

tags: MATA02-2022

## MATA02-2022: Quiz 5 practice [20pts total]

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**During tutorials week 12: April 4-8**

### 1. Roots [12pts]

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- For each of the following three root problems, one of them will be solveable using the method with Fermat's Little Theorem, one of the remaining two will be solveable using the method with Euler's Theorem, and the one left over will not be solveable using either method.
- Solve the two problems that are solveable using those two methods.
- Say why the left over problem cannot be solved using either of the two methods.

1.  $\sqrt[12]{7} \pmod{61}$

2.  $\sqrt[5]{3} \pmod{23}$

3.  $\sqrt[13]{8} \pmod{57}$

**Extra space for problem 1**

## 2. Fermat Primality Testing [8pts]

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We know 41 is a prime number from the Sieve of Eratosthenes. But if you didn't know that, one way to show that it is probably prime is to use the Fermat Primality Test.

Using Fermat's primality test, show that with probability at least  $1/8$ , 41 is prime.

**Extra space for problem 2**