

Powers & Roots

Numbers & Patterns · Grade 6

Score: _____ / 12

★ Hard · 12 Questions

Solve each problem. Show your work in the space provided. Write your answer on the line.

1. Simplify: $(2^2 \times 3)^3$

Answer: _____

2. Evaluate: 5^{-2}

Answer: _____

3. Simplify: $(3^2 \times 2^3) \div (3 \times 2^2)$

Answer: _____

4. Solve for x: $2^x = 32$

Answer: _____

5. Solve for x: $3^x = 81$

Answer: _____

6. Simplify: $(4^3 \times 4^2) \div 4^4$

Answer: _____

7. Simplify: $(2^3)^2 \times 2^{-4}$

Answer: _____

8. Evaluate: $(1/2)^4$

Answer: _____

9. If $4^x = 64$, find x .

Answer: _____

10. Simplify: $6^2 \div 6^{-1}$

Answer: _____

11. Write in standard form: 3.6×10^4

Answer: _____

12. Order from least to greatest:

2^5 , 3^3 , 4^2 , 5^1

Answer: _____

Answer Key

Powers & Roots — Hard

1. $12^3 = 1,728$

$(2^2 \times 3)^3 = (4 \times 3)^3 = 12^3 = 1,728$. Or: $2^6 \times 3^3 = 64 \times 27 = 1,728$.

2. $1/25$

$5^{-2} = 1/5^2 = 1/25$.

3. 6

$3^2 \div 3 = 3^1 = 3$. $2^3 \div 2^2 = 2^1 = 2$. Result: $3 \times 2 = 6$.

4. $x = 5$

$2^1=2$, $2^2=4$, $2^3=8$, $2^4=16$, $2^5=32$. So $x=5$.

5. $x = 4$

$3^1=3$, $3^2=9$, $3^3=27$, $3^4=81$. So $x=4$.

6. $4^1 = 4$

$4^3 \times 4^2 = 4^5$. Then $4^5 \div 4^4 = 4^1 = 4$.

7. $2^2 = 4$

$(2^3)^2 = 2^6$. Then $2^6 \times 2^{-4} = 2^{6-4} = 2^2 = 4$.

8. $1/16$

$(1/2)^4 = 1^4/2^4 = 1/16$.

9. $x = 3$

$4^1=4$, $4^2=16$, $4^3=64$. So $x=3$.

10. $6^3 = 216$

$6^2 \div 6^{-1} = 6^{2-(-1)} = 6^3 = 216$.

11. 36,000

Move decimal 4 places right: $3.6 \rightarrow 36,000$.

12. $5^1=5$, $4^2=16$, $3^3=27$, $2^5=32$. Order: $5 < 16 < 27 < 32$.

Evaluate each: $2^5=32$, $3^3=27$, $4^2=16$, $5^1=5$. Least to greatest: 5,16,27,32.
