




Check Your Understanding – Exponents and Scientific Notation

The table below identifies the key concepts from this unit.

1. Check your understanding by completing these questions.
2. Check your answers in the key provided.
3. In the table below, highlight the questions you got correct.
4. Ask peers/Dr. James about concepts where you can improve.

| Key Concepts |  Mild |  Medium |  Spicy |
|---|---|---|--|
| Exponential Notation Basics | 1 | | |
| Multiplying and Dividing with Exponents | 2 | 3 | 4, 7, 9, 12 |
| Power of a Power (including power of a product and power of a quotient) | 5 | 6 | 7, 9, 12 |
| Exponents of 0 | 8 | | 9 |
| Negative Exponents | 10 | 11 | 12 |
| Converting To and From Scientific Notation | 13 | | |
| Operations with Numbers in Scientific Notation | 14 | 15, 16, 17 | |

1a) Use exponential notation to simplify the following:

$$4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 =$$

1c) Calculate the following:

$$12^3 =$$

2a) Use the rules of exponents to simplify the following:

$$b^5 * b^7 =$$

1b) Use exponential notation to simplify the following:

$$-x \cdot -x \cdot -x - x =$$

1d) Calculate the following:

$$-4^6 =$$

2b) Use the rules of exponents to simplify the following:

$$\frac{g^{12}}{g^8} =$$

3a) Use the rules of exponents to simplify the following:

$$12a^{-3} * 2a^8 =$$

3b) Use the rules of exponents to simplify the following:

$$30y^6 \div 6y^{-3} =$$

4a) Use the rules of exponents to simplify the following:

$$3b^4a^3c^5 * -4a^8b^{-2}c =$$

4b) Use the rules of exponents to simplify the following:

$$\frac{40a^{-3}b^8c^2}{8a^2bc^5} =$$

5a) Write the following in the form $a^?b^?$

$$(ab)^5 =$$

5b) Write the following in the form $\frac{4^?}{y^?}$

$$\left(\frac{4}{y}\right)^7 =$$

6a) Write the following in the form $5^?j^?w^?$

$$(5j^2w^7)^3 =$$

6b) Write the following in the form $\frac{17^?a^?}{b^?c^?}$

$$\left(\frac{17a^2}{b^7c^9}\right)^3 =$$

7) Use the rules of exponents to simplify the following:

$$(3a^2bc^6)^3 * \left(\frac{3b^3a^2b^8c^7}{abc^5}\right)^2 =$$

8a) Calculate the following:

$$17^0 =$$

8b) Calculate the following:

$$g^0 =$$

9) Use the rules of exponents to simplify the following:

$$(12g^6k^2t)^4 \cdot \left(\frac{g^2t^5k}{kg^2t^7}\right)^2 =$$

10a) Use the rules of exponents to re-write the following with only positive exponents:

$$6^{-130} =$$

10b) Use the rules of exponents to re-write the following with only positive exponents:

$$\frac{1}{x^{-4}} =$$

11) Use the rules of exponents to re-write the following with only positive exponents:

$$\frac{x^{-4}y^2z^{-8}}{a^2b^{-9}} =$$

12) Use the rules of exponents to simplify the following, and write your answers using only positive exponents:

$$\frac{(3a^3b^9c^0)^{-4}(a^{16}b^2)}{c^{-15}} =$$

13a) Write the following number in scientific notation:

$$12\,670\,000\,000\,000 =$$

13b) Write the following number in scientific notation:

$$0.00000235 =$$

14a) Calculate the following and write your answer in scientific notation:

$$(1.2 \times 10^7)(3.5 \times 10^9) =$$

14b) Calculate the following and write your answer in scientific notation:

$$(9.7 \times 10^{23}) \div (8.5 \times 10^5) =$$

15) Calculate the following and write your answer in scientific notation:

$$(8.9 \times 10^8)(9.7 \times 10^{-2}) =$$

16) Calculate the following and write your answer in scientific notation:

$$(2.8 \times 10^{-6}) \div (6.7 \times 10^{10}) =$$

17a) Calculate the following and write your answer in scientific notation:

$$15.89 + (3.2 \times 10^{-2}) =$$

17b) Calculate the following the write your answer in scientific notation:

$$(5.4 \times 10^3) - 2352 =$$

Answers

1a) 4^7

1b) $(-x)^4$

1c) 1728

1d) -4096

2a) b^{12}

2b) g^4

3a) $24a^5$

3b) $5y^9$

4a) $-12a^{11}b^2c^6$

4b) $5a^{-5}b^7c^{-3}$ or $\frac{5b^7}{a^5c^3}$

5a) a^5b^5

5b) $\frac{4^7}{y^7}$

6a) $5^3j^6w^{21}$

6b) $\frac{17^3a^6}{b^{21}c^{27}}$

7) $3^5a^8b^{23}c^{22}$

8a) 1

8b) 1

9) $12^4g^{24}k^8$

10a) $\frac{1}{6^{130}}$

10b) x^4

11) $\frac{y^2b^9}{a^2x^4z^8}$

12) $\frac{a^4c^{15}}{3^4b^{34}}$ or $\frac{a^4c^{15}}{81b^{34}}$

13a) 1.267×10^{13}

13b) 2.35×10^{-6}

14a) 4.2×10^{16}

14b) 1.14×10^{18}

15) 8.633×10^7

16) 4.179×10^{-17}

17a) 1.5922×10 or 1.5922×10^1

17b) 3.048×10^3