5 a)

full: 100 200 300 400 500 600 700 800 900

744 full squares

half: 100

171 half squares

85.5 area

total area: 1029.5

Necklace chain lengths 82 squares

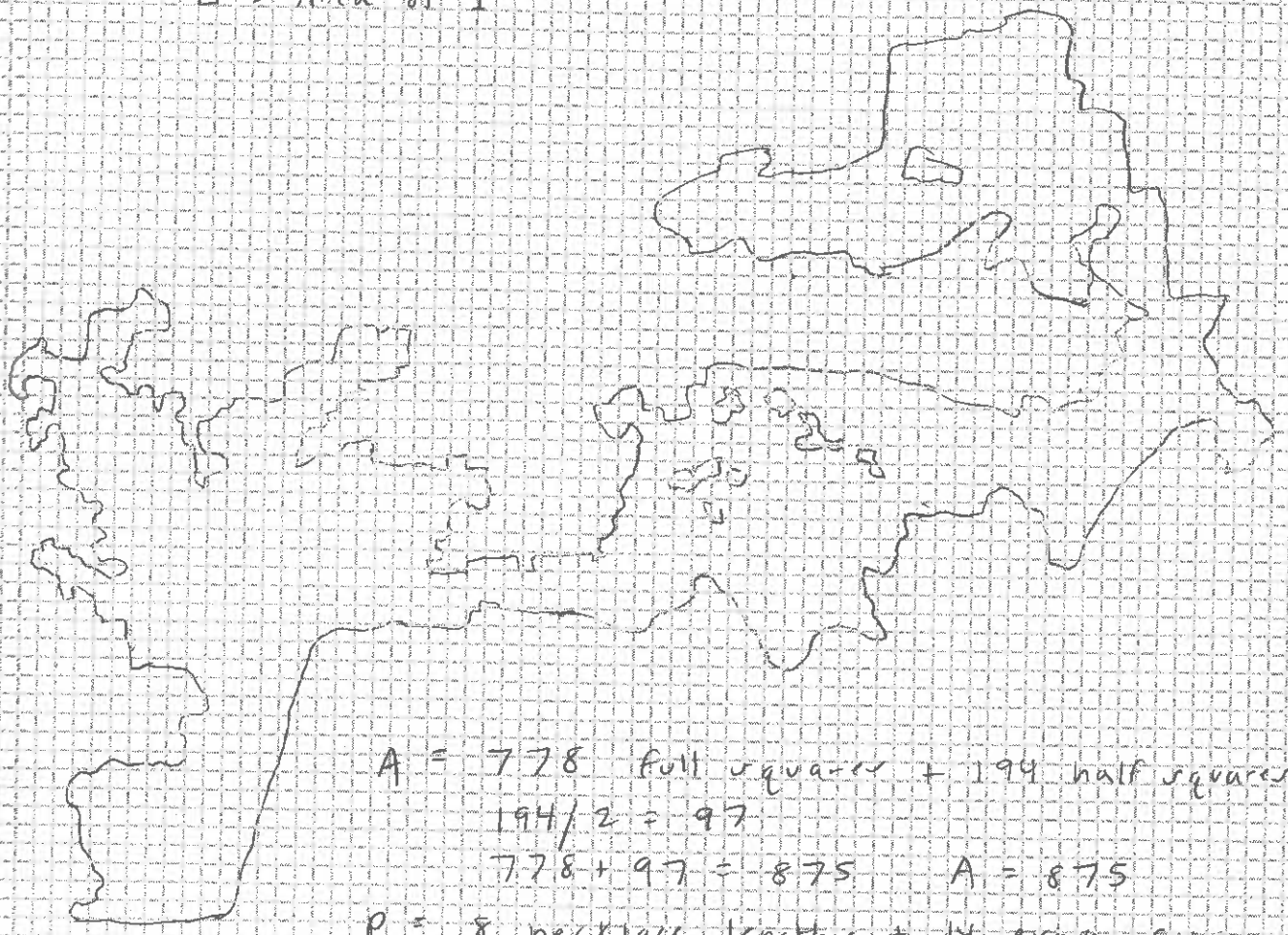
Track shape with roman

5 chain lengths + 7 squares

$(82 \times 5) + 7 = 417$

5b.

□ = Area of 1



A = 778 full squares + 194 half squares

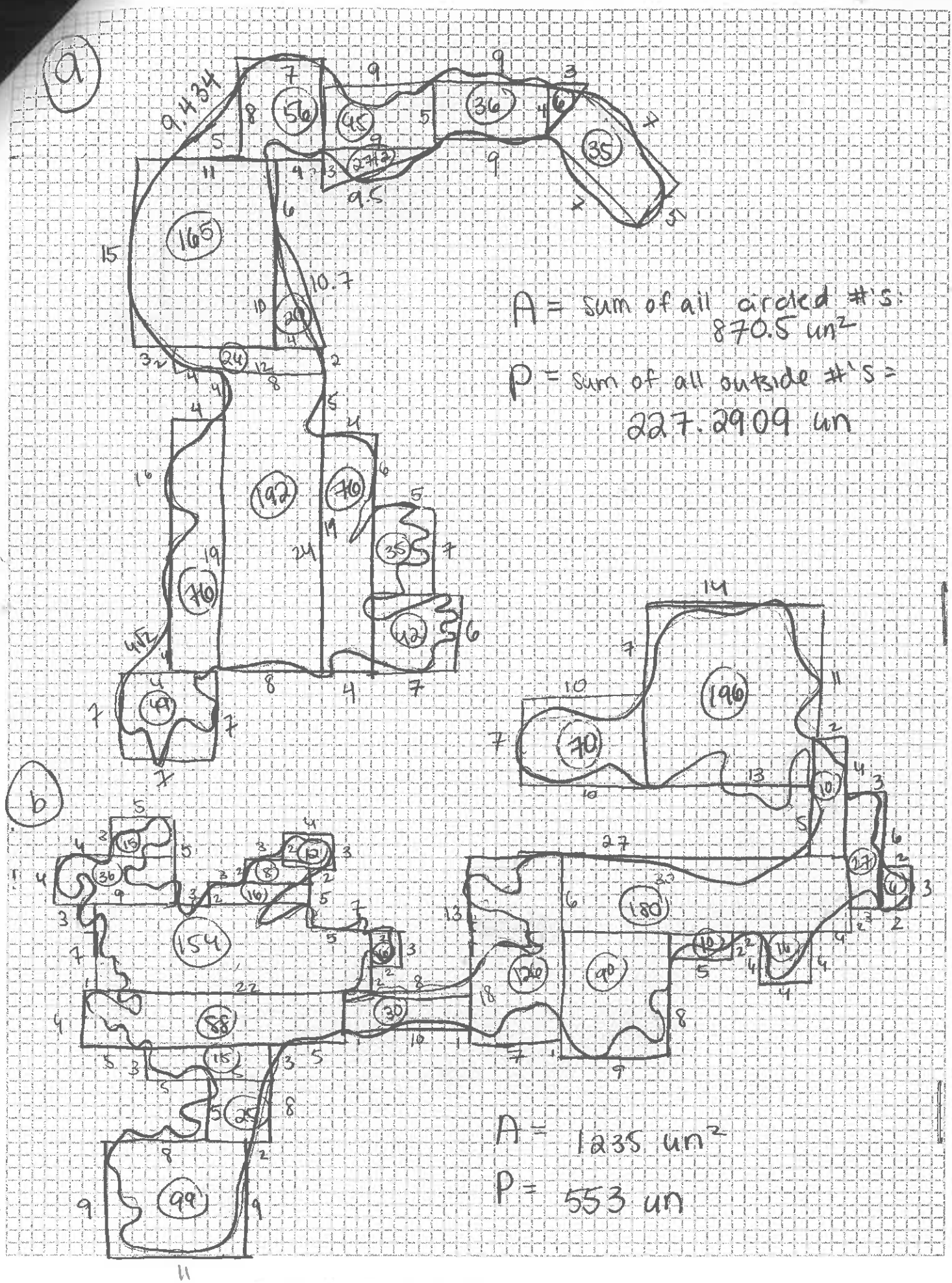
194/2 = 97

778 + 97 = 875 A = 875

P = 8 necklace lengths + 14 extra squares

(8 × 82) + 14 = 670 P = 670

$$C(5) = \frac{400\pi(875)}{(670)^2} \approx 2.449\ldots$$

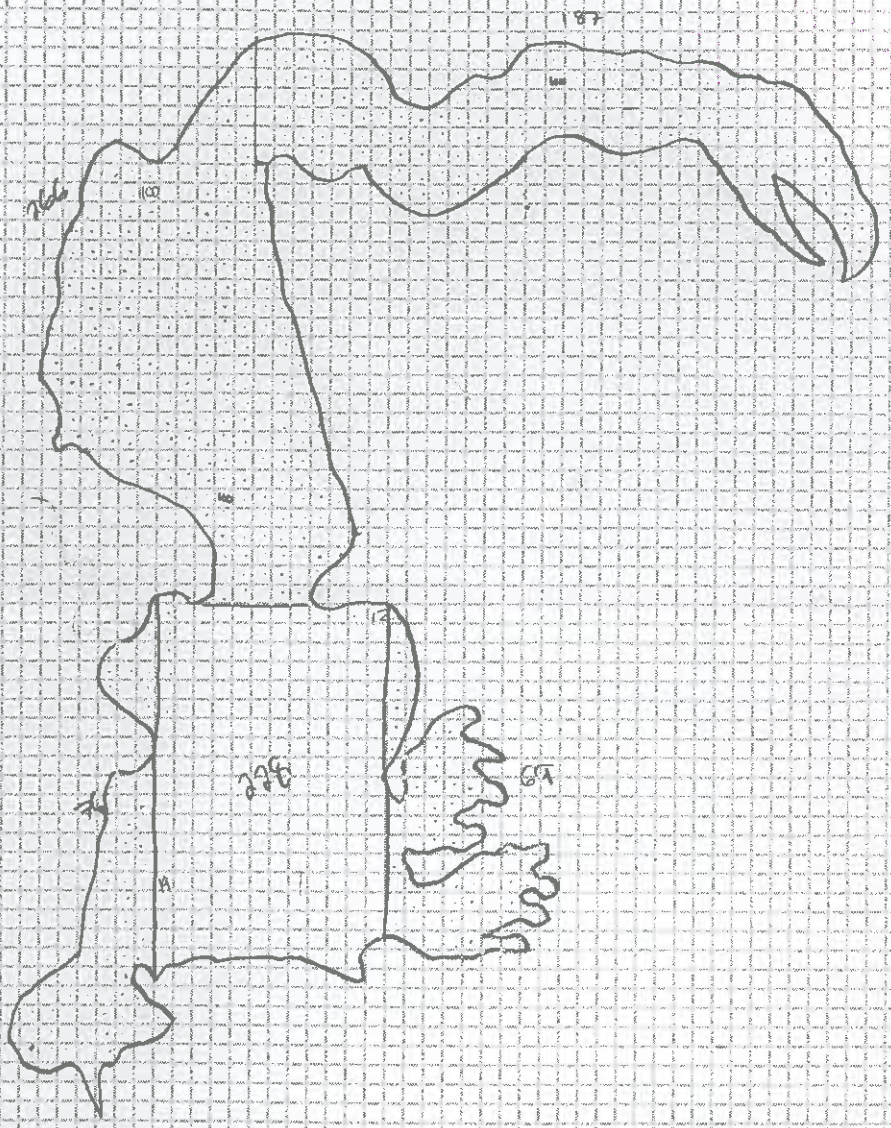

a
A = sum of all circled #'s:
870.5 un²
P = sum of all outside #'s =
227.2909 un
b
A = 1235 un²
P = 553 un

1 square = 1 unit

$C = \frac{4001\pi(A)}{Perim^2} = \frac{4001\pi(826)}{347^2} = C = 8.6204$

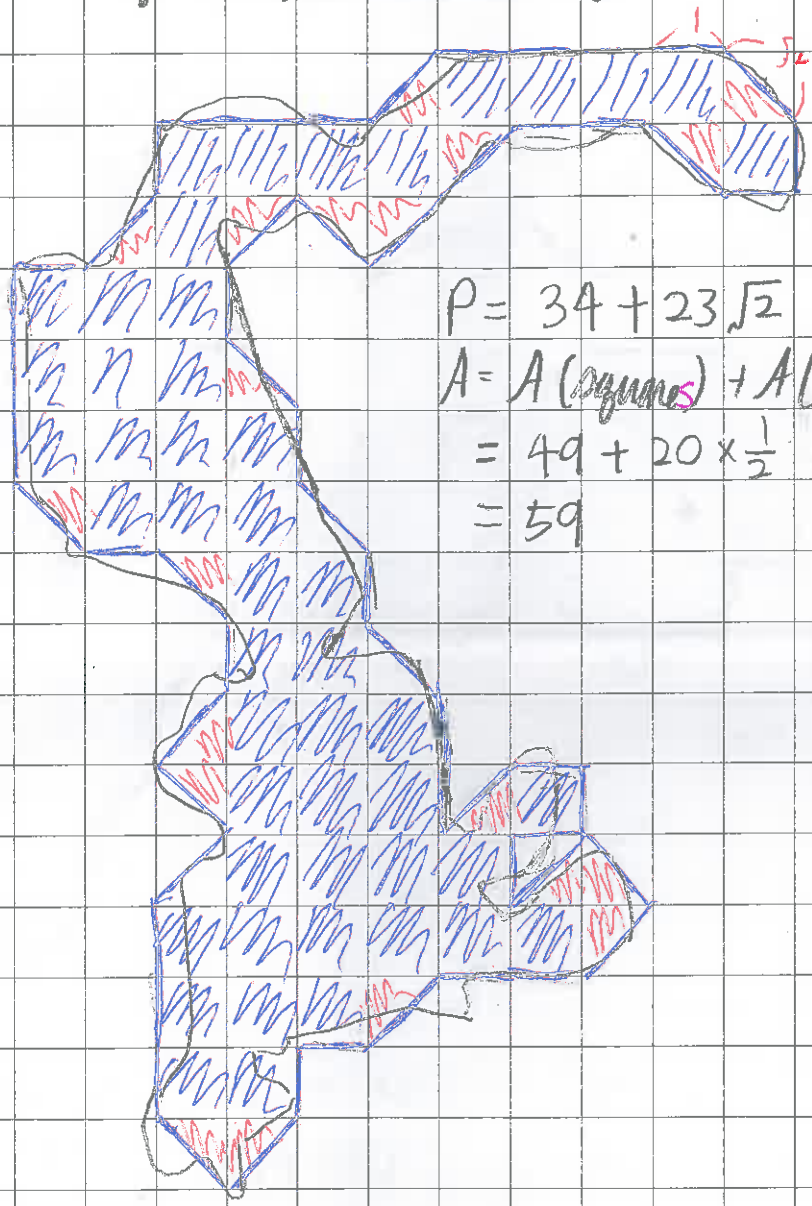
A = 826

P = 347



In order to compute the compactness score you must find the area and the perimeter of the shape. I found the area by counting the number of squares within the shape. I found the perimeter by measuring with a piece of string that's length was equal to 11 squares and went around the shape. The string went around about 3 1/2 times. I got that its compactness score was a very low 8.8204.

#5 (a) Let the side of each square is 1 unit, and the given curve is first outlined and then is roughly re-outlined (in blue line) so that it consists of triangles and triangle



$P = 34 + 23\sqrt{2}$

$A = A(\text{squares}) + A(\text{triangles})$

$= 49 + 20 \times \frac{1}{2}$

$= 59$

$$C = \frac{400\pi A}{P^2} = \frac{400\pi \cdot 59}{(34+23\sqrt{2})} \approx \boxed{16.175}$$