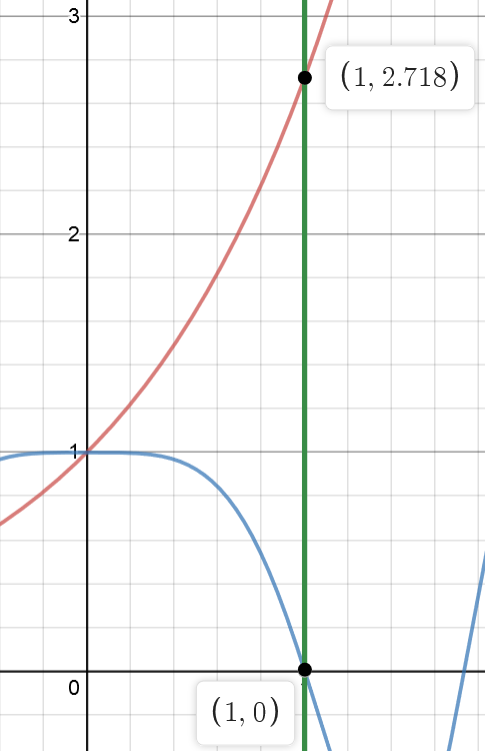
FB1: Find the volume of the solid generated by rotating the region bounded by the curves , and about the y-axis.



When all three curves are drawn, the graph can be seen in Figure A:

As can be seen from the graph, the region is bounded within the   
points To find the volume of the solid, let us  
divide the *y* interval of the region into [0,1] and [1,e]. Then the   
volume of the solid becomes a sum of two different volumes of the   
two disks, for which the formula for calculating the areas S is

S

To find the volumes of both disks, the curves must be rearranged   
in terms of *y*, which gives us the following curves:

,

,

,

where x is positive because the region is in the positive side.

Thus, the volume of the lower disk is

Figure A

and the volume of the upper disk is

Hence, the volume of the whole solid of revolution is the sum of the volumes of both disks:

FB2: Decide whether the set A of positive integers divisible by 17 and B the set of positive integers

divisible by 11 are in bijection.

The set A can be written in the notation , and the set B can be written as . As can be seen, a function can be defined to be

Since *f* has an inverse function

because it is injective (given by the fact it is a linear function) and surjective (given by the fact that the inverse function is defined for all aA), the function *f* is a bijection. Thus, the two sets A and B are in bijection.

FB3: Suppose that are disjoint cycles in the symmetric group for .

a) Let by a cycle of length 3 and a cycle of length 9. What is the order of . Is the permutation even or odd?

b) Show that for every positive integer *n* we have

a)

The order of is 9 because it is the least common multiple of 3 and 9. Using the formula

to find the parity of the permutation, and which gives

and proves that the permutation is even.

b)

By the definition of exponentiating permutations,

This rearrangement can be done because and are disjoint, which means that they commute.