

Name: Answer key

### 3.2 Worksheet

1. Write each expression as a single power

$$\begin{aligned} \text{a) } 3^4 \times 3^9 \div 3^{11} \\ = 3^{13} \div 3^{11} \\ = 3^2 \end{aligned}$$

$$\begin{aligned} \text{b) } (-4)^3 \div (-4)^2 \times (-4)^{10} \\ = (-4) \times (-4)^{10} \\ = (-4)^{11} \end{aligned}$$

$$\begin{aligned} \text{c) } 6^0 \times 6^3 \div 6^2 \\ = 6^3 \div 6^2 \\ = 6 \end{aligned}$$

$$\begin{aligned} \text{d) } \frac{4^3 \times 4^5}{4^2 \times 4^6} \\ = \frac{4^8}{4^8} \\ = 4^0 \end{aligned}$$

$$\begin{aligned} \text{e) } \frac{(-3)^4 \times (-3)^4}{(-3)^3} \\ = \frac{(-3)^8}{(-3)^3} \\ = (-3)^5 \end{aligned}$$

2. Simplify each expression, then evaluate.

$$\begin{aligned} \text{a) } (5^3 \times 5^3)^1 - (4^2)^2 \\ = 5^6 - 4^4 \\ = 15625 - 256 \\ = 15369 \end{aligned}$$

$$\begin{aligned} \text{b) } 10^2 \times 10^2 + 10^4 \\ = 10^4 + 10^4 \\ = 2(10^4) \\ = 20000 \end{aligned}$$

$$\begin{aligned} \text{c) } 2^3 \times 2^2 - 2^5 \times 2 \\ = 2^5 - 2^6 \\ = -32 \end{aligned}$$

$$\begin{aligned} \text{d) } (3^3 \div 3^2)^3 + (8^4 \times 8^3)^0 \\ = (3)^3 + 1 \\ = 27 + 1 \\ = 28 \end{aligned}$$

$$\begin{aligned} \text{e) } \frac{10^4 \times 10^3}{10^2} \\ = \frac{10^7}{10^2} \\ = 10^5 \\ = 100000 \end{aligned}$$

$$\begin{aligned} \text{f) } \frac{10^5}{10^3} + 10^2 \\ = 10^2 + 10^2 \\ = 2(10^2) \\ = 200 \end{aligned}$$

$$\begin{aligned} \text{g) } 4^2 - 3^0 \times 3 + 2^3 \\ = 4^2 - 3 + 2^3 \\ = 16 - 3 + 8 \\ = 21 \end{aligned}$$

$$\begin{aligned} \text{h) } 3^2 \times 3 + 2^2 \times 2^4 \\ = 3^3 + 2^6 \\ = 27 + 64 \\ = 91 \end{aligned}$$

# Answer Key

$$\textcircled{1} 2^4 \times 2^3 \\ = 2^7$$

$$\textcircled{2} 2^6 \div 2^2 \\ = 2^4$$

$$\textcircled{3} (2^4)^3 \\ = 2^{12}$$

$$\textcircled{22} a^4 \times a^3 \\ = a^7$$

$$\textcircled{23} (m^6)(m^2) \\ = m^8$$

$$\textcircled{25} a \times b^2 \times a^4 \\ = a \times a^4 \times b^2 \\ = a^5 \times b^2$$

$$\textcircled{30} a^5 \times a^0 \\ = a^5$$

$$\textcircled{32} x^6 \div x^3 \\ = x^3$$

$$\textcircled{36} m^4 \div m^0 \\ = m^4$$

$$\textcircled{38} (x^3)^2 \\ = x^6$$

$$\textcircled{45} \left(\frac{a}{b}\right)^4 \\ = \frac{a^4}{b^4}$$

$$\textcircled{46} \left(\frac{x^2}{y^3}\right)^5 \\ = \frac{x^{10}}{y^{15}}$$

$$\textcircled{50} 5m^4 \times 3m^2$$

$$= (5 \times 3)(m^4 \times m^2) \\ = 15m^6$$

$$\textcircled{51} (4ab^4)(-5a^3b^2)$$

$$= (4 \times -5)(ab^4 \times a^3b^2) \\ = -20a^4b^6$$

$$\textcircled{57} 5a(-2ab^2)(-3b^3)$$

$$= 5a(-2 \times -3)(ab^2 \times b^3) \\ = 30a^2b^5$$

$$\textcircled{53} (-6m^2n^2)(-4mn^5)$$

$$= 24m^3n^7$$

$$\textcircled{57} (-10x^4) \div (-2x)$$

$$= \left(\frac{-10}{-2}\right) \left(\frac{x^4}{x}\right)$$

$$= 5x^3$$

$$\begin{aligned} \textcircled{58} \quad & \frac{45a^2b^4}{9ab^2} \\ & = \left(\frac{45}{9}\right) \left(\frac{a^2}{a}\right) \left(\frac{b^4}{b^2}\right) \\ & = 5ab^2 \end{aligned}$$

$$\begin{aligned} \textcircled{59} \quad & \frac{(4m^2n^4)(7m^3n)}{14mn^5} \\ & = \frac{28m^5n^5}{14mn^5} \\ & = 2m^4 \end{aligned}$$

$$\begin{aligned} \textcircled{60} \quad & \frac{3ab^3 \times 10a^4b^2}{15a^2b^6} \\ & = \frac{3^0 a^5 b^5}{15a^2b^6} \\ & = 2a^3b^{-1} \\ & = \frac{2a^3}{b} \end{aligned}$$

$$\begin{aligned} \textcircled{67} \quad & (-4x^2)^3 \\ & = (-4)^3 (x^2)^3 \\ & = -64x^6 \end{aligned}$$

$$\begin{aligned} \textcircled{68} \quad & (-3m^3n^2)^2 \\ & = (-3)^2 (m^3)^2 (n^2)^2 \\ & = 9m^6n^4 \end{aligned}$$

$$\begin{aligned} \textcircled{73} \quad & \left(\frac{-2a^2}{3y^3}\right)^3 \\ & = \left(\frac{-2}{3}\right)^3 \left(\frac{a^2}{y^3}\right)^3 \\ & = \frac{-8a^6}{27y^9} \end{aligned}$$

$$\begin{aligned} \textcircled{74} \quad & \left(\frac{3a}{-b^4}\right)^4 \\ & = \left(\frac{3}{1}\right)^4 \left(\frac{a}{-b^4}\right)^4 \\ & = \left(\frac{-81a^4}{b^{16}}\right) \end{aligned}$$

$$\begin{aligned} \textcircled{76} \quad & \left(\frac{6ab^3}{2ab}\right)^3 \\ & = (3b^2)^3 \\ & = 27b^6 \end{aligned}$$

$$\begin{aligned} \textcircled{78} \quad & \frac{6}{x^0+y^0} \\ & = \frac{6}{1+1} \\ & = \frac{6}{2} \\ & = 3 \end{aligned}$$

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$$\begin{aligned} \text{a) } \quad & x^2 \times x^3 = 32 \\ & = x^5 = 32 \\ & = x = \sqrt[5]{32} \\ & = x = 2 \end{aligned}$$

$$\begin{aligned} \text{b) } \quad & x^5 \div x^2 = 64 \\ & = x^3 = 64 \\ & = x = \sqrt[3]{64} \\ & = x = 4 \end{aligned}$$