

Name: \_\_\_\_\_

Mark: \_\_\_\_\_

**Mini-math Gr 5/6: Monday, May 17, 2021 (15 minutes)**

**Calculators allowed!**

- (1) Consider a  $5 \times 5 \times 5$  cube with the outside surface painted blue. Alice cuts the cube into  $5^3$  identical, unit cubes, then picks a cube at random. Given that the cube Alice picked has at least one painted blue face, what is the probability that the cube has exactly two blue faces?
- (2) (Challenge) Consider an  $n \times n \times n$  cube with the outside surface painted blue where  $n \geq 3$ . Alice cuts the cube into  $n^3$  identical, unit cubes, then picks a cube at random. Given that the cube Alice picked has at least one painted blue face, what is the smallest value of  $n$  such that the probability that the cube has exactly two blue faces is less than 0.11?