Indices and scientific notation - practice test 1

16 questions | 39 marks | 55 minutes

Build fluency with index laws, scientific notation and compatible units.

Equivalent correct methods earn the corresponding marks.

1. Evaluate 2^5. [1 mark]

$2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$.

Answer: 32

2. Write $6^3 \times 6^2$ as one power. [1 mark]

Add exponents for a same-base product: $3 + 2 = 5$.

Answer: 6^5

3. Simplify $(4^2)^3 \div 4^4$. [2 marks]

$(4^2)^3 = 4^6$.

$4^{6-4} = 4^2 = 16$.

Answer: 16

4. Write 5^{-2} as a fraction. [2 marks]

$5^{-2} = \frac{1}{5^2} = \frac{1}{25}$.

Answer: $\frac{1}{25}$

5. Evaluate $(-2)^0 + (-2)^{-2}$. [3 marks]

$(-2)^0 = 1$ and $(-2)^{-2} = \frac{1}{4}$.

$1 + \frac{1}{4} = \frac{5}{4}$.

Answer: $\frac{5}{4}$

6. Simplify $3x^2 \times 5x^4$. [2 marks]

Multiply coefficients and add matching exponents: $3 \times 5 = 15$, $2 + 4 = 6$.

Answer: $15x^6$

7. Write $\frac{18a^3}{6a^5}$ with positive exponents, for $a \neq 0$. [2 marks]

The coefficient is 3 and the power is a^{-2}.

$3a^{-2} = \frac{3}{a^2}$.

Answer: $\frac{3}{a^2}$

8. Write 640000 in scientific notation. [2 marks]

$640000 = 6.4 \times 100000$.

Answer: 6.4×10^5

9. Write 7.08×10^{-4} as an ordinary decimal. [2 marks]

Divide 7.08 by 10000.

Answer: 0.000708

10. Which is larger, 9.6×10^4 or 1.1×10^5? Explain. [2 marks]

$1.1 \times 10^5 = 11 \times 10^4$, and $11 > 9.6$.

Answer: 1.1×10^5

11. Calculate $(3 \times 10^5)(8 \times 10^{-2})$ in scientific notation. [3 marks]

$3 \times 8 = 24$ and $5 + (-2) = 3$.

$24 \times 10^3 = 2.4 \times 10^4$.

Answer: 2.4×10^4

12. Calculate $\frac{4.8 \times 10^9}{1.2 \times 10^3}$. [3 marks]

$4.8 \div 1.2 = 4$ and $9 - 3 = 6$.

Answer: 4×10^6

13. Calculate $6.2 \times 10^5 + 9 \times 10^4$. [3 marks]

$9 \times 10^4 = 0.9 \times 10^5$.

$(6.2 + 0.9) \times 10^5 = 7.1 \times 10^5$.

Answer: 7.1×10^5

14. A microbe is 3×10^{-6} m long. A drawing is 6 cm long. Find the magnification. [4 marks]

$6 \text{ cm} = 6 \times 10^{-2}$ m.

Magnification $= \frac{6 \times 10^{-2}}{3 \times 10^{-6}} = 2 \times 10^4 = 20000$.

Answer: 20000 times

15. A file contains 7.5×10^8 bytes. A connection transfers 2.5×10^6 bytes/s at a constant rate. Find the time in minutes. [4 marks]

$t = \frac{7.5 \times 10^8}{2.5 \times 10^6} = 3 \times 10^2 = 300$ s.

$300 \div 60 = 5$ minutes.

Answer: 5 minutes

16. A student writes $2^3 + 2^4 = 2^7$. Explain the error and calculate the correct value. [3 marks]

Index exponents are added when powers are multiplied, not added.

$2^3 + 2^4 = 8 + 16 = 24$.

Answer: 24