Prime factorisation and exponent notation

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. Write 60 as a product of prime powers. [2 marks]

Split $60 = 6 \times 10$.

Then $60 = (2 \times 3)(2 \times 5) = 2^2 \times 3 \times 5$.

Answer: $2^2 \times 3 \times 5$

2. Write 108 as a product of prime powers. [2 marks]

Split $108 = 4 \times 27$.

Then $4 = 2^2$ and $27 = 3^3$.

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

3. Write a product of five 7s using exponent notation, then evaluate the power. [2 marks]

Five equal factors give 7^5.

Multiply $7 \times 7 \times 7 \times 7 \times 7 = 16{,}807$.

Answer: $7^5 = 16{,}807$

4. Evaluate $2^3 \times 5^2$. [2 marks]

Calculate $2^3 = 8$ and $5^2 = 25$.

Then $8 \times 25 = 200$.

Answer: 200

5. Use prime factors to find the highest common factor of 48 and 72. [3 marks]

$48 = 2^4 \times 3$ and $72 = 2^3 \times 3^2$.

Use three factors of 2 and one factor of 3.

$2^3 \times 3 = 24$.

Answer: 24

6. Find the whole-number value of n if $2^n \times 3 = 96$. [3 marks]

Divide both sides by 3 to get $2^n = 32$.

$32 = 2^5$, so $n = 5$.

Answer: $n = 5$