

## Answer Key

The Sieve of Eratosthenes is an ancient method for finding all primes numbers up to a specified number. It was created by Eratosthenes (275-194 B.C., Greece), an ancient Greek mathematician. Just as a sieve is a strainer for draining spaghetti, Eratosthenes's sieve drains out composite numbers and leaves prime numbers behind. The numbers from 1 to 100 are listed in the table below. We will use The Sieve of Eratosthenes to find all primes up to the number 100 by following the directions below.

### Directions:

1. Cross out 1 since it is not prime.
2. Circle 2 because it is the smallest prime number. Cross out every multiple of 2.
3. Circle the next open number, 3. Now cross out every multiple of 3.
4. Circle the next open number, 5. Now cross out every multiple of 5.
5. Circle the next open number, 7. Now cross out every multiple of 7.
6. Continue this process until all numbers in the table have been circled or crossed out.

You have just circled all the prime numbers from 1 to 100!

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

### Questions:

1. How many prime numbers are there from 1 to 100? **25**
2. List all prime numbers from 1 to 100.  
**2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, and 97.**
3. Which number is the only even prime number? **2**
4. An emirp (prime spelled backwards) is a prime that gives you a *different* prime when its digits are reversed. For example, 13 and 31 are emirps. List all emirps between 1 and 100.  
**13 & 31, 17 & 71, 37 & 73, 79 & 97.**