

## Math History for Precalculus

### Pafnuti Lvovich Chebyshev

1. When did Pafnuti; Lvovich Chebyshev (chuh bi SHAWF) live? *1821–1894*
2. Where was he from? *Russia (Okatovo)*
3. Give an alternate spelling of his last name. *any 1: Chebishev; Tchebycheff; Tchebychev; Tschebytschew*
4. What is the theorem that you studied in this chapter that is named after him? *Chebyshev's Theorem. At least  $1 - \frac{1}{n^2}$  scores in a set of data must lie within  $n$  standard deviations of the mean.*

$\pi(n)$  is an interesting function. It represents the number of primes less than  $n$ .

For example  $\pi(12) = 5$  since there are 5 primes less than 12 (2, 3, 5, 7, and 11).

5. Find  $\pi(8)$ ,  $\pi\left(\frac{97}{4}\right)$ ,  $\pi(e)$ , and  $\pi(71)$ . *4, 9, 1, 20*
6. What did Chebyshev prove about  $\pi(n)$ ?  $\lim_{x \rightarrow \infty} \frac{\ln n}{n} \pi(n) = 1$  *if it exists*
7. When did he prove this prime number theorem? *1850*
8. From this theorem can be deduced Bertrand's postulate. What does the postulate say? *There is always a prime between a number and its double. ( $\forall n \exists \text{ prime } p \ni n < p < 2n$ )*
9. Which two men proved the essential condition of the theorem in question 6? *Jacques S. Hadamard, 1865–1963, and Charles J. de la Vallée Poussin, 1866–1962*

Chebyshev also contributed research on the method of least squares and the law of large numbers, making him a leader in the study of probability and statistics.

One of his students made further contributions to statistics by studying chains of events.

10. Name this student of Chebyshev and give the years of his birth and death. *Andrei Andreyevich Markov, 1856–1922 (also spelled Markoff; he studied Markov chains).*