

**SchoolNova, Math 5c**  
**Homework 1**  
**Numbers, Prime Factorization, GCD, LCM**  
**September 17, 2017**

Please provide sufficient details about how you solved the problem. More difficult problems are marked with a \*. If unable to solve a problem, please present your thoughts and partial solution.

1. Find the prime factorization of the following numbers: (a) 1245 (b) 1352 (c) 1683
2. Find the Least Common Multiple (LCM) and Greatest Common Divisor (GCD) of the following numbers, using prime factorization:
  - 42 and 52.
  - 51 and 340.
  - 1012 and 1232.
3. Using the sieve of Eratosthenes, find all prime numbers between 1 and 200. A table of numbers is attached.
4. A package of plastic forks contains 16 forks. A package of plastic knives contains 12 knives. What is the smallest number of packages of each kind you have to buy to get exactly the same number of forks and knives?
5. Consider the number  $2 \times 2 \times 2 \times 5 \times 5 \times 7 \times 11$ . In how many zeros does it end? (Try doing it without performing the multiplication).
6. If it is 7 am now, what time of the day will it be in 27 hours? 127 hours? 11043 hours?
7. If a number is divided by 3 or 5, the remainder is 1. If it is divided by 7, the remainder is 0. What number between 1 and 100 satisfies the above conditions?
- 8.\* Let  $a$  be a counting number.
  - (a) What is the GCD of  $a$  and  $a + 1$ ?
  - (b) What is the GCD of  $a$  and  $a + 2$ ?
- 9.\* A person takes a sheet of paper, then tears it into 4 pieces. He then picks up one of the pieces and tears it into 4 pieces, and so on. Do you think he will ever get exactly 200 pieces?

## Sieve Of Eratosthenes

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200