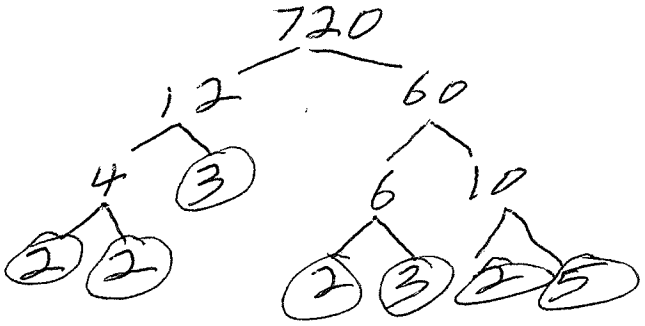
Name SOLUTIONS

1. (2 points) List in increasing order all prime numbers less than 50.

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47

2. (3 points) In order to determine if 409 is prime, a student decides to check if 409 is divisible by any of the numbers 2, 3, 4, 5, ..., 406, 407 or 408. This takes a very long time. A student who uses the *Prime Number Test* would only have to check for divisibility by what smaller list of numbers? Since $\sqrt{408}$ is between 20 and 21, we only have to check divisibility by primes ≤ 20, we check for primes 2, 3, 5, 7, 11, 13, 17, 19

3. (3 points) Beginning with the product $720 = 12 \times 60$, sketch a factor tree to find the prime factors of 720. Write 720 as a product of its prime factors.



$720 = 2^4 \cdot 3^2 \cdot 5$

4. (2 points) The factor trees used by two different students might be different but both should lead to the same prime factorization of a given number. This is due to a theorem which states the following:

Every composite whole number can be expressed as the product of primes in exactly one way except for the order of the factors in the product.

What is the name of this important theorem?

Fundamental Theorem of Arithmetic