

Due: Friday May 20 at 6:00 PM.

1. (a) Find all primes less than 140 using the Prime Sieve. Use the "worksheet" provided to show your work.
(b) Suppose you are able to cross out all multiples of any number k that are less than or equal to 1,000 in one minute. How long would it take you to create a list of primes less than 1,000? Assume that all other steps in the sieve process take negligible time. Explain your answer.
2. (a) Use the line through $(-1, 0)$ with rational slope m to find a formula in terms of m for all rational points (points with rational coordinates like $(3/5, 4/5)$) in the first quadrant of the unit circle.
(b) Use the formula from (a) to find a formula for Primitive pythagorean triples. Do this by making use of the fact that if $(\frac{a}{c}, \frac{b}{c})$ is a rational point with fractions reduced to lowest terms, then (a, b, c) is a primitive Pythagorean triple.
3. (a) Prove that if $a \mid n$ and $b \mid n$ with $\gcd(a, b) = 1$, then $ab \mid n$. Show that the condition $\gcd(a, b) = 1$ is essential.
(b) Prove that if $a \mid bc$ and $\gcd(a, b) = 1$, then $a \mid c$.

	2	3	4	5	6	7	8	9	10
1									
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