^d\right)^e$
$a^{cde}$

18. $\left(\frac{3x^3y^2}{z^4}\right)^3$
$\frac{27x^9y^6}{z^{12}}$

19. $\frac{(-2)^5}{(-2)^2} \times -2^3$
$\frac{-32}{4} \times -8$
$= 64$

20. $-3(-3)^2 - (-2)^2$
$-3(9) - 4$
$-27 - 4 = -31$

21. $\left(\left(3x^2\right)^2\right)^3$
$\left(9x^4\right)^3 = 729x^{12}$

22. $\left(3\left(2a^2\right)^2\right)^2$
$\left(3 \times 4a^4\right)^2$
$\left(12a^4\right)^2 = 144a^8$

23. $(-1)^{12345}$
$-1$

24. $\frac{(-2)^{112}}{-2^{109}}$
$\frac{2^{112}}{-2^{109}} = -2^3 = -8$

25. $1^0 + 0^1$
$1 + 0 = 1$

26. $0^0$
Undefined

27. $\left(\frac{6p^4p^6q^4}{4p^6q^3}\right)^2$

$\left(\frac{3p^3q}{2}\right)^2$

$\frac{9p^6q^2}{4}$

28. $\left(\frac{(-2)^2}{(-3)^4}\right)^2$

$\left(\frac{4}{81}\right)^2$

$\frac{16}{6561}$

29. $-3\left(-\frac{1}{3}\right)^2 + (-2)^3 - \left(\frac{-3^4}{(-3)^2}\right)^2$

$-3\left(\frac{1}{9}\right) - 8 - \left(-\frac{81}{9}\right)^2$

$-\frac{1}{3} - 8 - 81$

$-\frac{268}{3}$

30. $\frac{3}{x}\left(\frac{2x}{3x^3}\right)^3 \div \frac{1}{x^2}$

$\frac{3}{x}\left(\frac{2}{3x^2}\right)^3 \times x^2$

$3x \times \frac{8}{27x^2} = \frac{24}{27x}$

31. Solve $16 = 4^{5x}$

$2^4 = 4^{5x}$

$4 = 5x \rightarrow x = \frac{4}{5}$

32. Solve $\frac{2^8}{2^x} = 2^{x+1}$

$2^{8-x} = 2^{x+1}$

$8 - x = x + 1$

$7 = 2x$

$x = \frac{7}{2}$

33. Solve $27^{1-3x} = \frac{3^8}{3^x}$

$(3^3)^{(1-3x)} = 3^{8-x}$

$3 - 9x = 8 - x$

$-5 = 8x$

$x = -\frac{5}{8}$