

Answer Key – Prime Time Probability

The goal for this game is to land on prime numbers and collect points. For your first turn, you have a lot of primes available to you.

- On what prime numbers is it possible to land with your first turn? [2,3,5,7,11]
- Choose one of the random number generators available to you for moving and find the probability of landing on a prime and earning points with your first turn. You may use pictures, diagrams, formulas or reasoning.
 - I chose [see chart for question 4]
 - Show your work for finding P(landing on a prime, using the type of random number generator you chose)

see chart for question 4

- Choose another random number generator available to you and find the probability of landing on a prime and earning points with your first turn. You may use pictures, diagrams, formulas or reasoning.
 - I chose [see chart for question 4]
 - Show your work for finding P(landing on a prime using the type of random number generator you chose)

see chart for question 4

- Which option is better? Use probability and logic to defend your answer.

Best Options at the Top

RNG	Probability	Which is Best?
Equal Spinner (3 Primes) (only possible with spinner numbers 2, 3, 4, 5)	$P(\text{landing on a prime}) = \frac{3}{4} = .75$	For the first move in the game this option has the highest probability of landing on a prime
Flip 6 Coins	$P(\text{landing on a prime}) = \frac{41}{64} = .64$	This option is the 2 nd best option for landing on a prime with your first move. However it requires the player to use all six coins which costs points at the end of the

		game
Flip 4 Coins	$P(\text{landing on a prime}) = 10/16 \text{ or } 5/8 = .625$	Flipping 4 coins or 5 coins gives the 3 rd best probability of landing on a prime. Students may not want to choose this option because choosing this option means losing points at the end of the game.
Flip 5 Coins	$P(\text{landing on a prime}) = 21/32 = .656$	
Uneven Spinner with 3 at top	$P(\text{landing on a prime}) = 195/360 \text{ or } .54$	This is the 4 th best option because 195° of the spinner are covered with primes. This will be difficult for students to figure out as the degrees of each section are not readily available.
Uneven Spinner with 2 at top	$P(\text{landing on a prime}) = 190/360 \text{ or } .52$	This is the 5 th best option because 190° of the circle is covered with primes when two is at the top.
Rolling 1 Die	$P(\text{landing on Prime}) = 1/2 = .5$	These are all tied for 6 th place. Students may again shy away from flipping 3 coins as they cost points later in the game.
Flip 3 Coins	$P(\text{landing on a prime}) = 1/2 = .5$	
Equal Spinner (2 Primes)	$P(\text{landing on a prime}) = 1/2 = .5$	
Rolling 2 Dice (add)	$P(\text{landing on a Prime}) = 5/12 = .42$	Adding and subtracting the dice result in the same probability (6 th best option), however when subtracting the die you also have to possibility of not going anywhere.
Rolling 2 Dice (subtract)	$P(\text{landing on a prime}) = 16/36 = 4/9 = .44$	
Equal Spinner (1 Prime)	$P(\text{landing on a prime}) = 1/4 = .25$	Both of these options have the same probability. Again, not using your coins will give you more points at the end of the game.
Flip 2 Coins	$P(\text{landing on a prime}) = 1/4 = .25$	
Flip 1 Coin	$P(\text{landing on a prime}) = 0$	This option will not land you on a prime with your first turn.