- All of David's telephone numbers have the form 555–*abc*–*defg*, where a, b, c, d, e, f, and g are distinct digits and in increasing order, and none is either 0 or 1. How many different telephone numbers can David have?

(A) 1   **(B)** 2   **(C)** 7   **(D)** 8   **(E)** 9

2005 AMC 10 B, Problem #18— "How many digits are unused?"

- **Solution (D)** The last seven digits of the phone number use seven of the eight digits $\{2, 3, 4, 5, 6, 7, 8, 9\}$, so all but one of these digits is used. The unused digit can be chosen in eight ways. The remaining seven digits are then placed in increasing order to obtain a possible phone number. Thus there are 8 possible phone numbers.

Difficulty: Medium-hard

NCTM Standard: Number and Operations Standard: Understand numbers, ways of representing numbers, relationships among numbers, and number systems

Mathworld.com Classification:
Number Theory > Special Numbers > Digit-Related Numbers > Digit