

Prime Power Pack

Break composite numbers into prime factors.

GRADE 6 • MA.6.NSO.3.4

MA.6.NSO.3.4 "Express composite whole numbers as a product of prime factors with natural number exponents."

NAME _____

DATE _____

BUILD PRIME PRODUCTS

A prime factorization writes a composite number as a product of prime numbers. Keep dividing or breaking apart factors until every factor is prime. Use an exponent to show a prime factor that repeats.

WORKED EXAMPLE

Express 72 as a product of prime factors with exponents.

1. $72 = 2 \times 36$

2. $72 = 2 \times 2 \times 18$

3. $72 = 2 \times 2 \times 2 \times 9$

4. $72 = 2 \times 2 \times 2 \times 3 \times 3$

Answer: $72 = 2^3 \times 3^2$

PRACTICE 6 problems

- 1** Express 24 as a product of prime factors with exponents.

ANSWER _____

- 2** Express 45 as a product of prime factors with exponents.

ANSWER _____

- 3** Express 56 as a product of prime factors with exponents.

ANSWER _____

- 4** Express 75 as a product of prime factors with exponents.

ANSWER _____

- 5** Express 84 as a product of prime factors with exponents.

ANSWER _____

- 6** Express 100 as a product of prime factors with exponents.

ANSWER _____

APPLY IT Show your work

- 1** The art club orders 96 sticker sheets for a school event. Express 96 as a product of prime factors with exponents.

WORK SPACE

ANSWER _____

- 2** A gaming club has 180 players signed up for a tournament. Express 180 as a product of prime factors with exponents.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Express 1,512 as a product of prime factors with exponents.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Express 24 as a product of prime factors with exponents.	$24 = 2^3 \cdot 3$
2	Express 45 as a product of prime factors with exponents.	$45 = 3^2 \cdot 5$
3	Express 56 as a product of prime factors with exponents.	$56 = 2^3 \cdot 7$
4	Express 75 as a product of prime factors with exponents.	$75 = 3 \cdot 5^2$
5	Express 84 as a product of prime factors with exponents.	$84 = 2^2 \cdot 3 \cdot 7$
6	Express 100 as a product of prime factors with exponents.	$100 = 2^2 \cdot 5^2$

PART 2 • APPLY IT

1. $96 = 2^5 \cdot 3$ Break 96 into prime factors: $96 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$. Write the five factors of 2 as 2^5 .
2. $180 = 2^2 \cdot 3^2 \cdot 5$ Break 180 into prime factors: $180 = 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5$. Use exponents for the repeated 2s and 3s.

CHALLENGE

$$1,512 = 2^3 \cdot 3^3 \cdot 7$$

Accept prime factors written in any order, as long as the factors and exponents are correct. Do not accept a factorization that includes a composite factor.