



Try these problems before watching the lesson.

1. To express 20 as a sum of different powers of 2, we would write $20 = 2^4 + 2^2$. The sum of the exponents of these powers is $4 + 2 = 6$. If 400 were expressed as a sum of at least two distinct powers of 2, what would be the least possible sum of the exponents of these powers?
2. What is the base 4 representation of the base 2 number 11011000_2 ?
3. The product of integers 240 and k is a perfect cube. What is the smallest possible positive value of k ?
4. The base six number 53_6 is equal to the base b number 113_b . What is the positive value of b ?



First Problem: What is the least positive base-10 integer that can be written as a 4-digit number in base 3 and as a 3-digit number in base 4?

Second Problem: A positive integer q is the product of a prime number and a perfect square. Additionally, q is the product of a different prime number and a perfect cube. What is the least possible value of q ?

 Follow-up Problems

5. What is the smallest positive integer n such that $2n$ is a perfect square and $3n$ is a perfect cube?
6. The base 9 representation of a positive integer is AB and its base 7 representation is BA . What is the integer expressed in base 10?
7. If $2015 + a = b$ for positive integers a and b , both of which are palindromes, what is the smallest possible value of a ?
8. In base b , 441_b is equal to n^2 in base 10, and 351_b is equal to $(n - 2)^2$ in base 10. What is the value of b , expressed in base 10?

 Share Your Thoughts

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