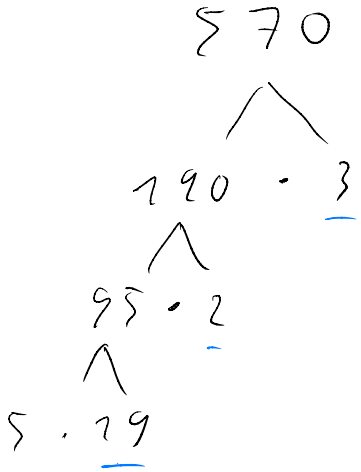
Fall 2022 Math 2603 Quiz #8
Due November 2nd at 11:50 am

Dr. Day's section

The point total is 16 points. There are 3 questions.

Rules: (1) You may use your textbook, online course materials, and your own notes on this quiz, but other resources may not be used and you may not consult with anyone other than Dr. Day. (2) You may not use any web searches, consult any online forums, or use any calculator or computer program to do mathematical computations. (3) You may use electronic devices to prepare and submit your answers and to view electronic versions of your notes and textbook, but you may not use them for any other purpose.

1. (4 points) Find the prime factorization of 570. Show your work. If your answer involves any prime factors greater than 20, explain how you know they are prime.



Prime factors: 5, 19, 2, 3

2. (4 points) Verify that 223 is a prime number. Show your work and explain your reasoning.

223

1.) $15^2 = 225 > 223$

2.) list all prime numbers less than 15 so...: 2, 3, 5, 7, 11, 13

3.) check if 223 is divisible by any of the prime numbers less than 15 so...

223 % 2 = 1, 223 % 3 = 1, 223 % 5 = 3, 223 % 7 = 6, 223 % 11 = 3, 223 % 13 = 2

therefore 223 is prime

for any composite number, (x) it's prime factors must be less than the square root of the number since $\sqrt{223} < 15$, we only have to check if 223 is divisible by any prime number less than 15. If not, then 223 is a prime number.

3. (4 points) Find the least common multiple of $2^2 \cdot 3^3 \cdot 5$ and $2^3 \cdot 3^2 \cdot 7$. (You do not need to fully simplify your answer; writing it as a product of primes is fine.)

$2^2 \cdot 3^3 \cdot 5$ and $2^3 \cdot 3^2 \cdot 7$

$4 \cdot 27 \cdot 5 = 540$

$8 \cdot 9 \cdot 7 = 504$

$3 \cdot 3 \cdot 3 \cdot 2 \cdot 2 \cdot 2 \cdot 7 \cdot 5 = 7560$

4. (4 points) Let $n = 11202_3$. Express n in base 5. (Hint: express it in base 10 first.)

$(2 \cdot 3^0) + (0 \cdot 3^1) + (2 \cdot 3^2) + (1 \cdot 3^3) + (1 \cdot 3^4) =$

$(2 \cdot 1) + (0 \cdot 3) + (2 \cdot 9) + (1 \cdot 27) + (1 \cdot 81) =$

$2 + 0 + 18 + 27 + 81 = 728_{10}$

5^3	5^2	5^1	5^0
125	25	5	1
1	0	0	3

$728_{10} \rightarrow 10030_5$