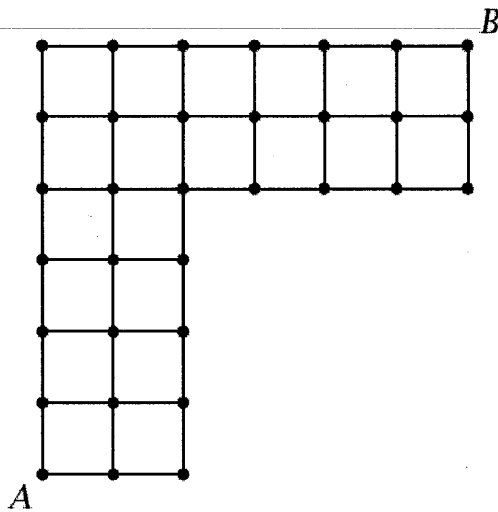


- 1) The street map below shows the only routes in a rectangular coordinate system. Using this map, how many different shortest paths, along streets only, are there from  $A$  to  $B$ ?



- (A) 100      (B) 262      (C) 297      (D) 924      (E) 927

Heron's formula states that the area of a triangle whose sides have lengths  $a$ ,  $b$ , and  $c$  is

$$A = \sqrt{s(s-a)(s-b)(s-c)},$$

where  $s$  is the semiperimeter of the triangle; that is,

$$s = \frac{a+b+c}{2}.$$

- 2) Compute the area of a triangle whose side lengths are 9, 11, and 14.

- (A)  $11\sqrt{17}$       (B)  $12\sqrt{17}$       (C)  $11\sqrt{34}$       (D) 77      (E) 99

3) Let  $N$  be the base-3 number 221221. When  $N$  is written in base-9, what is its left-most digit?

- (A) 1      (B) 2      (C) 6      (D) 7      (E) 8

4) Evaluate  $\frac{1}{20 + \frac{1}{15 + \frac{1}{20 + \frac{1}{15 + \dots}}}}$  to the nearest thousandth.

- (A) 0.047      (B) 0.048      (C) 0.049      (D) 0.050      (E) 0.051

5) Given  $\log_2(\log_2(\log_3 x)) = \log_2(\log_3(\log_2 y)) = 0$ , compute the value of  $x - y$ .

- (A) -1      (B) 0      (C) 1      (D) 2      (E) 17