

How Did the Light Dress Up for the Costume Party?

Write a fraction (or 1) for each power.
For each set of exercises, there is one
extra answer. Write the letter of this
answer in the corresponding box at
the right.

8	3	5	10	4	1	7	9	6	2
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1	7^{-2} 2^{-3} (B) $\frac{1}{9}$ (V) $\frac{1}{49}$ 3^{-2} (L) $\frac{1}{8}$ (A) $\frac{1}{12}$	Answers	6	10^{-1} 20^{-2} (U) $\frac{1}{400}$ (A) $\frac{1}{10}$ 100^{-3} (E) $\frac{1}{2000}$ (O) $\frac{1}{1,000,000}$	Answers
2	10^{-4} 4^{-3} (G) $\frac{1}{64}$ (D) $\frac{1}{81}$ 9^{-2} (R) $\frac{1}{27}$ (N) $\frac{1}{10,000}$		7	2^{-7} 5^{-4} (T) $\frac{1}{500}$ (L) 1 15^0 (M) $\frac{1}{625}$ (V) $\frac{1}{128}$	
3	15^{-1} 8^{-3} (S) $\frac{1}{40}$ (J) $\frac{1}{32}$ 2^{-5} (P) $\frac{1}{15}$ (C) $\frac{1}{512}$		8	8^{-2} 10^{-5} (I) $\frac{1}{256}$ (O) $\frac{1}{64}$ 4^{-4} (Y) $\frac{1}{100,000}$ (A) $\frac{1}{196}$	
4	5^{-3} 3^{-4} (H) $\frac{1}{125}$ (P) $\frac{1}{144}$ 12^{-2} (E) $\frac{1}{96}$ (F) $\frac{1}{81}$		9	7^{-3} 15^{-2} (E) $\frac{1}{343}$ (H) $\frac{1}{300}$ 11^0 (L) 1 (T) $\frac{1}{225}$	
5	6^0 1000^{-1} (T) $\frac{1}{1000}$ (A) $\frac{1}{693}$ 9^{-3} (L) 1 (I) $\frac{1}{729}$		10	13^{-2} 2^{-6} (B) $\frac{1}{64}$ (M) $\frac{1}{169}$ 16^{-1} (F) $\frac{1}{72}$ (S) $\frac{1}{16}$	

* answer on separate paperPart I:

5. Evaluate.

- a) 2^3 b) 2^{-3} c) -2^3 d) -2^{-3}
 e) $(-2)^3$ f) $(-2)^{-3}$ g) $-(-2)^3$ h) $-(-2)^{-3}$

9. Simplify.

- a) $10^4 \times 10^{-7}$ b) $3^{-5} \times 3^{-2}$
 c) $5^{-6} \div 5^2$ d) $(-2)^{-5} \times (-2)^{12}$
 e) $4^8 \div 4^{-3}$ f) $(-7)^{-3} \div (-7)^{10}$

12. Evaluate each power.

- a) -2^{-3} b) -4^{-2} c) -10^{-2} d) -5^0
 e) $-(-3)^0$ f) $-(-3)^{-1}$ g) $-(-5)^{-2}$ h) -7^{-3}

20. Two powers are given. Determine which one is greater. Explain your answer. Check with a calculator.

- a) $2^{-3}, 3^{-2}$ b) $2^{-4}, 4^{-2}$ c) $2^{-5}, 5^{-2}$

24. Use the laws of exponents to evaluate each expression.

- a) $3^2 \times 3^{-1}$ b) $5^3 \times 5^{-2}$
 c) $10^{-3} \times 10^{-2}$ d) $4^2 \times 4^{-2} \times 4^3$
 e) $2^{-6} \times 2^{-2} \times 2^5$ f) $(-1)^1 \times (-1)^2 \times (-1)^3$
 g) $\frac{7^{-1}}{7^3}$ h) $\frac{6^{-2}}{6^{-3}}$
 i) $\frac{(-3)^0}{(-3)^{-1}}$

Part II:

2. Write as a product of powers.

- a) $(5 \times 2)^3$ b) $(5 \times 2)^2$ c) $(5 \times 2)^1$
 d) $(5 \times 2)^0$ e) $(5 \times 2)^{-1}$ f) $(5 \times 2)^{-2}$

3. Write as a product or a quotient of powers.

- a) $(2 \times 5)^{-2}$ b) $(9 \times 3)^{-4}$ c) $(5 \times 7)^{-3}$
 d) $\left(\frac{2}{3}\right)^{-2}$ e) $\left(\frac{1}{2}\right)^{-4}$ f) $\left(\frac{4}{3}\right)^{-3}$

4. Write as a power.

- a) $(2^3)^{-2}$ b) $(3^{-2})^4$ c) $(4^{-3})^2$
 d) $(5^2)^{-4}$ e) $(8^{-5})^0$ f) $(7^{-2})^{-1}$

8. Use guess and check. Find each value of n .

- a) $(n^2)^2 = 16$
 b) $(n^2)^3 = 729$
 c) $(n^5)^2 = 1024$

9. Write each expression as a product or a quotient of powers.

- a) $(6 \times 2)^3$ b) $(3 \times 7)^5$
 c) $(9 \times 5)^4$ d) $\left(\frac{3}{5}\right)^5$
 e) $\left(\frac{1}{3}\right)^3$ f) $\left(\frac{3}{2}\right)^{10}$

14. Write as a power.

- a) $(2^3)^{-2}$ b) $(5^2)^{-1}$
 c) $(3^{-5})^{-2}$ d) $(4^0)^{-2}$
 e) $[(-2)^2]^{-3}$ f) $[(-4)^3]^{-2}$

17. Simplify

- a) $(3^2)^3 \times (3^4)^2$
 b) $(6^5)^2 \div (6^2)^3$
 c) $(7^3)^2 \times (7^8)^2$
 d) $(15^3)^4 \div (15^{-6})^{-2}$
 e) $(8^{-5} \times 8^{13})^{-4}$
 f) $(4^{-2})^{-3} \div (4^{-6})^{-2}$
 g) $(51^{-3})^{-5} \div (51^{-4})^6$
 h) $(29^{-6})^3 \times (29^7)^{-2}$
 i) $(101^{-8})^{-4} \div (101^{-7})^{-5}$

Key

Part I:

5. a) 8 b) $\frac{1}{8}$ c) -8 d) $-\frac{1}{8}$
 e) -8 f) $-\frac{1}{8}$ g) 8 h) $\frac{1}{8}$
9. a) 10^3 b) $\frac{1}{3^7}$ c) $\frac{1}{5^8}$ d) $(-2)^7$
 e) 4^{11} f) $(-\frac{1}{7})^{13}$
12. a) $-\frac{1}{8}$ b) $-\frac{1}{16}$ c) $-\frac{1}{100}$ d) $-\frac{1}{343}$
 e) -1 f) $\frac{1}{3}$ g) $-\frac{1}{25}$ h) $-\frac{1}{343}$

20. Explanations may vary.

- a) $2^{-3} > 3^{-2}$ b) $2^{-4} = 4^{-2}$ c) $2^{-5} < 5^{-2}$

24. a) 3 b) 5 c) $\frac{1}{100\,000}$ d) 64
 e) $\frac{1}{8}$ f) 1 g) $\frac{1}{2401}$ h) 6
 i) -3 j) $\frac{1}{3}$ k) $\frac{1}{25}$ l) 16

Part II:

2. a) $5^3 \times 2^3$ b) $5^2 \times 2^2$ c) $5^1 \times 2^1$
 d) $5^0 \times 2^0$ e) $\frac{1}{5^1} \times \frac{1}{2^1}$ f) $\frac{1}{5^2} \times \frac{1}{2^2}$
3. a) $\frac{1}{2^2} \times \frac{1}{5^2}$ b) $\frac{1}{9^4} \times \frac{1}{3^4}$ c) $\frac{1}{5^3} \times \frac{1}{7^3}$
 d) $\frac{2^{-2}}{3^{-2}}$ e) $\frac{1^{-4}}{2^{-4}}$ f) $\frac{4^{-3}}{3^{-3}}$
4. a) $\frac{1}{2^6}$ b) $\frac{1}{3^8}$ c) $\frac{1}{4^6}$
 d) $\frac{1}{5^8}$ e) 8^0 f) 7^2
8. a) 2 or -2 b) 3 or -3 c) 2 or -2
 9. a) $6^3 \times 2^3$ b) $3^5 \times 7^5$ c) $9^4 \times 5^4$
 d) $\frac{3^5}{5^5}$ e) $\frac{1^3}{3^3}$ f) $\frac{3^{10}}{2^{10}}$
14. a) $\frac{1}{2^6}$ b) $\frac{1}{5^2}$ c) 3^{10}
 d) 4^0 e) $\frac{1}{(-2)^6}$ f) $\frac{1}{(-4)^6}$
17. a) 3^{14} b) 6^4 c) 7^{22}
 d) 15^0 e) $\frac{1}{8^{32}}$ f) $\frac{1}{4^6}$
 g) 51^{39} h) $\frac{1}{29^{32}}$ i) $\frac{1}{101^3}$