**Problem 1.** Let $A = \{1, 2, 3, 4, 5, 6\}$. How many 4-digit numbers LESS THAN 4000 are possible using the digits from the set A, where we are not allowed to repeat the digits?

  (a) 240

  (b) 648

  (c) 360

  (d) 300

  (e) 180

  (f) 150

Problem 2. A coin is tossed five times. How many outcomes are there where either the first two tosses result in a head OR the last two tosses result in a head?

  (a) 14

  (b) 16

  (c) 15

  (d) 17

  (e) 19

  (f) 20

Problem 3. The following is part of the city map of Anytown, USA.
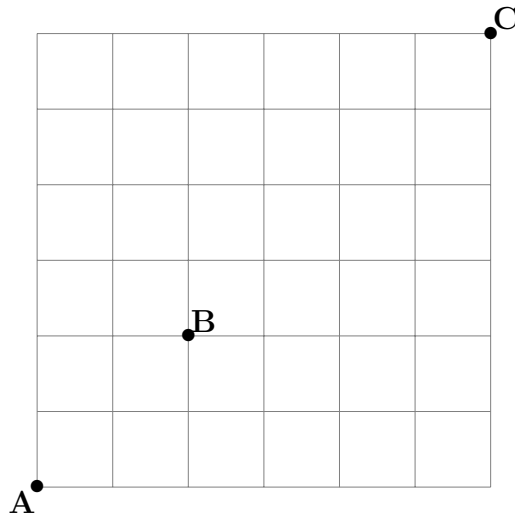
How many paths from **A** to **C** (only traveling east or north) avoid passing through **B**?

(a) $C(12,6)$

(b) $C(4,2)C(8,4)$

(c) $C(12,6) - C(8,4)$

(d) $C(12,6) - C(4,2)$

(e) $C(12,6) - C(2,1)C(4,2)$

(f) $C(12,6) - C(4,2)C(8,4)$

Problem 4. There are 16 tennis players in Dimbledon Open which is played at Broket Club at Abandon, UK. In how many different ways can the players be paired off in eight pairs to play each other in the first round?

(a) $\frac{16!}{(2!)^8}$

(b) $\frac{16!}{(8!)^2 2!}$

(c) $\frac{16!}{8!(2!)^8}$

(d) $\frac{16!}{(8!)^2}$

(e) $16!$

(f) $P(16,8)$