

# HW21

Sunday, December 5, 2021 5:37 PM

1. Compute the Mobius function  $\mu(n)$  for  $n$  between 1 and 20, and use it to compute the Mertens function  $M(n) = \sum_{i=1}^n \mu(i)$  for  $1 \leq n \leq 20$ .

n	$\mu(n)$	$M(n)$
1	1	1
2	-1	0
3	-1	-1
4	0	-1
5	-1	-2
6	1	-1
7	-1	-2
8	0	-2
9	0	-2
10	1	-1
11	-1	-2
12	-1	-3
13	-1	-4
14	1	-3
15	1	-2
16	0	-2
17	-1	-3
18	-1	-4
19	-1	-5
20	-1	-6

2. Verify the Goldbach conjecture for all even integers between 4 and 30.

4	2,2
6	3,3
8	3,5
10	5,5
12	5,7
14	7,7
16	5,11
18	7,11
20	7,13
22	5,17
24	11,13
26	13,13
28	11,17
30	13,17

3. List of all the twin primes less than 30  
(3,5) (5,7) (11,13) (17,19)

4. Verify the Collatz conjecture for all  $n$  between 2 and 20.

2	1	4										
3	10	5	16	8	4							
4	2	1										
5	16	8	4									
6	3	10	5	16	8	4						
7	22	11	34	17	52	26	13	40	20	10	5	
8	4											
9	28	14	7	22	11	34	17	52	26	13		
10	5	16	8	4								
11	34	17	52	26	13	40	20	10	5			
12	6	3	10	5	16	8	4					
13	40	20	10	5	16	8	4					
14	7	22	11	34	17	52	26	13	40	20		
15	46	23	70	35	106	53	160	80	40	20		
16	8	4										
17	52	26	13	40	20	10	5	16	8	4		
18	9	28	14	7	22	11	34	17	52	26	13	
19	58	29	88	44	22	11	34	17	52	26	13	
20	10	5	16	8	4							