Alicia tosses 3 fair coins. What is the probability that she gets at least 1 head? Express your answer as a common fraction.

Two fair dice are tossed. What is the probability that the sum is 8? Express your answer as a common fraction.

Two fair dice are tossed. What is the probability that the *product* of the two numbers so obtained is divisible by 3? Express your answer as a common fraction.

What is the probability that a randomly selected positive divisor of 2^{100} is a divisor of 2^{50}? Note that for any positive integer N, both 1 and N are divisors of N. Express your answer as a common fraction.

When Mr. Lucky starts betting, he has 3 dollars. On any bet, he wins with probability 1/3 and loses with probability 2/3. If he wins a bet, the total amount of money he has triples. If he loses a bet, he loses 2/3 of the total amount of money he has. Mr. Lucky's objective is to walk away with 27 dollars in his pocket, and he can keep playing as long as he has at least 3 dollars. What is the probability that he reaches his objective? Express your answer as a common fraction.

Alicia chooses at random a multiple of 6 between 1 and 121. Beth chooses at random a multiple of 15 between 1 and 121. What is the probability that they choose the same number? Express your answer as a common fraction.

The figure below is a 4 by 4 grid of points. Each point is 1 cm from its nearest horizontal and vertical neighbours. Two of these 16 points are chosen at random. What is the probability that they do not lie in the same horizontal row? Express your answer as a common fraction.

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Halfy, Perfect, and Thirdy are mathematicians who participate in a target shooting competition to win a gold coin. When they shoot at the target, Halfy hits it 1/2 of the time, Perfect hits it all the time, and Thirdy only hits it 1/3 of the time. They have a total of 5 bullets.

Halfy shoots first. If he hits, he eliminates one of the other two from the competition (at his choice, so as to maximize his chance of winning the gold). Next goes Perfect (if he was not eliminated already). He hits the target, and eliminates any of the other competitors still left (in a way that maximizes his chance of winning the gold). Then Thirdy gets a turn (if he was not eliminated already), and so on, until two of the three are eliminated *or* the 5 bullets are all gone. If two of the three are eliminated, the last remaining person wins the gold. If they run out of bullets before a winner is declared, no one wins the gold. What is the probability that no one wins the gold? Express your answer as a common fraction.