Q1 How many positive integers m are there such that $m^2 + 2017$ is a perfect square?

A. 1

B. 2

C. 3

D. 4

E. 6

Q2 Let x satisfies the equation $\frac{1}{x} = \frac{1}{2017^2} + \frac{1}{2018^2} + \cdots + \frac{1}{4030^2}$. Which of the following numbers is the nearest to x?

A. 2016

B. 2017

C. 3024

D. 4035

E. 4037

Q3 Let x, y and z be real numbers such that $3x + y = 1$, $3y + z = \frac{1}{2}$, and $3z + x = -\frac{1}{2}$. What is the value of $x + y + z$?

A. 1

B. $\frac{1}{2}$

C. $\frac{1}{3}$

D. $\frac{1}{4}$

E. 0

Q4 Three points A, B, and C have coordinates (0, 4), (6, 2), and (10, 4), respectively. Then ∠ABC equals ______.

A. 105°

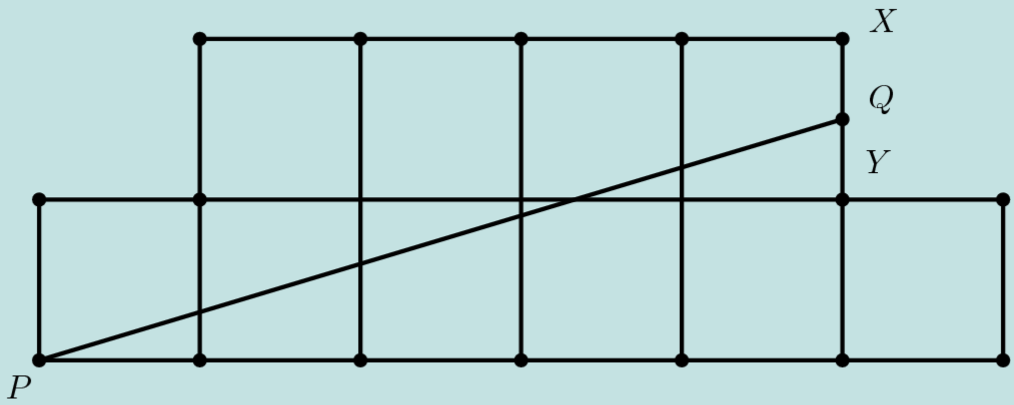
B. 120°

C. 135°

D. 145°

E. None of the above

Q5 The diagram shows an octagon consisting of 10 unit squares. The shapes below *PQ* is a unit square and a triangle with base 5. If PQ divides the area of the octagon into two equal parts, what is the value of $\frac{XQ}{QY}$?



A. $\frac{2}{5}$

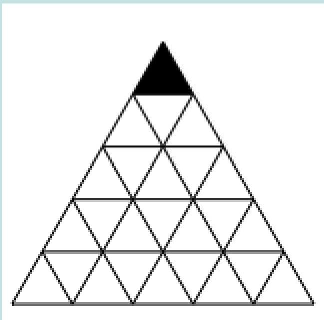
B. $\frac{1}{2}$

C. $\frac{3}{5}$

D. $\frac{2}{3}$

E. $\frac{3}{4}$

Q6 In the figure, two triangles are considered neighbours if they have a side or a point in common. You can only move from one triangle to its neighbouring triangle. How many possible shortest paths are there to the bottom row from the black triangle?



A. 81

B. 153

C. 215

D. 375

E. 945

Q7 The numbers a_1, a_2, a_3 and a_4 are drawn one at a time from the set {0, 1, 2, …, 9}. If these four numbers are drawn with replacement, what is the probability that $a_1a_4 - a_2a_3$ is an even number?

A. $\frac{1}{2}$

B. $\frac{1}{4}$

C. $\frac{3}{8}$

D. $\frac{3}{4}$

E. $\frac{5}{8}$

Q8 Consider the sequence of real numbers (a_n), for n = 1, 2, 3, …,

$a_1 = 2$ and $a_n = (\frac{n+1}{n-1})(a_1 + \cdots + a_{n-1})$ for all n ≥ 2.

Determine the value of $\frac{a_{2017}}{2^{2017}}$.

Q9 For each positive integer x, let S(x) denotes the sum of its digits. Find the smallest positive integer n such that $9S(n) = 16[S(2n)]$.

Q10 Anna and Birger walks at the same constant speed. They start at the same place, facing in the same direction. Birger walked in that direction throughout the time. Anna, however, turned 90 degrees to the right immediately after her first step. Then she turned another 90 degrees to the right immediately after taking two more steps, and yet another 90-degree turn to the right immediately after taking four more steps. She walked this way, doubling the number of steps every time she turns. When Anna was about to turn for the 17th time, both of them stopped.

If the ratio of the distance each has walked to the distance between them at the end is $x: y$ (simplest form), then write down the first four digit of

$x + y$?