Student Name:_____

Section D

D1
How many factors are there for 2024?

Answer to D1: _____

D2
How many different ways are there to arrange the letters in "ILOVEMATH"?
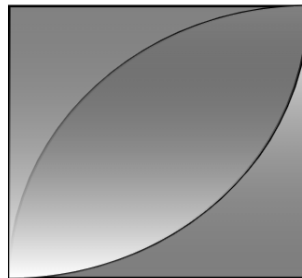
Answer to D2: _____

D3.
Two fair dice are rolled. What is the probability that the sum of the two face up sides is greater or equal to the product of the two face up sides.

Answer to D3: _____

D4
In the square below with side length of 2, two quarter circles are drawn at opposite corners of the square, and that they have radius equal to the side length of the square

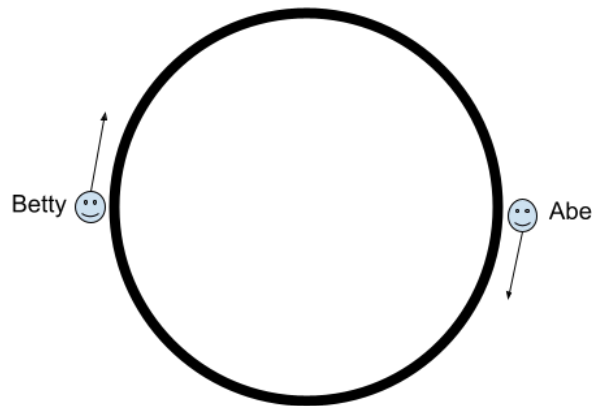Find the area of the intersection between the two quarter circles (the middle area)

Answer to D4: _____

Student Name:_____

D5

On a circular track, Abe and Betty start at opposite sides of the circle facing opposite directions.

Betty decides to bring a moped onto the track, and thus she travels twice as fast as Abe. If Betty completes two full laps, find the number of times she would have passed Abe.
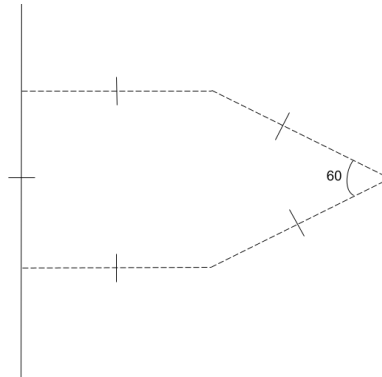
Answer to D5: _____

Student Name:_____

D6

Farmer Bobby is creating a pen that will attach to the side of his barn to house his pigs. He wants a design similar to the one shown below.

The dotted lines represent where new fencing should be. If Bobby has 50m of fence, what is the maximum area that Bobby can enclose within his fence.

Answer to D6: _____

D7

An ant starts at 0 on a number line. Each day starting on day 1, the ant moves 2^n spaces to either the left or right, where n is the number of the day. What is the difference between the farthest and shortest distances the ant could be from 0 after a week?

Answer to D7: _____

D8

Find the closest integer to the infinite expression:

$$2024 + \cfrac{2024}{2024 + \cfrac{2024}{2024 + \cfrac{2024}{2024 + \ldots}}}$$

Answer to D8: _____