Question 24849 Person A choses a random real number a from 0 to 2 , Person B choses a random real number b from 0 to 2 What is the probability that $|a-b| \geq 1/3$.

Solution. In fact, we get some random point in the square $[0,2] \times [0,2]$, so here we have deal with geometric probability and the probability above is the probability that our point (a,b) is not in the traingles(defined by vertexes) $(0,0), (0,1/3), (1/3,0), (1,1), (1,2/3), (2/3,1)$. We need to compute the area of the square without those triangles $4 - 2 \cdot 1/2(1/3)^2$ equals $E[\mathbb{I}_{|a-b|\geq 1/3}] = \int_{(a,b)\in[0,2]^2, |a-b|\geq 1/3} 1/4 \, da \, db = \frac{4-2\cdot 1/2(1/3)^2}{4} = \frac{35}{36}$.

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